

Environmental Significance of Distributed Photovoltaic Power Generation

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ABSTRACT: This paper discusses the advantages of distributed photovoltaic power generation and strategic position, and distributed photovoltaic power generation environmental significance. From present analysis, Chinese power market is still in the traditional centralized power generation and the outlook for 2020, distributed photovoltaic power plants will account for only 17% of total power station; the way of traditional power generation will cause great damage to the environment and centralized power generation and distribution of electrical area is very uneven. From the perspective of power consumption, distributed photovoltaic power generation is now more in line with the concept of environmental protection.

KEY WORDS: solar cells; distributed; photovoltaic power generation.

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I. The strategic position of developing distributed generation

Our country faces three major strategic challenges:

- 1) Environmental pollution and the deterioration of the atmospheric environment.
- 2) Once energy is faced with the prospect of exhaustion, human beings must seek alternative energy.
- 3) From the perspective of energy-security, the energy structure is transferred from coal and oil to clean energy such as renewable energy and nuclear energy.

Under the promotion of these three strategic demands, China has begun to make full use of renewable energy, and photovoltaic power generation has been developing vigorously in recent years as an important direction in renewable energy. The PV system is divided into two types, one is the centralized PV power system, mainly the large ground station in the vast ground ten more than two MW installed; distributed photovoltaic power generation system, mainly^[1] photovoltaic power generation system installed on the roof.

The rest of the world photovoltaic power generation system accounted for more than 80% of the total mainly in the distributed generation. In China, centralized photovoltaic power generation system account for most of the power generation, the main reason is that China's policy to promote national policy oriented, and the operation mode of this top-down, more easily and quickly promote the construction of centralized PV system. There are some problems about centralized PV system in our country. Desert areas are in the west of china and the solar energy resources in desert area is very good and convenient for the development of centralized photovoltaic power plants. However, in these areas, the power consumption is poor and the power generated by the photovoltaic system need to transfer in long distance. However, the power transmission capacity of our country is limited and the power is fluctuant, which makes the large-scale power transmission more difficult.

Therefore, in west areas, it is a common phenomenon that the photovoltaic power generation has been abandoned. While in the developed eastern regions, the power load is very high, but not a large area of useless land supply installation of centralized PV power plant use. In order to solve this kind of large-scale centralized power generation and unbalanced load of large-scale application, in the eastern region to develop distributed photovoltaic system is of great significance^[2].

II. Advantages of distributed photovoltaic power generation

- (1) High revenue, distributed photovoltaic power plant annual income of 10% or more, the income of ground power plants may be higher.
- (2) Green and low-carbon, a small distributed generation system with an installed capacity of 3 kilowatts. The annual power output is about 3650 degrees (there are differences in the amount of power generation in different places), and it can generate 91250 degrees in 25 years, which is equivalent to the saving standard 36.5 tons of coal, 94.9 tons of carbon dioxide and 0.8 tons of sulfur dioxide^[3].

(3) Strong support from the government. In July 2013, the State Council issued "Several Opinions on Promoting the Healthy Development of Photovoltaic Industry", clarifying the 20-year implementation period of on-grid electricity price subsidy. In August 2013, the NDRC released the "Proposal on Promoting Price Leverage Notice on the Healthy Development of Photovoltaic Industry "clarified the distributed subsidy policy of 0.42 yuan. In September 2013, the Ministry of Finance released the " Circular on the Policy of Value-added Tax of Photovoltaic Power Generation ", specifying that distributed value-added tax will be refunded 50% on time, and 2014 In September, the National Energy Administration released the Notice on Further Implementing the Relevant Policies of Distributed Generation and clearly defined the distributed photovoltaic power generation. In March 2015, the National Energy Administration issued the Notice on Issuing 2015 Implementation Plan of Photovoltaic Power Generation In 2015, the installed capacity of PV in China will not be less than 17.8GW.

(4) The trend of the times, all countries are vigorously develop photovoltaic power generation, the widespread application of new energy is the trend of the times, Germany, for nine consecutive years to maintain the world's largest photovoltaic power generation position. Photovoltaic has become Germany's largest installed base of power, the United States, in 2014, photovoltaic power generation accounted for 32% of the total capacity of new power generation equipment in the United States, second only to natural gas thermal power generation, Japan, its custom The official goal is that the PV installed capacity will reach 28GW by 2020, and Japan is still actively studying the feasibility of space photovoltaic power plants. China, in 2013, the cumulative installed capacity of photovoltaic power generation in China reached 11.3GW and the installed capacity in 2014 reached 28.05GW^[4].

