

Research on development and utilization of rural renewable energy and countermeasures

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Abstract: China's rural population is large, the economic development is relatively backward, thus facing the problem of uneven distribution of energy. However, with the full development of carbon peak and carbon neutral plan, the extensive development and deepening utilization of rural renewable energy has become an important way to reduce the double carbon index, which can not only promote the rural revitalization construction and green agricultural development, but also solve the problem of rural environmental pollution, and provide important help for the circular development of ecological agriculture and the optimization of rural living environment. In this context, this paper carries out research, through the analysis of China's rural renewable energy utilization status, and then put forward the problems faced in the process of rural renewable energy utilization, and finally summarize the effective strategies for the development and utilization of rural renewable energy.

Key words: rural areas; Renewable energy; Clean energy; utilization

Since the reform and opening up, China's rural construction has achieved great achievements, especially in the context of rural revitalization construction, rural economic development has improved rapidly, and has become one of the centers of gravity of China's economic construction. However, in the process of economic development, the problems of energy development, utilization and environmental protection in rural areas have become increasingly serious. In order to adhere to the development strategy of "green water and green mountains are gold and silver mountains", rural areas must comprehensively promote the development and utilization of renewable energy, so as to provide all-round support for rural green agriculture, ecological economy and environmental protection construction. To further solve the problem of energy shortage faced by rural areas in China at this stage.

1. The utilization of renewable energy in rural areas

1. Rapid development of innovative technologies

In recent years, with the financial support of the state and the government, rural renewable energy-related technologies have developed rapidly, especially in biogas engineering and crop straw utilization technology. For example, "carbon-gas-fertilizer co-production efficiency + centralized gas supply", "three-way bidirectional cycle", "fuel + fertilizer", "graded full quantification" and other straw utilization technologies have transformed the straw of various crops in rural areas into renewable energy. Another example is the scale and maturity of biogas engineering technology, gasification, solidification and carbonization of straw treatment technology, solar thermal energy utilization products, water-heated kang technology, high-efficiency and low-emission new stove technology.

2. Prominent construction of biogas engineering

In the vast rural areas of our country, most areas have the conditions for the development of biogas project, which makes the construction of biogas project become the main channel for the development of rural renewable energy, which not only provides a lot of clean energy for the majority of farmers, but also can constantly improve the rural living environment. At present, all parts of our country are promoting biogas construction projects, and the construction of rural household biogas, farming community biogas, large and medium-sized biogas and other different levels of engineering projects, a large number of rural people began to use biogas energy.

3. Popularize the utilization of solar energy

Solar energy not only has renewable characteristics, but also belongs to clean energy, with environmental protection and convenient application characteristics. At present, the use of solar energy in rural China is becoming popular, mainly to use solar heat, generally used for public lighting street lights and household water heaters, but the northwest region is also promoting the pilot work of photovoltaic power generation projects.

4. Crop straw energy

With the development and promotion of air pollution prevention and control and green agriculture in China, straw burning has become an important activity for strict prevention and control in rural areas. In order to further utilize crop straw, relevant research units make full use of the high calorific value attribute of straw, thus developing a large number of energy technologies using straw as raw materials, such as straw molding fuel, pyrolysis gasification technology, carbon, gas and fertilizer co-production technology, etc. With the help of dry and wet anaerobic fermentation processes, the biogas utilization goal of straw is achieved. Further broaden the utilization path and value of crop straw, and then greatly reduce the situation of farmers burning straw.

5. Promoting energy-saving stoves across the board

Stoves are a necessity for rural families, and the level of energy consumption of stoves is also a key factor affecting rural energy utilization. In recent years, China's development of rural stoves technology has also achieved remarkable results, energy-saving stoves compared with traditional rural heating stoves, not only can save 30%-45% of energy, but also has low noise, easy to use, safe and reliable, easy to install and other characteristics, not only loved by farmers, but also become an important measure to promote environmental

protection and energy saving agricultural construction, And further improve the quality of life level of farmers.

6. The utilization of natural gas has yielded results

In addition to traditional rural construction, China is also actively promoting the construction of new rural areas in urbanization, and through the construction of sound natural gas pipelines, to achieve the effective transformation of rural energy and industrial structure, but also to provide important support for energy conservation and emission reduction. In recent years, the construction of rural communities in China has developed rapidly, and a large number of villages have realized the purpose of centralized living and central heating through relocation and merger, which provides conditions for the construction of natural gas heat pipeline network.

7. Demonstration and guidance by local governments

With the financial support of the state, local governments have also achieved notable results in the construction of demonstration projects for the comprehensive utilization of clean energy. Local governments have supported the construction of a large number of demonstration villages for the comprehensive utilization of clean energy, thus promoting energy-saving stoves, energy-saving kang, solar street lights, solar water heaters and other equipment into rural homes. At the same time, many demonstration projects such as “biogas demonstration projects” and “straw energy utilization centers” have been established, creating favorable conditions for the green development of rural areas. It has become an important measure to build an ecologically beautiful countryside.

