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Obstacle Analysis of Photovoltaic Building Rural Promotion

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Abstract

Photovoltaic buildings are promoted and developed in rural areas in the form of new, efficient and low-carbon clean energy utilization, which is an effective way to achieve the goal of " double carbon. " This chapter first introduces the concept and characteristics of photovoltaic buildings, and then analyzes the obstacles existing in the popularization and application of photovoltaic buildings in rural areas. They are: insufficient government support and tendentiousness, insufficient economic incentive policies, photovoltaic building-related enterprises. There is no upstream and downstream industrial chain, small scale of construction and interest-driven in rural areas, rural residents are bound by traditional concepts and lack of understanding of photovoltaic buildings. Finally, the countermeasures and suggestions for the promotion of photovoltaic buildings in rural areas are put forward from the perspectives of government, enterprises and rural residents.

Keywords

Photovoltaic Building; Rural Promotion; Obstacle Factors.

1. Introduction

At present, photovoltaic buildings have made some progress in urban areas of China, but the development in rural areas is still in its infancy, and the huge rural photovoltaic building market is developing slowly. The villagers are constrained by traditional ideas and lack of awareness of photovoltaic buildings. They have not yet realized that photovoltaic buildings have many advantages such as energy saving, environmental protection, low-carbon green, and land saving. This section analyzes the obstacles to the promotion of photovoltaic buildings in rural areas from three aspects : government, enterprises and residents(2021) [1].

2. The Concept and Characteristics of Photovoltaic Building

2.1. Concept of Photovoltaic Building

Photovoltaic building refers to a solar photovoltaic power generation system that is designed, constructed and installed at the same time as the building and forms a perfect combination with the building. It can keep the indoor temperature of the building at an ideal level and provide electricity for indoor electrical equipment. (2019) [2]Photovoltaic buildings can be divided into two categories : one is the combination of photovoltaic arrays and buildings, and the other is the integration of photovoltaic arrays and buildings. Such as photoelectric tile roof, photoelectric curtain wall, photoelectric lighting roof, etc. In these two ways, the combination of photovoltaic arrays and buildings is a common form, especially the combination with building roofs(2021) [3]. On the one hand, photovoltaic arrays equipped with photovoltaic buildings are usually installed on the roof or exterior walls of houses, occupying less space. On the other hand, the photovoltaic array can absorb the energy of solar radiation outside the building, reduce the temperature outside the building, and maintain the wall heat collection and indoor cooling load at a stable level, thus indirectly achieving the purpose of energy conservation and emission reduction(2022) [4].

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2.2. Characteristics of Photovoltaic Buildings

As one of the important ways to realize building electrification and low carbonization, photovoltaic building has the advantages of short construction period, less construction site work, high standardization, green and low carbon environmental protection(2023) [5]. There are also some shortcomings in its development process, such as strong technical professionalism, high technical requirements for on-site installation workers, high uncertainty of transportation risks of photovoltaic components and accessories, high production costs, and low consumer awareness of photovoltaic buildings.

3. Analysis of Obstacles to the Promotion of Photovoltaic Buildings in Rural Areas

3.1. Government Level

(1) Policy support is insufficient and tendentious. Although photovoltaic buildings have achieved certain development in urban areas, the development of photovoltaic buildings in rural areas has been in a primitive state. At present, most of the relevant policies focus on urban areas, and the policies in promoting the rural photovoltaic construction market are relatively lagging behind. However, the grass-roots government 's implementation of the national photovoltaic construction policy is not in place, and there is a lack of targeted policy guidance for rural photovoltaic construction. The economic and environmental benefits brought by its development have not been fully recognized(2019) [6]. There are no clear regulations on the construction layout planning, equipment maintenance, quality supervision, policy incentive mechanism and other aspects of photovoltaic buildings in rural areas, and the acceptance and evaluation standards of photovoltaic buildings are not perfect.

(2) Economic incentive policies are insufficient. The economic incentive policies of photovoltaic buildings mainly include electricity price subsidies, installation subsidies and tax incentives. In the early stage of the promotion of photovoltaic buildings in rural areas, the biggest factor hindering its promotion is the cost problem. In the absence of interest protection, it is difficult to generate investment attraction for related enterprises, and the high construction cost has kept rural residents in a wait-and-see state, resulting in slow development in rural areas(2022) [7].

