

Application prospects of solar thermal power generation technology

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.

Is solar thermal energy a suitable solution for process heat applications?

Heat energy is preferred as compared to electrical energy to meet the energy requirement of various applications in the process industries. Therefore, the solar thermal energy system is considered to be one of the attractive solutions for producing thermal energy for process heat applications.

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 future prospects of solar energy?

Future prospects of solar technology Solar energy is one of the best options to meet future energy demands since it is superior in terms of availability, cost effectiveness, accessibility, capacity, and efficiency compared to other renewable energy sources .

What are the applications of photovoltaic-thermal systems?

Applications of photovoltaic-thermal systems are summarized in detail. A view on the future of PV/T developments and the future work is presented. The commercial solar cells are currently less efficient in converting solar radiation into electricity. During electric power conversion, most of the absorbed energy is dissipated to the surroundings.

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).

Solar power generation using SPV systems can be used for residential, commercial, industrial, agricultural and traction applications. Recent research focuses on the electrical vehicle driven by solar energy which is a need of the hour technology. Solar cells are the prime important source of energy for lunar missions in powering space vehicles such as ...

Solar energy can be applied for the temperature control of buildings, heat generation for industries, food

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refrigeration, heating of water, irrigation systems, power generation and various other processes, and the overall performance of PV/T systems can be evaluated from the view points of thermodynamics and marketing.

In this review, we investigated the global potential of solar energy technologies, their limitations and benefits, and their future prospects. Accordingly, we concluded that ...

A state-of-the-art power cycle with a primary and a secondary heat transfer fluid and a two-tank thermal energy storage is used as a benchmark technology for electricity generation with...

The Application Status and Prospects of Solar Photovoltaic Power Generation Technology in China Kunqi Zhao, Li Liu, Cheng Xing University of Science and Technology Liaoning, Anshan Liaoning 114000, China Abstract: Solar photovoltaic power generation, as an environmentally friendly energy technology that converts sunlight into electricity, directly converts sunlight into ...

forms and characteristics of solar thermal power generation, introduces the application of solar energy at home and abroad, analyzes its development trends, and puts...

Solar photovoltaic (PV) technology is indispensable for realizing a global low-carbon energy system and, eventually, carbon neutrality. Benefiting from the technological developments in the PV industry, the levelized cost of electricity (LCOE) of PV energy has been reduced by 85% over the past decade [1]. Today, PV energy is one of the most cost-effective ...

The selection of solar technology for a specific application will depend on the required temperature and mode of operation with adequate thermal efficiency at a competitive cost, ranging from USD ...

One of its major applications is in solar thermal power generation (CSP). This storage system is capable of providing the heat energy needed (such as, for electricity generation) during night time or rainy season when solar energy is not available or insufficient. Thus, electricity generation can be synchronized and coupled with the energy grid operation ...

Starting from the current situation of solar thermal power generation in the world, this paper briefly introduces the solar thermal power generation technologies such as ...

Solar thermal systems are used as a heat source for small individual home applications to large-scale applications such as space heating, cooling, water heating, heat for process industries and power generation, etc.

Solar thermal power generation has a bright future globally. This paper describes the main forms and characteristics of solar thermal power generation, introduces the application of...

