

Analysis of the Current Situation of Solar Energy Utilization and Suggestions for Popularization and Promotion in the Shannan Region of Tibet

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Abstract

The Tibet region is rich in solar energy resources. This article conducts research and analysis on the current situation of the use of new energy in thirteen primary and secondary schools in the Shannan region of Tibet. It elaborates on the relevant problems in the development and utilization of solar energy in the Shannan region of Tibet, and proposes the current situation of solar energy resource utilization in the Tibet region and planning suggestions for promotion and popularization.

Keywords

Shannan, Tibet; Solar energy; Utilize the current situation; Promotion suggestions.

1. INTRODUCTION

The widespread use of fossil fuels such as coal and oil has led to environmental pollution, and the total storage of these non renewable resources is also continuously decreasing. Solar energy, as a green and permanent energy source, has promising prospects for development, but there are also some issues with the promotion and popularization of new energy. Therefore, this article will analyze the development status of the solar energy field in Tibet and the popularity of new energy concepts in Tibet through research data, in order to identify two issues that hinder the promotion and popularization of new energy in Tibet, and propose prospects for promoting solar energy in Tibet.

2. THE DEVELOPMENT STATUS OF SOLAR ENERGY IN TIBET

Solar energy is an inexhaustible source of environmentally friendly energy. Due to its long sunshine duration, diverse terrain, scattered residential areas, and other conventional energy shortages, the full and effective utilization of solar energy resources in Tibet has important practical significance for energy conservation, environmental protection, and alleviating energy shortages. Meanwhile, with the significant improvement of people's living standards, promoting the new energy industry project in Tibet can not only efficiently utilize energy to meet electricity and heating needs, but also effectively protect the ecological environment and improve people's living standards. Tibet has the highest solar energy resources in the country and is also one of the most abundant regions in the world. The average annual solar radiation in most areas of the region reaches 6000-8000MJ/m², which is about twice that of the plains at the same latitude. At the same time, the sunshine duration is also a high value center in the country, with an average annual sunshine duration of 3300-3600 hours, distributed in an increasing pattern from east to west. The proportion of direct radiation to total radiation is 56% -78% throughout the year, and can reach 71% -78% in summer. The utilization of solar energy in the Tibet Autonomous Region began in the early 1980s, including solar thermal utilization

and solar photovoltaic power generation. Traditional solar energy utilization includes solar stoves, solar water heaters, and passive solar houses. As of 2015[1], a total of 250000 solar stoves were promoted in Tibet, with a promotion area of 450000 square meters for solar water heaters, about 420000 square meters for passive solar houses, and about 6 million square meters for solar greenhouses.

At present, the scale of China's solar energy industry has ranked first in the world, making it the country with the largest production and usage of solar water heaters and an important producer of photovoltaic modules in the world. Photovoltaic power generation technology and solar thermal utilization technology have taken the lead in the world, providing new solutions and approaches to meet China's continuously growing energy demand, and also providing strong support for the development of solar energy in Tibet. Through the investigation and analysis of the current situation of the use of new energy in thirteen primary and secondary schools in the Shannan region of Tibet, it was also found that there are many problems in the development of the solar energy field in Tibet. The promotion and popularization of solar energy in Tibet are widespread, but the effective utilization rate is very low. A total of 13 primary and secondary schools were surveyed this time, and their construction and use situation (as shown in Table 1). According to the survey statistics, the construction rate of solar bathrooms can reach 84.6%, However, the normal utilization rate is only 15.38%, indicating that the solar energy penetration rate in the Shannan region of Tibet is relatively high. However, due to the lack of professional talents, the solar water heating system cannot fully play its due value.

3. POPULARITY OF NEW ENERGY CONCEPTS

Promoting new energy is to expand the influence of new energy, improve the universal utilization rate of new energy, and the popularization of ideas is more important. The popularization of ideas eliminates people's inherent biases towards new energy, which is more conducive to the popularization and promotion of new energy. A national research report [2] points out that the current situation of new energy in China is still mainly driven by government policy support, and the driving force of market demand is not strong enough. This indicates that people have insufficient acceptance of new energy, hold a skeptical attitude towards new energy, and their consumption concepts are still stagnant in the past. This is observed from the current trend of society, and there are still shortcomings in the promotion and popularization of new energy. In addition, a sampling survey method was used to conduct a questionnaire survey on the concept and common knowledge of new energy among thirteen primary and secondary school students in the Shannan region of Tibet. Based on the analysis of the survey data (as shown in Table 2), even though new energy related products can be seen everywhere in Tibet, the popularity of the new energy concept among primary and secondary school students in the Shannan region of Tibet is still very low, especially among some township primary school students, the popularity rate is even 0, It can be said that no one knows, and school students are still at the forefront of knowledge endpoints, indicating that the popularity of new energy concepts in the Shannan region of Tibet is still very low.