3.2. Enterprise Level

(1) There are few related enterprises involved in the photovoltaic industry in rural areas, and no upstream and downstream industrial chains have been formed. The design, transportation, production and construction of photovoltaic building components in rural areas have not yet formed a complete industrial chain. The upstream and downstream enterprises are disconnected from each other and operate independently(2022) [8]. Due to the lack of attention, in the research and development of rural photovoltaic building related technology and the training of technical personnel, the investment of enterprises is relatively small ; participation in rural photovoltaic construction projects lacks enthusiasm and relevant experience.

(2) The construction scale of photovoltaic buildings in rural areas is small, the installation rate is low, and the interest drive is small. Due to the characteristics of rural houses, the construction area, width and length of each village house are completely different, which leads to the difficulty of large-scale and standardized manufacturing of photovoltaic modules. The time when villagers want to build houses is different, resulting in a small scale of photovoltaic building construction in rural areas ; it is difficult to form mass production, high production cost and low profit, which leads to the low enthusiasm of relevant enterprises to participate in the construction of photovoltaic buildings in rural areas.

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3.3. Residents Level

(1) The villagers are bound by traditional ideas. The construction of traditional buildings has taken root in the hearts of rural residents and is unwilling to accept new things. Most villagers believe that it is safer and more reliable to find some local construction workers with construction experience to build their own houses. Due to financial constraints, do not want to spend too much money to build more energy-saving environmental protection, beautiful high-quality housing ; for photovoltaic buildings, most rural residents hold a ' wait and see ' mentality and are reluctant to try the first ; compared with the subjective needs of individuals, it is more inclined to the behavior and attitude of others to determine whether they adopt photovoltaic technology.

(2) Rural residents do not understand photovoltaic buildings. Most rural residents do not understand new things. At first, they have resistance, worry about affecting light and generating radiation. They refuse to use photovoltaic buildings only because photovoltaic arrays need to be placed on the roof of their own houses. Suspicious about its safety, quality and maintenance ; the installation cost of photovoltaic components is high, and the high cost of use has prompted most rural residents to object, thus ignoring the long-term economic, green and environmental benefits of rural areas.

4. Countermeasures and Suggestions for Rural Promotion of Photovoltaic Buildings

4.1. Establish a Policy System for Photovoltaic Buildings, Strengthen Policy Support and Implementation Efforts

The government should plan mandatory promotion policies, and clearly specify the installation and construction of photovoltaic buildings and photovoltaic arrays for projects suitable for photovoltaic buildings, such as poverty alleviation relocation and renovation of old houses. In addition, it is necessary to strengthen the supervision of policy implementation to ensure the implementation of relevant policies. Therefore, it is necessary to establish a policy system corresponding to photovoltaic buildings, pay attention to the development planning of rural buildings, and lay a solid foundation for the smooth promotion of rural photovoltaic buildings.

4.2. Opening up Preferential Channels for the Construction of Photovoltaic Buildings and Providing Subsidies for Special Design Funds

The government should strengthen its publicity efforts for rural residents. While using media such as television, newspapers, and the internet to carry out science popularization, it should also regularly organize and hold rural propaganda activities. The detailed process of photovoltaic building construction, the advantages of photovoltaic building housing, and safety issues that residents are concerned about should be demonstrated to rural residents through video playback, deepening their understanding of photovoltaic buildings.

4.3. Improve the Quality Acceptance and Maintenance of Photovoltaic Buildings in Rural Areas

At present, the main contractors of self built houses in rural areas are still local construction teams, which lack technical knowledge related to photovoltaic buildings and are unable to carry out post maintenance work for photovoltaic buildings. Add professional housing quality inspection and subsequent maintenance services for the rural residential construction market. During the use of photovoltaic buildings, regular free quality and safety inspections are conducted on the photovoltaic facilities inside each building to minimize rural residents' concerns about the quality and safety of photovoltaic buildings.

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4.4. Seize the Pain Points of Residents and Highlight Product Advantages

Photovoltaic construction enterprises must pay attention to the needs of residents for the use of photovoltaic buildings when developing and applying rural photovoltaic components. On the premise of meeting the living needs of villagers, optimize the building structure to enhance the comfort of their living, thereby effectively alleviating the problems of cold winters and hot summers in rural areas.

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