

PDEOZE PowerContainer

Combination of curtain wall and solar



Overview

To address the problems of PV facade overheating and air-conditioning cold-heat offset, this study proposed a novel PV double-glazing ventilated curtain wall system (PV-DVF) that combined PV cooling and

How can a curtain wall system increase solar power in tall buildings?

Increasing electrical generation and solar potential of tall buildings can therefore be attained by manipulation of the geometry and other design features of the facades, subject to visual and functional constraints, such as window design and positioning. A curtain wall system represents an efficient way to integrate photovoltaic modules.

How does a photovoltaic curtain wall work?

A photovoltaic curtain wall coupled with an air-conditioning system is designed. Curtain wall cooling and supply air reheating are achieved using heat recovery. System performance is evaluated, taking an office in hot-humid summer as a case. The system increases power output by 1.07% and achieves 27.51% energy savings.

How does a curtain wall increase the temperature of a solar system?

Due to the expansion of PV coverage ratio, more solar energy is captured and converted into electrical energy, while more thermal energy is generated from the curtain wall and therefore increases the system component temperature. Fig. 21.

How does a double-glazing PV curtain wall work?

In the hybrid system, the ventilated double-glazing PV curtain wall provided reheat energy for the subcooled supply air while effectively cooling the PV facade. It efficiently facilitated solar-electric conversion and excess heat recovery (HR), thereby enhancing the electrical and thermal performance of the building.

What is a curtain wall?

The architectural solution chosen for the curtain wall is based on a modular concept, achieving both aesthetic and functional integration with the main ventilation system of the building. The interstitial air cavity of a double-skin glazed façade is used for harvesting heat from solar energy and recovering transmission losses from the indoor space.

Does a curtain wall reduce heat gain from solar radiation?

It can be found that the heat gain through the curtain wall decreases from 394.95 W under 0.1 PV coverage ratio to –144.03 W under 0.9 PV coverage ratio. The increased PV coverage ratio means that a larger area of PV cells is covered with the glazing, thus considerably reducing the heat gain from solar radiation.

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