III. The impact of distributed photovoltaic power generation on the environment

Solar panels are the core part of a distributed PV system and the most expensive part of a solar power system. Its function is to convert solar energy into electrical energy or send it to the battery to store or drive the load. Solar energy, Health of clean energy, solar power generation is safe and reliable, pollution-free, noise-free, beautiful environment, low failure rate, long life, and its energy-saving emission reduction benefits, environmental benefits, and social benefits are very significant solar energy efficiency is mainly reflected in the photovoltaic building Reducing the consumption of conventional energy during operation, its environmental benefits are mainly reflected in the emission of any harmful gases. Compared with thermal power, solar energy does not emit soot, carbon dioxide, nitrogen oxides and other harmful substances while providing energy, as shown in Figure 1 Shown is the system block diagram of the impact of distributed photovoltaic power generation on the environment^[5-6].

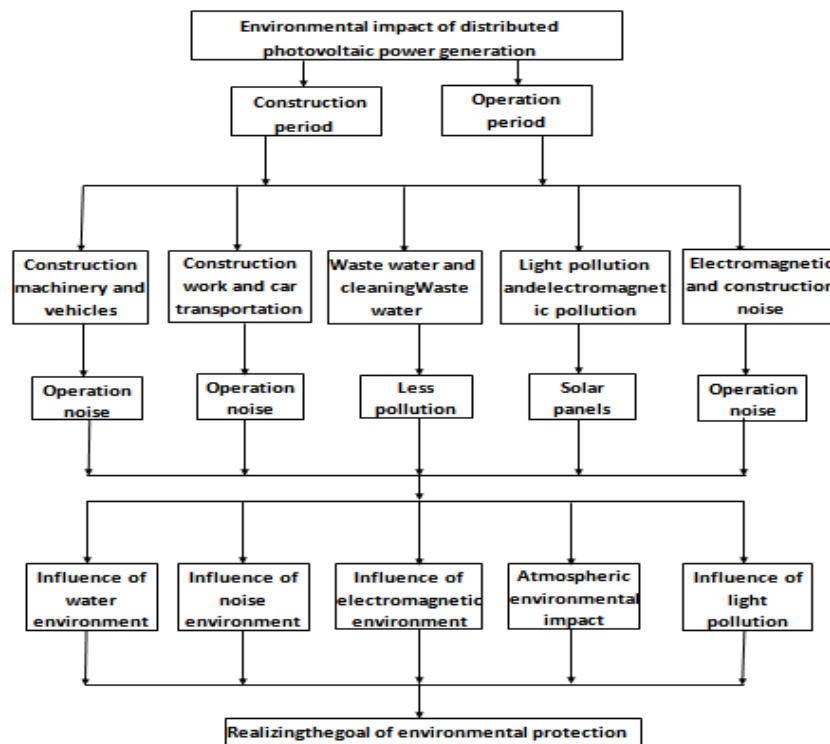


Fig.1.A system block diagram for the impact of distributed photovoltaic power on the environment

Distributed although expensive, but can use renewable energy, less pollution, good environmental benefits, electricity is convenient, can alleviate the local electricity shortage, see, from the perspective of flexible consumption, small investment, low threshold, high rate of return, have the characteristics of system independent, self control, high safety can make up; lack of power system stability, can continue to supply at the time of the accident, become an important supplement to the centralized power supply indispensable, distributed photovoltaic power generation can overcome environmental pollution; no noise, no pollution to the environment; to ease the power shortage in the local area to a certain extent, start and stop fast, peaking performance is good. Transmission loss is low, no need to build the power station, simple operation, easy to realize automatic.

IV. Conclusion

- 1) The distributed photovoltaic power generation is a clean energy power generation project, which can maximize the economic benefit.
- 2) Compared with traditional power generation and centralized power generation, it has no emissions of soot, sulfur dioxide, nitrogen oxides, carbon dioxide and solid waste, and has good environmental benefits.
- 3) Not only to optimize the structure of energy strategy, improve the local ecological environment, but also improve the quality of atmospheric environment, has better promotion value, distributed photovoltaic power generation is not only the best form of large-scale photovoltaic applications, is also a very important way to solve China's power production is balanced.

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