

Solar photovoltaic roof of Chinese office building



Overview

The utilization of distributed power generation system plays an essential role in the design of resilient cities. With the ever increasing of efficiency and decreasing of production cost, Photovoltaic (PV) system is becoming a globally welcomed city component. During the design of PV systems, the matching of demand and supply power curve is critical. This paper evaluates the PV usage potential in different neighborhoods of Shanghai through matching th. The utilization of distributed power generation system plays an essential role in the design of resilient cities. With the ever increasing of efficiency and decreasing of production cost, Photovoltaic (PV) system is becoming a globally welcomed city component. During the design of PV systems, the matching of demand and supply power curve is critical. This paper evaluates the PV usage potential in different neighborhoods of Shanghai through matching the rooftop PV generation profile with the electricity demands of office buildings. The typical electricity use pattern of an office building is calculated by clustering method with data from a sub-metering platform, and PV generation curve is generated through simulation approach. Case studies were done in 140 neighborhoods of Shanghai City, and theoretical self-utilization ratio and PV utilization of each neighborhood were calculated.

- PhotovoltaicDistributed energy systemSelf-utilizationRenewable energy

1.National Bureau of Statistics of PRC. China static yearbook of 2017. Beijing, China; <>Google Scholar

2.National Development and Reform Commission. 13th 5-year plan of energy of China. Beijing, China; <>Google Scholar

3.Changhai Peng, Ying Huang, Zhishen WuBuilding-integrated photovoltaics (BIPV) in architectural design in ChinaEnergy and Buildings, 43 (2011), pp. 3592-3598View PDFView articleView in ScopusGoogle Scholar.

Article Content

Unleashing the green potential: Assessing Hong Kong's building solar PV ...

In dense urban areas like Hong Kong, where buildings significantly contribute to electricity consumption and greenhouse gas emissions, the development of cost-effective Building-Integrated Photovoltaics (BIPV) is pivotal. While early research predominantly focused on roof PV potential, recent studies have begun addressing the untapped potential of ...

LCQ13: Installation of solar energy generation systems on ...

Erection of supporting structures for solar photovoltaic (PV) systems on general private buildings (other than New Territories Exempted Houses (village houses) (Note 1) is considered building works regulated under the Buildings Ordinance (Cap. 123) (BO). ... that works directly to the Office of the Permanent Secretary for Housing under ...

Impacts of Roof-top Solar Photovoltaic Modules on Building Energy ...

There are already some studies on the effects of the use of photovoltaic panels positioned on the roof, above the cooling and heating loads of the top floor of urban buildings, a ...

PV can cover almost half of typical office buildings' electricity ...

From pv magazine Germany. How much of the electricity needs of an office building can be met with a photovoltaic system installed on-site? A group of researchers at the Center for Solar Energy and ...

The Role of Solar Photovoltaic Roofs in Energy-Saving Buildings ...

The depletion of global resources has intensified efforts to address energy scarcity. One promising area is the use of solar photovoltaic (PV) roofs for energy savings. This study conducts a comprehensive bibliometric analysis of 333 articles published between 1993 and 2023 in the Web of Science (WOS) core database to provide a global overview of research on ...

Development and Performance of Roof-Based Building-Integrated ...

Abstract. A building-integrated photovoltaic-thermal (BIPVT) system integrates building envelope and photovoltaic-thermal collectors to produce electricity and heat. In this paper, the electrical and thermal performance of roof-based BIPVT systems developed in the recent two decades and their effects on heating and cooling load of the building are reviewed. ...

Potential and climate effects of large-scale rooftop ...

In order to study the RTPV potential of major cities in Northwest China, we utilized the Photovoltaic Geographical Information System (PHOTOVOLTAIC GIS, re.jrc.ecropa.eu/pvg_tools/en/) to estimate ...

Chinese "Sun Dial" is the World's Largest Solar-Powered Office ...

China, constantly straddling the line between super-polluter and clean tech pioneer, has unveiled what for the time being is the world's largest solar-powered office ...

Research status and application of rooftop photovoltaic ...

The rapid development of science and technology has provided abundant technical means for the application of integrated technology for photovoltaic (PV) power generation and the associated architectural design, thereby facilitating the production of PV energy (Ghaleb et al. 2022; Wu et al., 2022). With the increasing application of solar technology ...