2. Problems faced in the process of using renewable energy in rural areas

1. The development and utilization of clean energy is not balanced enough

China’s rural development has a large imbalance problem, even between the rural areas, the eastern and western regions are still a big gap; Even in the same area, there are obvious differences between different villages. This leads to a great imbalance in the development and utilization of clean energy in different rural areas. Rural areas with good development trend and certain economic advantages can establish a relatively refined energy management system to achieve the comprehensive utilization of renewable energy goals, but backward rural areas can only adopt extensive energy utilization methods, not only low energy utilization rate, but also because of backward equipment, building energy conservation is not in place and other problems. The construction of its renewable energy system is relatively slow, unable to meet the needs of the farmers.

2. It is difficult to implement renewable energy support policies

Policy support is a key driving force for industrial development. At present, China does not provide subsidy policies for biogas engineering, biomass energy, marsh fertilizer utilization and other end products, which makes rural renewable energy development process attaches importance to construction but ignores management, and fails to form a good management mechanism for sustainable development. At the same time, China has provided support policies for biogas power generation, land use and electricity, but it has not been implemented in some remote areas, which has affected the popularity of biogas project construction and has become an important factor hindering the healthy development of biogas industry. In addition, there are also some industries lack of policy support and the development of the problem, such as biomass energy molding fuel and gas-carbon joint enterprises, its production process of electricity does not enjoy the national preferential policies, making its electricity cost is high.

3. The construction of renewable energy has not formed a system

For the construction of rural renewable energy, the government departments involved are more complicated, but at present, due to the failure to establish a systematic management process and program, so that various departments can not form a good cooperation relationship. For example, photovoltaic projects or biogas power generation projects, which involve development and reform, electricity, energy and other departments, energy-saving transformation of rural houses also involves housing departments, capital-related activities need to contact with finance, finance, taxation and other departments, livestock manure and straw resources utilization also need to be approved by the environmental protection department. This makes the renewable energy projects and engineering construction in the need for multi-departmental coordination and support, but at present because there is no systematic management mechanism, leading to different standards between different departments, different management responsibilities, affecting the integrity and sustainability of the construction.

4. Renewable energy promotion and publicity to be strengthened

The implementation of rural renewable energy projects and projects must go through the process of technology research and development -- product incubation -- application and popularization. However, at present, the export of rural labor is quite prominent, resulting in a large number of rural labor with high education level and strong ability to accept new things to go out, while most of the rural labor force left behind is the elderly, women and children with relatively low education level. Under the limitation of educational level, many farmers are reluctant to take the initiative to use advanced technology and equipment. In particular, some energy-saving products require a certain cost, and ordinary farmers do not calculate the benefits of energy conservation, and often refuse the promotion of new products. This requires the relevant departments to further strengthen the promotion and publicity work, through the “application experience”, “tracking teaching”, “Party members take the lead” and other ways to ensure that renewable energy projects and projects are put in place.

5. The sustainable operation of biogas projects needs to be improved

Biogas is the key content of rural renewable energy, but with the development of rural urbanization, farmers’ lifestyle is constantly changing, resulting in poor sustainable operation effect of rural biogas projects. On the one hand, the construction and use time of some large and medium-sized rural biogas projects is relatively long, and its infrastructure lacks maintenance and maintenance, and even parts damage problems appear, which makes the project utilization rate is low. On the other hand, in the operation process of rural biogas projects, there

is a lack of professionals with relevant knowledge and skills, which makes its operation continuity poor and difficult to provide long-term energy services for farmers.

3. The development and utilization strategy of rural renewable energy

1. Improve policies and regulations, and establish a management system for the development and utilization of renewable energy

Laws, regulations and policy documents are the basic guarantee for the development and utilization of rural renewable energy. On the one hand, the state should further improve the “Renewable Energy Law of the People’s Republic of China” and “Energy Conservation Law of the People’s Republic of China” and other relevant laws and regulations for the development and utilization of rural renewable energy, and put forward more clear and detailed laws and regulations, including corresponding requirements and indicators. At the same time, it should put forward requirements for the cooperation and management of various departments, so as to form a standardized management model and system.

On the other hand, the national and local governments should comprehensively promote the construction of rural renewable energy development and utilization industry through policy support. First, on the basis of regional advantages, we should focus on supporting regional advantages of renewable energy industry and supporting the healthy and sustainable development of related industries. Second, it is necessary to focus on talent support, strengthen enterprise contacts, promote technological updates, and provide tracking services for rural renewable energy project industries, and regularly carry out maintenance and maintenance activities. Third, it is necessary to promote the related technology development, product processing and operation of rural renewable energy, and provide policies such as investment subsidies, tax exemptions and concessions for land use and electricity.

