
High-efficiency solar-powered containerized irrigation system for agriculture

Are solar-powered irrigation systems sustainable?

Overview of practiceSolar-powered irrigation systems (SPIS) are a clean technology option for irrigation, allowing the use solar energy for water pumping, replacing fossil fuels as energy source, and reducing greenhouse gas (GHG) emissions from irrigated agriculture. The sustainability of SPIS greatly depends on

What is solar-powered irrigation?

Solar-powered irrigation is a game-changing solution for modern agriculture. By harnessing the sun's energy, farmers can reduce costs, improve efficiency, and protect the environment. Whether for small-scale farms or large agricultural operations, this system provides a reliable, cost-effective, and sustainable way to irrigate crops.

Can solar-powered smart irrigation systems improve food security?

The system's economic analysis demonstrated a payback period of 5.6 years, highlighting its financial viability. This study underscores the transformative potential of solar-powered smart irrigation systems in enhancing food security, conserving water, reducing energy consumption, and mitigating carbon emissions in urban agriculture.

How can solar technology improve irrigation practices?

These systems employ innovative methods and automation to improve irrigation practices, reducing water consumption while enhancing agricultural yield (Kumbhar et al., xxxx). Furthermore, using solar technologies in smart irrigation reduces reliance on fossil fuels, operational costs, and environmental impact.

Therefore, the study aims to advance sustainable urban agriculture by designing and evaluating a solar-powered smart rooftop irrigation system for peppermint cultivation.

As the global population grows and climate change intensifies, the agricultural sector is under increasing pressure to produce more food while reducing its environmental ...

The Internet of Things (IoT) can enable the fourth industrial revolution, significantly boosting production and efficiency in the agricultural sector by optimizing farming practices. ...

Efficient water management is crucial in modern agriculture, especially in regions facing water scarcity. Traditional irrigation systems often result in water wastage, which ...

Irrigation in remote areas - Unlike traditional electric or diesel-powered pumps, solar-powered systems work in off-grid locations, ensuring water access where conventional ...

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The agricultural sector faces challenges such as water scarcity, energy inefficiency, and declining productivity, particularly in arid regions. Traditional irrigation methods contribute ...

This feature optimizes its use in seasonal crop rotations and in agricultural operations spread across different locations. The system operates autonomously, harnessing photovoltaic solar ...

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