High-rise wind power generation system

Overview

Are openings in high-rise buildings attracting wind power generation?

With the increasing concerns on energy crisis, openings in the high-rise buildings are getting more attraction for wind power generation. Li et al. pointed out that the openings could result in wind speed amplifications to some extent and would be of benefit for wind turbine installation for the purpose of wind energy utilization [21, 22].

What is wind engineering for high-rise buildings?

At present, wind engineering for high-rise buildings mainly focuses on the following four issues: wind excitation and response, aerodynamic damping, aerodynamic modifications and proximity effect. Taking current research progress of wind engineering for high-rise buildings.

Are building-integrated wind turbines a viable option for high-rise buildings?

In particular, as for high-rise buildings, the installation of building-integrated wind turbines seems to be viable as long as the building aerodynamics can enhance the wind speed fields around the buildings.

Can a wind energy optimization tool be used for high-rise buildings?

In addition, Bayoumi et al. (2013) developed a wind energy optimization tool for high-rise buildings (WEOT) to help designers predict how much power can be harvested from wind turbines installed at strategic locations around a building’s exterior, as shown in Fig. 30.

What is the wind speed ratio of a high-rise building?

The wind speed ratio is less than 1.0 when wind direction exceeds 20°. 4. Conclusions Based on numerical simulation and wind tunnel testing, this study investigated the wind loads and wind speed amplifications on high-rise buildings with openings. The main conclusions are listed as follows:.

What is the current research progress of wind engineering for high-rise buildings?

current research progress of wind engineering for high-rise buildings. Some critical p revious work and remarks are listed at the end of each chapter. From the future perspective, the CFD is still the most promising technique for structural wind engineering.

High-rise wind power generation system

Wind Power Generation and Modeling , part of Power System ...

Nov 9, 2023 · This chapter provides a reader with an understanding of fundamental concepts related to the modeling, simulation, and control of wind power plants in bulk (large) power ...

An Experiment and CFD Simulation for the Application ...

Aug 26, 2023 · This study confirms the viability of applying small wind power generation systems to high-rise apartment buildings, which will contribute to reducing greenhouse gas emissions. ...

Performance assessment of tall building-integrated wind ...

Mar 1, 2016 · The wind power density for tunnel-3 is found to be slightly larger than that for tunnel-4, which is possibly because of the interference effect of a high-rise building adjacent to tunnel ...

Wind Power Generation and Wind Power Generation System

Apr 16, 2018 · This chapter introduces in detail the modern wind power generation system (WPGS), focusing on the widely used cage asynchronous generator system, doubly-fed ...

Wind power prediction using stacking and transfer learning

Apr 4, 2025 · As countries focus more on renewable energy, especially wind power, predicting wind power output accurately is crucial for managing power grids and saving costs.

Harvesting Wind Energy from Tall Buildings

Mar 8, 2022 · Abstract-- Integrating wind energy systems into building design is a small but growing trend, and high rises with their elevated wind speeds seem particularly suited to the ...

Urban High-Rise Wind Power: Feasibility Research of ...

Jun 18, 2025 · BIWT systems offer a solution by harnessing the wind speeds available at urban high-rise buildings, reducing reliance on traditional power grids and minimizing energy ...

Harvesting wind energy in low-rise residential buildings: ...

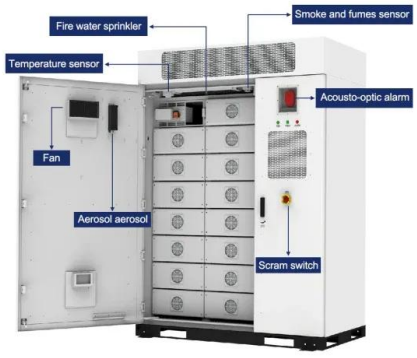
Nov 20, 2017 · In another study, the feasibility of wind power utilization in high-rise buildings of Hong Kong was explored through CFD simulations (Lu and Sun, 2014). This study concluded ...

Implementing wind turbines in a tall building for power generation...

May 1, 2013 · Comparative analysis and discussions of the results for four cases were conducted. The objective of this study is to evaluate the wind speed amplifications in the tunnels for wind ...

Energy-plus Building and Energy-plus Community ...

Jan 10, 2022 · Furthermore, according to the space-time characteristics of productivity and energy consumption of energy-plus building and energy-plus community, the key technologies of ...

