Solar panel design for high-rise residential buildings in China

Are solar irradiation resources and BIPV potential of residential buildings in China?
Based on the developed mathematical model, this paper assesses the solar irradiation resources and BIPV potential of residential buildings in different climate zones of China. It is found that roofs are the first choice for BIPV installation, followed by south façades, especially in high-latitude cities, and then east and west facades.

Can solar panels be used in high-rise buildings?
Despite the city's subtropical climate and abundant solar energy resources,along with numerous buildings with potential for PV power generation,architects remain cautiousabout adopting extensive PV panels on the facades of high-rise buildings.

Does China have a potential for solar energy development?
Given the low-density layout and high-intensity development of China's residential blocks,China's residential communities have great potential for solar energy development. However,while BIPV and SWH technologies have been applied on a large scale,related theoretical studies are relatively insufficient.

Does China have a rural residential photovoltaic system?
China's rural residential photovoltaic system has been greatly developedin recent years. However,most existing researches,are difficult to reflect the real development situation of the whole system.

Does China have a centralized photovoltaic system?
,since 2013,China's newly added distributed photovoltaic installed capacity have fluctuated upward,and reached 29.28 GW by 2021,accounting for 53.4% of the total,and exceeding the centralized photovoltaic system for the first time in history.

Can building-integrated photovoltaics (BIPV) be implemented in Shenzhen?
Scaling up the implementation of Building-Integrated Photovoltaics (BIPV) in Shenzhencould effectively reduce the dependence on traditional energy sources and minimize the environmental impact of buildings . Shenzhen is a city with a high population density and limited land area,characterized by a dense concentration of high-rise buildings.

Zhang and Chen (Citation 2017) studied the traditional architectural design of rural residential buildings in the Lingnan region of China, and proposed the design of a combination of tube tile roofs and photovoltaic ...

The proposed simulation method optimizes building PV systems while ...

Emerging designs have introduced the integration of greenery into BIPV ...

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Timber building has gained more and more attention worldwide due to it being a generic renewable material and having low environmental impact. It is widely accepted that the use of timber may be able to reduce the ...

Energy consumption in existing buildings accounts for about 40% of global energy use, which has exceeded the demand of the manufacturing and transportation sectors [1] ina is the world"s largest energy consumer in general, as well as the second largest for all buildings and the largest for residential buildings globally [2].The existing building stocks in ...

23 ????· China is at the forefront of a revolutionary innovation that could reshape both urban architecture and energy consumption. Researchers from multiple esteemed institutions have developed a dynamic vertical photovoltaic ...

In recent years, Multi-Objective Optimization (MOO) has been widely used in architecture and urban planning research and practice to ensure a building"s performance. In architecture design, the building layout design, especially in residential buildings, is becoming in high demand to design high performance buildings in China. These designs ...

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Urban residential blocks have regular characteristics in morphological layout, height and spacing, which are restricted by national and local architectural design standards (Standard for urban residential area planning and design, 2018, Code for fire protection design of buildings, 2014, Design code for residential buildings, 2011, Residential building code, 2005, ...

In this paper, high-rise residential buildings in the cities of Xi"an and Yulin, which have differences in solar radiation, in the western solar enrichment area of China are taken as the research objects. The four objectives of building energy consumption, thermal comfort, life-cycle cost, and life-cycle carbon emissions are weighed using the SPEA-2 algorithm by adjusting ...

There is an urgent need for systematic architectural studies to promote FIPV application for buildings with balconies. This research aims to develop a holistic architectural method supporting the integrative design of FIPV for residential high-rise buildings.

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This paper, focused on high-rise residential buildings located in two areas of Northwestern China with different solar radiation, introduces a multi-objective optimization method, which was implemented through the Grasshopper simulation and optimization platform coupled with a TOPSIS method to find the optimal design solution that minimized the ...

The proposed simulation method optimizes building PV systems while considering power generation efficiency and supports the future design of energy-efficient residential and office buildings in Shenzhen, supporting long-term reductions in carbon emissions.

This paper, focused on high-rise residential buildings located in two areas of ...

Solar water heating system has been widely used in low-rise residential buildings in China, ...

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