Harvesting Sunlight: The Dynamics of Rooftop Solar in Rural China

Solar photovoltaic (PV) technology is emerging as a key component of China's strategy to bridge its electricity gap and achieve its "dual carbon" goals, according to a new AIIB report and forecasts from energy agencies and academic institutions. The efficiency and cost-effectiveness of solar PV are key factors in its rising prominence, with projections indicating its ...

Expanding Solar Energy Opportunities: From Rooftops to Building ...

By generating clean energy onsite rather than sourcing electricity from the local electric grid, solar energy provides certainty on where your energy is coming from, can lower your electricity bills, and can improve grid resilience and reliability, among the many environmental and financial benefits of solar energy. But there's more than one way to generate solar energy on a ...

Semi-Transparent Building Integrated Photovoltaic Solar Glazing ...

The performance of the semi-transparent building integrated PV glazing on office building facade has been investigated in Tanzania's tropical climate. Experimental measurements of the electrical and optical parameters for the system efficacy evaluation were done at various conditions which included cloudy, normal, and clear sky days.

City-scale roof-top photovoltaic deployment planning

In the context of the global carbon neutrality issue and China's carbon neutrality target, there is the trend towards large-scale renewable energy utilization and among these, solar photovoltaic (PV) resources will account for a great proportion due to its advantages on cost and technology. There are two kinds of PV project, distributed solar photovoltaic (DSPV) ...

(PDF) A review of building integrated photovoltaic: ...

The building integrated photovoltaic (BIPV) system have recently drawn interest and have demonstrated high potential to assist building owners supply both thermal and electrical loads.

Research on Key Technologies of Solar Photovoltaic Building ...

Download Citation | Research on Key Technologies of Solar Photovoltaic Building Integration | On December 21, 2020, The State Council Information Office issued a white paper titled "China"s ...

Analysis of the Potential of Urban Buildings to Accommodate Roof ...

where (S_{ava}) is the available roof area. R is the solar radiation of study area, respectively.. 2.3 Urban Building Energy Demand Simulation Urban Building Data Acquisition and Processing. Building geometry data was obtained from Amap, Baidu Map and OpenStreetMap (OSM) with a resolution of 1m.

Shading effect and energy-saving potential of rooftop photovoltaic ...

The discussion presented underscores the tremendous function of solar photovoltaic systems in buildings, especially in enhancing the thermal performance of facades and mitigating their impact on urban climate change . The building rooftop presents a wealth of spatial opportunities for promoting the utilization and conservation of solar energy.

Design and performance analysis of a novel office building ...

This paper describes a novel office building attached photovoltaic (OBAPV) system consisting of the photovoltaic (PV) array, office building, electric vehicle and power grid. ...

Energy Efficiency Optimization of Different Curved Building

With the global promotion of carbon reduction efforts, the integrated use of solar energy in buildings is becoming increasingly challenging (Shen et al. 2023, Kou et al. 2022).Building integrated photovoltaics (BIPV) enables the possibility of buildings as energy producers (Maghrabie et al. 2021).With the increasing development of BIPV technology, emerging BIPV ...

Photovoltaic Installation Project on the Roofs of the Office ...

Polyshine Solar won the cooperation opportunity by its high-quality lightweight and flexible photovoltaic modules, along with a tailored installation solution suitable for TPO rooftops . The weight of Polyshine Solar 's photovoltaic modules is 70% lower than that of traditional glass modules and have a bending radius of up to 0.5 m. With the ...

Electricity production and cooling energy savings from installation ...

DOI: 10.1016/J.ENBUILD.2012.06.032 Corpus ID: 110879773; Electricity production and cooling energy savings from installation of a building-integrated photovoltaic roof on an office building

Gain Solar Company | China BIPV Solar Panel Solution Factory

Solar energy has revolutionized the renewable energy landscape, and solar shingles are at the forefront of this change. Also called solar roof tiles or solar roof shingles, these innovative products are both functional and aesthetic, offering homeowners a way to harness the sun's energy without the bulk of traditional panels.

Green roofs and facades with integrated photovoltaic system for ...

BIPV can be integrated into the building envelope (roof or façade), replacing traditional building envelope materials, and making a significant contribution to achieving net-zero energy buildings. ... Technology, cost, economic performance of distributed photovoltaic industry in China. Renewable and Sustainable Energy Reviews, 110 (2019 ...