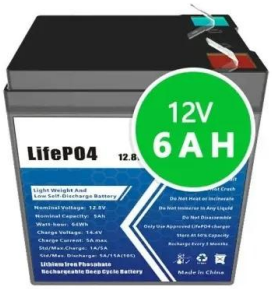


A Review of Hybrid Solar PV and Wind Energy System

Aug 22, 2023 · The integration of hybrid solar and wind power systems into the grid can further help in improving the overall economy and reliability of renewable power generation to supply ...

Early development of an innovative building integrated wind, solar ...

Apr 1, 2012 · An efficient wind-solar hybrid renewable energy generation system with rain water collection feature is designed for urban high rise application. The design is a combination that ...



Adaptive optimal secure wind power generation control for ...

Jan 1, 2024 · Adaptive optimal secure wind power generation control for variable speed wind turbine systems via reinforcement learning Mahmood Mazare Show more Add to Mendeley

Optimizing the Integration of Wind and Solar Power for ...

Jun 6, 2025 · Power generation using the integration of wind and solar at high-rise building energy systems, and power prediction using various environmental parameters.

Energy production features of rooftop hybrid photovoltaic-wind system

Apr 15, 2022 · Rooftop photovoltaic (PV)-wind hybrid systems serve as a promising energy supply source to mitigate environmental concerns and satisfy high energy demands. Most of ...

Early development of an energy recovery wind turbine generator for

Dec 1, 2013 · An innovative idea on extracting clean energy from man-made wind resources with micro wind turbine system for power generation is introduced in this p...

China's First Offshore Wind Farm Using High-rise Pile Cap ...

Apr 13, 2019 · This project has made many records in China's offshore wind power industry: it first adopted anti-typhoon design at offshore booster stations, created innovative engineering ...

Development of a small wind power system with an ...

Jun 15, 2016 · The generation quantity of the small wind power system with an integrated exhaust air duct proposed in the previous section was predicted for application in an actual super high ...

Micro hydro power generation from water supply system in high rise

Oct 15, 2017 · However, researches about the PATs used in the WSS of one individual high rise building for hydropower generation and head reduction have been less studied. In the present ...

Wind energy system for buildings in an urban environment

Mar 1, 2023 · Optimizing the design of building openings by changing the fillet radius and diameter has been found to maximize the efficiency of wind energy generation through building ...

Solar and wind power generation systems with pumped ...

Apr 1, 2020 · To increase the capacity and address the curtailment of wind power plants, PHS has been considered as an effective energy storage solution due to the large energy density and ...

(PDF) Wind engineering for high-rise buildings: ...

Mar 29, 2021 · As high-rise buildings become more and more slender and flexible, the wind effect has become a major concern to modern buildings. At present, ...

The design, simulation and testing of an urban vertical axis wind

Dec 1, 2013 · Dayan [6] has suggested that mounting turbines on the top of high-rise buildings may provide the perfect opportunity for urban on-site generation from wind power. However, in ...

Optimizing power generation in a hybrid solar wind energy system ...

Mar 27, 2025 · The rising demand for renewable energy has recently spurred notable advancements in hybrid energy systems that utilize solar and wind power. The Hybrid Solar ...

Performance assessment of tall building-integrated wind ...

Mar 1, 2016 · In addition to a series of energy-efficient measures, the most eye-catching innovation in the design of Pearl River Tower is the deployment of four wind turbines installed ...

Overview of the development of offshore wind power generation ...

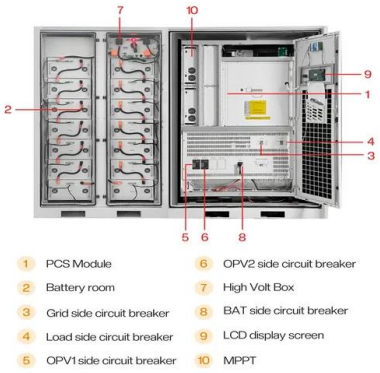
Oct 1, 2022 · Offshore wind power generation has gained continuous attention and has been developed rapidly in China, because of its huge potential to drive the energy transition ...

The Performance of Small Wind Power Generation ...

Aug 25, 2017 · Ha al. et (2005) conducted a study to propose the possibility of the application of wind power generation systems to high buildings such as super high-rise buildings, through ...

CFD assessment of wind energy potential for generic high-rise ...

Sep 1, 2022 · The impact of upstream high-rise buildings on the wind energy potential has not been considered in most of the studies. In addition, only a very few studies focused on the ...



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