Table 1. Survey and Statistics on the Usage of Solar Bathrooms

Serial number	Questionnaire location	Number of schools	Is there a solar bathroom	Solar bathroom area (m ²)	Current situation and existing problems
1	Naidong middle school	1097	yes	128	The system is old, aging and partially damaged, and there is no operation and maintenance personnel.
2	Naidong District Experimental Primary School	980	yes	86	The solar bathroom was built and not used, and there were no operation and maintenance personnel.
3	Jieba Township primary school	221	yes	42	The system is damaged, the system water supply cannot be guaranteed, and there are no operation and maintenance personnel.
4	Suozhu Township primary school		no	0	The student bathroom was not built.
5	Yadui Township primary school	352	yes	62	The pressure of circulating water pump is insufficient, and the water well is frozen and dry in winter.
6	Pozhang Township primary school	372	yes	60	The system is damaged, the layout of vacuum tube collector is unreasonable, it is seriously shaded by the floor, and there are no operation and maintenance personnel.
7	Jiazhulin town primary school	334	yes	58	The system is damaged, the vacuum tube collector is cracked, and there are no operation and maintenance personnel.
8	Gongga Experimental Middle School	989	yes	148	The volume of hot water storage tank is too small to meet the consumption demand.
9	Jixiong town Central Primary School	478	yes	64	The system is damaged. In winter, the system has the problems of insufficient tap water pressure and frequent water cut-off. The circulating water pump is damaged and there are no operation and maintenance personnel.
10	Jedexiu town primary school	432	yes	66	The system is damaged, a few vacuum pipes burst, the circulating water pump is damaged, and there are no operation and maintenance personnel.
11	Aza wanxiao	956	yes	112	The system is damaged, the make-up water pressure of the system is insufficient, and there are no operation and maintenance personnel.
12	Zhaqi Township primary school	509	yes	84	The system is damaged and the circulating water pump is damaged.
13	Lancet ridge Completely small	221	yes	46	Electric heating is used for bathing hot water.

Table 2. Survey and Statistics on the Popularity of New Energy Concept

Serial number	Questionnaire location	Number of respondents (person)	New energy concept Number of people known (person)	New energy concept Relatively confused (person)	New energy concept Unknown number (person)	New energy concept Penetration rate
1	Naidong middle school	43	5	8	30	11.63%
2	Naidong District Experimental Primary School	52	3	5	44	5.77%
3	Jieba Township primary school	13	0	2	11	0
4	Suozhu Township primary school	15	0	3	12	0
5	Yadui Township primary school	10	1	2	7	10%
6	Pozhang Township primary school	10	0	2	8	0
7	Jiazhulin town primary school	10	1	3	6	10%
8	Gongga Experimental Middle School	38	3	4	31	7.89%
9	Jixiong town Central Primary School	40	1	3	36	2.5%
10	Jedexiu town primary school	15	0	4	11	0
11	Aza wanxiao	54	2	5	47	3.85%
12	Zhaqi Township primary school	14	0	2	12	0
13	Lancet ridge Completely small	20	1	2	17	5%

China's energy research and development technology has made certain achievements, and currently, it is more important to strengthen the popularization of concepts. At present, China has made certain achievements in new energy technologies such as wind energy and solar energy. In terms of nuclear energy, China has already built nuclear power stations such as Qinshan Nuclear Power Station, Daya Bay Nuclear Power Station, Ling'ao Nuclear Power Station, etc., and they are operating well. Many experts believe that China has occupied a certain commanding position in the development of new energy in China, but the development of its core technologies and supporting industries still needs to be strengthened. Experts have also provided their own opinions on the future development direction of new energy. Xu Heping [3] believes that China has indeed achieved certain results in breakthroughs and innovations in new energy technologies, but this is only a technological breakthrough. There is still a long way to go to achieve industrial development. In the past, we obtained a molding technology from abroad, and building an industry will definitely earn money. But today you get new technology, but you may not be able to make money. Zhang Guobao[4] stated that in order for renewable energy to achieve great development, it is necessary to innovate in mechanisms. This innovation is not only about technology, but also financial tools, systems, management, etc. Therefore, technology introduction cannot promote technological innovation in China. For example, in the field of wind power industry, Huachuang Wind Energy has always regarded promoting

technological progress and enhancing independent innovation capabilities as the core of its development strategy. It has established an integrated R&D team of production, learning and research, and established a domestic leading scientific research platform, which has great uniqueness and progressiveness in China's wind power industry.

