

# Solar energy in high-rise residential buildings is a must

Do high-rise buildings use solar energy?

This kind of energy conservation might be meaningfully reached in high-rise building design. In order to evaluate high-rise buildings in terms of solar energy use, the author analyzes the case studies from both passive solar strategies and active solar technologies' aspects.

Can high-rise buildings gain solar radiation?

Finally, high-rise buildings have great potential to gain solar radiations because of their vast facades. Analyzing case studies illustrate that applying solar passive strategies in high-rise buildings have a meaningful effect on reducing the total annual cooling and heating energy demand.

How much solar energy does a building need?

Conversely, the best-performing residential and commercial buildings have EUIs of 50-75 kWh/m<sup>2</sup> a. Only if building heights are limited to 5-10 floors does the available solar energy, and thus the permitted EUI, reach 50-75 kWh/m<sup>2</sup> a.

Can solar passive strategies be used as an alternative in high-rise buildings?

Therefore, by considering the use of solar passive strategies and active technologies as an alternative in high-rise buildings, this study tries to fill some of the current gaps as much as possible and its proposed fundamental message is changing architects' and construction builders' view in dealing with the subject. 1.1. Research methodology

Do daylighting and solar energy affect high rise buildings?

This paper summarizes the benefits and defects of daylighting and solar energy effects on high rise buildings. High rise buildings are seemingly well-tuned to their climate; and they provide a major portion of their own energy requirements through integrated passive design, daylighting, and intelligent control systems.

Should high-rise buildings be net-zero energy?

Only if building heights are limited to 5-10 floors does the available solar energy, and thus the permitted EUI, reach 50-75 kWh/m<sup>2</sup> a. Therefore, we recommend that policymakers not require high-rise buildings to be net-zero energy, unless they are prepared to limit building heights to 5-10 floors. 1. Introduction

One of the most widely used renewable energy is solar energy, the main forms of which are photo-thermal and photovoltaic. With the increasing domestic hot water consumption, the total energy consumption has reached 10%-20% of the total building energy consumption [1].

Therefore, a curved PV facade is recommended to be used for high-rise residential buildings. Buildings are accountable for one third of the world energy consumption, accounting for 40% of all carbon emissions

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and residential buildings account for 27% of global energy consumption and 17% of global carbon emissions (International energy agency 2017).

As urban areas become more populated and densified, it becomes more important to have low-energy high-rise buildings with minimal GHG emissions. On this ...

Globally, building energy consumption has been rising, emphasizing the need to reduce energy usage in the building sector to lower national energy consumption and carbon dioxide emissions. This study ...

Solar power plants have a number of advantages: saving fuel and energy resources; low operating costs; simplicity of design and reliability in work; minimal maintenance; durability; ...

Analyzing case studies illustrate that applying solar passive strategies in high-rise buildings have a meaningful effect on reducing the total annual cooling and heating energy demand. These strategies can be applied and adapted to high-rise buildings by using direct solar gain, indirect solar gain, isolated solar gain, thermal storage mass and ...

Here, the overall objective striven for is to introduce solar energy as a permanent renewable source in order to reduce energy consumption and building initial investment.

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Sustainable buildings have become a key issue for many developing and developed countries in the twenty-first century. The global population is expected to rise from 7.7 billion in 2019 to 9.7 billion in 2050 and will reach more than 10.9 billion by the end of this century [1]. This increase in the global inhabitants will correspondingly increase the demand for water, ...

Improving building energy systems is a major research hotspot due to the rising demand for indoor comfort and buildings' increasing energy consumption. The research object in this work is a high-rise residential building in Nanjing. The photovoltaic system and ground source heat pump system are introduced into the traditional cooling and ...

As urban areas become more populated and densified, it becomes more important to have low-energy high-rise buildings with minimal GHG emissions. On this account, this study evaluates the feasibility of achieving net-zero energy performance by employing solar energy in high-rise buildings in North America.

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Solar power plants have a number of advantages: saving fuel and energy resources; low operating costs; simplicity of design and reliability in work; minimal maintenance; durability; complete safety.

High-rise buildings have a significant impact on the surrounding environment [29], and their shadows significantly reduce the possibility of applying solar energy for surrounding low-rise buildings.

In order to evaluate high-rise buildings in terms of solar energy use, the author analyzes the case studies from both passive solar strategies and active solar technologies" aspects. In the first phase; direct solar gain, indirect ...

High-rise buildings have a significant impact on the surrounding environment. Building-integrated solar water heating (SWH) systems are effective ways to use renewable energy in buildings. Impediments, such as security concerns, aesthetics and functionality, make it difficult to apply SWH systems in high-rise buildings. At present, only China uses SWH ...

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