

Four solar thermal power generation technologies

What is solar thermal energy?

Solar thermal energy (STE) is a form of energy and a technology for harnessing solar energy to generate thermal energy for use in industry, and in the residential and commercial sectors. Solar thermal collectors are classified by the United States Energy Information Administration as low-, medium-, or high-temperature collectors.

What are the industrial applications of solar thermal energy?

In this article, an extensive review of various solar thermal energy technologies and their industrial applications are presented. The following industries are covered: power generation, oil and gas, pulp & paper, textile, food processing & beverage, pharmaceutical, leather, automotive, and metal industries.

What are the different types of solar energy conversion technologies?

Solar energy conversion technologies may be broadly classified into solar photovoltaic (PV) and solar thermal energy systems. Solar PV systems convert solar radiation into electricity directly and thermal systems convert solar radiation into heat.

How to integrate solar thermal energy systems with industrial processes?

The integration of solar thermal energy systems with the industrial processes mainly depends on the local solar radiation, availability of land, conventional fuel prices, quality of steam required, and flexibility of system integration with the existing process.

What are the different ways of solar energy thermal utilization?

Heating, hot water and thermal power generation are the more common ways of solar energy thermal utilization in EU [13,14]. At present, the solar water heater is the common way in China.

What are the characteristics and economics of solar thermal energy systems?

Kalogirou (2003) analyzed the characteristics and economics of solar thermal energy systems such as flat plate, evacuated tubular, compound parabolic, and parabolic trough collectors for industrial applications such as paper, textile, chemical, food, and beverage industries (temperature range from 60 °C to 260 °C).

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Sun is the most abundant source of energy for earth. Naturally available solar energy falls on the surface of the earth at the rate of 120 petawatts, which means that the amount of energy received from the sun in just one day can satisfy the whole world's energy demand for more than 20 years [5]. The development of an affordable,



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technology system consists of two groups of flat solar collectors and a low concentration solar collector (concentrator collectors).

Solar Thermal Electric Power Generation. Solar tower farm for harnessing the natural thermal energy . Credit: Afloresm via Flickr. Solar thermal technologies are designed to convert the incident solar radiation into usable heat. The process of solar heat conversion implies using energy collectors - the specially designed mirrors, lenses, heat exchangers, which would ...

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