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Performance parameters of solar air conditioner

Overview

Photovoltaic air-conditioner (PVAC) exhibits the advantages of high energy efficiency and convenient building integration, among solar cooling and heating technologies. The objective of this study is to pro.

Can solar PV air-conditioners reduce primary energy consumption?

Solar PV air-conditioners (PVAC) can contribute extensively to the energy self-sufficiency of buildings and thus to the reduction of primary energy consumption. The paper introduces a universal method to evaluate PVAC performance based on the Chinese national standards for climates and building types.

Why is the grid-connected photovoltaic air-conditioner system selected?

The grid-connected photovoltaic air-conditioner system is selected for investigation owing to itssuperiority toward the off-grid in terms of economic characteristic and system reliability (Li et al., 2017). The rationale of the grid-connected photovoltaic air-conditioner system is displayed in Fig. 1.

What determines the load capacity of a PVAC system?

For a PVAC system, the load capacity of the air-conditioner is determined by thebuilding heating or cooling demand. In the previous section, we studied the performance of PVAC at fixed PV capacities.

What is the economic performance of PVAC?

The economic performance of PVAC depends on the energy performance indicator SCR and the amount of solar radiation. The ROI of PVAC is in the range from0.18 to 0.26 in the context of the Chinese energy market. Buildings with higher SCR are apt to yield larger profits as the electricity purchase price is higher than the selling price in China.

What is solar fraction and self-consumption ratio SF & SCR?

Solar fraction and Self-consumption ratio SF and SCR can be used to evaluate thesynchronization of the generated power and load power in a renewable

energy system. The higher the SF and SCR are, the more self-sufficient the energy system.

Are grid-connected pvacs a part of building energy systems?

In terms of application, grid-connected PVACs arealways regarded as a part of building energy systems. Relevant researches focus on control strategies which can smooth the PV generation (Mammoli et al., 2012), lower the economic cost (Schibuola et al., 2015), and improve the indoor thermal comfort (Zhang et al., 2013).

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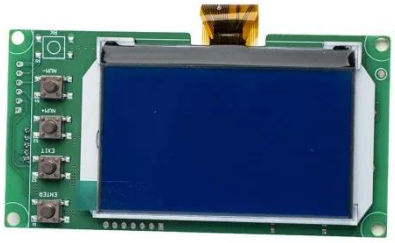

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