It can be seen that in the process of promoting new energy, technology introduction is not as important as concept popularization. We should vigorously promote the superiority of new energy technology development, popularize the concept of new energy, and provide policy support, so that people can understand the trend of new energy utilization and provide policy guarantees for new energy utilization.

4. PROSPECTS FOR THE PROMOTION AND POPULARIZATION OF SOLAR ENERGY

In the long run, renewable energy will be a crucial source of energy for humanity in the future. Therefore, most developed countries and some developing countries in the world attach great importance to the important role of renewable energy in future energy supply. Among new renewable energy sources, photovoltaic power generation and wind power generation are the fastest growing, and countries around the world have made the commercial development and utilization of solar photovoltaic power generation an important direction of development. According to the prediction of European JR [5], solar power generation will play an important role in the world's electricity supply by 2030, reaching over 10%, and renewable energy will account for 30% of the total energy structure; By 2050, solar power generation will account for 20% of total energy consumption, with renewable energy accounting for over 50%. By the end of this century, solar power generation will play a leading role in the energy structure.

The proposal for the issuance of the 14th Five Year Plan and the 2035 Long Range Goals by the Tibet Autonomous Region points out that the region should become a national and even international ecological civilization highland, taking the lead in achieving carbon peak and carbon neutrality. Accelerate the large-scale development of clean energy, form a comprehensive energy system that focuses on clean energy and complements oil, gas, and other new energy sources. By 2025, establish a national demonstration zone for the utilization of clean and renewable energy. In terms of power supply[6], during the 14th Five Year Plan period, the domestic demand for hydropower was 820000 kilowatts, with a new construction scale of 3055000 kilowatts and a continued construction scale of 2.215 million kilowatts; 1.04 million kilowatts of photovoltaic power plants are needed for domestic production; 50000 kilowatts of photovoltaic thermal power station put into operation; 200000 kilowatts of wind farm put into operation; 50000 kilowatts of geothermal power station put into operation; The gas power plant has been put into operation with a capacity of 540000 kilowatts (including renovation). By 2025, the required hydropower production and installed capacity will reach 3.07 million kilowatts; The installed capacity of solar power generation has reached 2.49 million kilowatts; The installed capacity of wind power has reached 210000 kilowatts; 90000 kilowatts of geothermal units; The gas turbine unit is 540000 kilowatts. In terms of clean energy export, the export of hydropower: during the 14th Five Year Plan period, the production scale was 975000 kilowatts, the new construction scale was 4.093 million kilowatts, and the continued construction scale was 2.12 million kilowatts. Outward photovoltaic power station: Supporting the clean energy transmission project in the upstream Sichuan Tibet section of the Jinsha River, 7.6 million kilowatts have been put into operation.

The Tibet Autonomous Region Energy Research Demonstration Center, as a research and development promotion and utilization platform in the field of new energy in the Tibet region, will also cultivate a new energy team in Tibet by establishing training bases, equipping teaching and experimental facilities, introducing advanced solar energy testing technology and talents;

Establish a solar photovoltaic service organization to provide technical consultation, maintenance, and repair services for photovoltaic power stations in the entire Tibet region; To provide necessary platforms and technical conditions for Tibet to extensively carry out international and domestic scientific and technological cooperation and exchange, promote the development of Tibet's new energy industry, lay a solid foundation for future renewable energy training work in Tibet, accumulate valuable experience for establishing a national level solar energy demonstration base, and make contributions to the sustainable development of Tibet's solar energy industry.

5. CONCLUSION

a) Although the advantages of new energy are obvious, the popularization of its concept is not enough, and there is a lack of widespread social recognition and a sound market environment. The acceptance of new energy by the public in terms of concept still needs a process, which restricts the further expansion of the new energy market. It is urgent for the government to strengthen publicity and guidance, clear public conceptual barriers, and create a good market environment for the development of new energy.

b) The lack of professionals in the field of solar energy has resulted in various photovoltaic power stations in the sparsely populated agricultural and pastoral areas of Tibet being unable to accurately determine the cause of faults in a timely manner due to the lack of real-time monitoring management and reliable analysis and statistics. This has to some extent delayed the maintenance of faulty photovoltaic power stations and solar thermal utilization systems, increased the cost of power station maintenance, and resulted in these photovoltaic power stations not fully playing their role.

c) Based on the current situation in Tibet, the application and development of solar energy in the region should further highlight development priorities, clarify development goals, vigorously promote implementation, and continue to explore new models of solar energy application suitable for production and life in vast agricultural and pastoral areas, in order to promote the development of the new energy industry in Tibet.

6. SUPPORTED PROJECT NAME

“Investigation and Research on the Promotion and Application of New Energy in Schools in Tibet Region”

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