Green roofs and facades with integrated photovoltaic system for ...

BIPV can be integrated into the building envelope (roof or façade), replacing traditional building envelope materials, and making a significant contribution to achieving net ...

Roof Tiles

In partnership with SolarPlexus, Onyx Solar presents a cutting-edge solar solution that elevates the sustainability of residential roofs. Our InRoof PV system integrates modern design with practicality, featuring a modular setup that accommodates low-slope roofs and includes inactive components for a cohesive and elegant look. Adopting our solar roof tiles is both ...

Research on the Design of Green Roofs for Office Buildings in ...

The roof is the part of a building that is exposed to solar radiation for the longest period, making green roofs particularly effective in reducing air conditioning energy ...

Full article: Parametric design of photovoltaic louver integrated ...

2.1. Description of the case study. Zhengzhou City (113:42E, 34:44N) is located in the central part of China, which belongs to the area with good solar energy resources and abundant and stable solar energy resources (Liang, Shi, and Gao Citation 2021). Simulations using Honeybee revealed that the west facade of the building could receive more solar ...

An optimization approach to photovoltaic building integration ...

For most office buildings, rooftop PV is not enough by itself to achieve a zero energy building, as the energy that offices needs is usually high and the roof space is limited, most parts of the roof already being used for other purposes; Each part of the building exposed to sunlight can become a photovoltaic power generator and there are almost no limitations today ...

Photovoltaic BIPV Solutions | Onyx Solar

Photovoltaics BIPV refers to the integration of photovoltaic systems directly into the architecture of buildings, such as walls, roofs, windows, or balconies. Unlike traditional solar panels that are added to a building, BIPV is designed as part of the building's structure, offering both functionality and aesthetic value. The photovoltaic modules generate electricity, reducing energy ...

Net-Zero Energy Consumption Building in China: An ...

The headquarters building of the China State Power Investment Corporation (SIPC) makes full use of photovoltaic (PV) modules for green energy harvesting on the effective area of the building's facade and roof, and the data ...

The Pioneer of Solar Energy Application - Building Integrated ...

An 8-kilowatt photovoltaic system was installed on the roof water tank of Shaw Amenities Building (Block VA) to absorb energy from the sunlight for power generation. Later, the same kind of device was also installed on the roof of Tang Ping Yuan Building (Block F-C) for testing different kinds of BIPV systems.

Sun Dial Solar Office Building

China has earned the distinction of having the world's largest solar-powered building. It is situated in Dezhou, Shangdong Province in northwest China. The building covers an area of 75,000-square-meter. The office building is ...

Top 10 Building Integrated Photovoltaics Manufacturers in the World

Photovoltaic Solar (Modules & Kits), Thermal Solar Heating, Concentrating Solar Power (CSP), and (BIPV) So, these were some of the top building integrated photovoltaics manufacturers in the world. Though China has the most manufacturers, other countries are not too far from catching up to the pace.

(PDF) Regional Adaptability Analysis of Solar Roof ...

Regional Adaptability Analysis of Solar Roof Utilization Technologies in China. March 2022; ... The solar PV system mounted on the building roof is used to produce ... For office buildings (5-10 ...

Impact of Renewable Energy Policies on Solar Photovoltaic ...

In 2011, the “SunShot Initiative” was introduced by the Solar Energy Technologies Office (SETO) of the DOE, which aimed to reduce the total cost of PV solar energy systems by 75% by 2020 . As solar PV technology made rapid progress closer to the 2020 targets, the SETO committed to reaching new cost targets for the upcoming decade, ...

The time-advance effect of China's rooftop solar photovoltaics ...

In addition to conventional solar technologies, rooftop solar photovoltaic (RSPV) systems have attracted wide attention as they can not only meet a building's distributed energy ...

Opportunity of rooftop solar photovoltaic as a cost-effective and ...

The installed capacity of distributed PV (mainly RSPV) in China has increased from 4.7 GW in 2014 to 79.9 GW in 2020, the latter of which accounted for 32.5 and 11.3%, respectively, of the cumulative PV capacity in China and globally (National Energy Administration, 2021; International renewable energy agency, 2021).

Contact Us

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