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Title: Solar power generation for asphalt heating

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What is a solar asphalt collector?

The cutting-edge technology known as asphalt solar collectors (ASCs), commonly referred to as solar asphalt or solar pavement, is an example of one of the applications that makes use of solar energy. Specifically, these systems combine conventional asphalt surfaces with solar energy harvesting capabilities.

How do asphalt pavements convert thermal energy into electric energy?

Asphalt pavements cover a high percentage of urban surface areas and store huge thermal energy due to high solar radiation. The thermoelectric effect can convert thermal energy into electric energy if there exist thermal gradients.

How to harvest energy from asphalt pavements?

Due to exposure to vehicle loading and solar radiation, asphalt pavements store a huge amount of energy. Therefore, many different techniques have been developed to harvest energy from asphalt pavements, including thermoelectric, geothermal, piezoelectric and electromagnetic, energy harvesting.

Which energy sources can be collected from asphalt pavements?

Among all the energy sources which can be collected from asphalt pavements (thermal energy, mechanical energy and wind energy), thermal energy stands out because the pavement temperature can be reduced when generating thermal energy.

PDF | On Feb 1, 2025, Wei Si and others published Solar energy harvesting and heat collection performance in a novel porous asphalt pavement fluid heat-collecting system | Find, read and cite all ...

Overall, PPFHS expands the heat exchange area between the fluid and the asphalt mixture, thereby increasing its heat collection efficiency and positioning it as a promising pavement ...

This study aims to present a state-of-the-art review of hydronic asphalt solar collectors (HASCs) and propose the best model to enhance the performance of asphalt solar collectors. The ...

The system consists of a solar collector system (thermally conductive asphalt concrete and aluminum sheets for heat conducting), a power generation system (multiple TEGs), and an ...

Parabolic trough solar collectors heating bulk asphalt can effectively reduce fossil fuel consumption, achieving low-emission asphalt heating production. This aligns with the international ...

Urban infrastructure can serve as a sustainable energy source as much as a basis for transport. As an innovative solution, solar-absorbing pavements turns conventional asphalt into an ...

Asphalt solar collectors (ASCs; structures embedded inside pavements for the extraction of heat due to solar irradiation) are modern devices for eco-friendly and energy-optimised roads. ...

The findings of the study concluded that asphalt has the potential to absorb solar energy and store heat energy.

Bobes-Jesus et al. [8] addressed a summary of studies on asphalt solar collectors, and the key findings of this research verify the system"s capacity to decrease the heat of the asphalt ...

Their process involves recovering the heat contained in the asphalt using a fluid circulating in pipes [9]. Among different solar energy recovery systems, the Asphalt Solar Collector (ASC) ...

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