2. Increase financial input and actively build typical, pilot and training projects

The development and utilization of rural renewable energy projects and projects have a certain nature of public welfare, so they need more adequate financial support, so as to achieve good social and ecological benefits. In this regard, the national and local governments need to continuously strengthen financial support, and actively cultivate and build typical and demonstration pilot projects and training projects. First, we should take the initiative to integrate the funds of local governments to support agriculture, and rationally allocate the proportion of funds for rural renewable energy projects. Second, we should actively mobilize social funds to invest in the construction of rural renewable energy projects, guide the investment of local governments, enterprises and individuals with state funds, and further promote the participation of rural communities, joint enterprises and individual farmers, so as to broaden financing channels, and even establish public welfare channels, by public welfare organizations, the public and outstanding enterprises to give certain donations. Third, we should organize individuals and social forces to actively invest in the construction of rural renewable energy projects, and encourage rural self-employed people to establish rural renewable energy enterprises, so as to provide necessary energy services for rural farmers in the local area, and then realize individual profits and achieve the goal of renewable energy utilization. At the same time, it is also necessary to encourage enterprises to cooperate with the government to establish pilot projects, and ensure the recovery of enterprise funds by paid use, which can also promote the comprehensive development of rural renewable energy projects. Fourth, project activities such as technical training and equipment use training should be organized to ensure that farmers can correctly use relevant renewable energy and its equipment and products.

3. Strengthen inter-departmental cooperation and guide multiple government departments to participate in coordinated development

The development and utilization of rural renewable energy is a long-term, comprehensive social welfare project, which not only spans many fields, disciplines and specialties, but also involves the support and cooperation of multiple government departments. This requires people’s governments at all levels and relevant departments to establish a unified understanding, not only to form a systematic and clear management regulations and standards, but also to clarify the responsibilities of each department and cooperation needs, in order to form a complete and systematic cooperation process, to ensure that rural renewable energy development projects can be quickly, convenient and reliable to complete the construction. At the same time, local governments should also improve the enthusiasm of various departments to participate in the development and utilization of rural renewable energy projects, and even establish priority work channels. On the one hand, through strengthening organizational leadership, ensure that all departments provide support services in accordance with their own functions, and on the other hand, implement planning and organize work to ensure that project construction is implemented in place, and various indicators are checked and audited in place. The convenient and cheap energy services provided to the people are also in place.

4. Pay attention to biogas energy, and improve the operation capacity and comprehensive benefits of biogas projects

Biogas engineering has important value in the development and utilization of rural renewable energy, and it is also a renewable energy project with industrial development capability in most rural areas of China. Therefore, the government needs to give higher support to biogas engineering operation enterprises, and upgrade biogas engineering and its products through enterprise independent innovation and industrial research and development. At the same time, the government can also carry out independent promotion cooperation with enterprises through demonstration projects to further reduce the operating level and cost expenditure of biogas engineering projects, and even further promote the intelligent level of biogas engineering projects and reduce the dependence on labor. On the one hand, it is necessary to focus on cultivating the market demand ability of biogas project terminal products, and provide diversified demonstration models for the construction of biogas ecological cycle agriculture model by strengthening the biogas ecological cycle agriculture model in the park, the enterprise planting and breeding integrated cycle agriculture model and the “third party operation” model. In order to guide different regions to choose the appropriate promotion model according to their regional characteristics and economic conditions. On the other hand, it is necessary to comprehensively promote the processing technology of products using biogas slurry as raw materials, so as to provide farmers with multi-

purpose products such as organic fertilizer, biological insecticide and matrix through formula upgrading and technical updating, and further exert the utilization value of organic household waste and toilet feces of farmers, which can not only promote the complete and systematic development of rural biogas industry. But also can purify the rural environment atmosphere, the implementation of environmental protection policies.

5. Develop the industrial system and establish and improve the rural renewable energy industry chain

In the development process of modern agriculture, we should take industrial systematization and chain construction as the ultimate goal, thus forming a stable operation system with stable operation and sustainable development. Therefore, in the process of rural renewable energy development and utilization projects and industrial construction, it is also necessary to actively build an industrial system, and then drive the synchronous development of rural economy, energy and ecology through a complete rural renewable energy industry chain. The state should regard the rural renewable energy project as an important direction of national scientific research and technological innovation, and provide key support for the scientific and technological development and industrialization of agricultural renewable energy projects. First, it is necessary to establish a sound agricultural renewable energy research related institutions, and improve the service system for the coordinated development of science and technology and industry by integrating the existing science and technology and resources. Second, it is necessary to establish a sound talent training system related to agricultural renewable energy, comprehensively enhance the support of talents, and provide a steady flow of talents for the development of renewable energy industry. Third, we should promote the intensive development of the renewable energy industry, continuously develop related industries through technology synthesis and equipment innovation, and provide support for all aspects of rural clothing, food, housing and transportation. Fourth, we should establish complete supporting facilities, and actively develop related products, and reuse the waste generated in the industrial system, so as to improve the efficiency of industrial recycling, reduce operating costs, and constantly broaden the scope of profit, thus forming a perfect industrial chain.

6. Strengthen the influence of publicity and create a good social atmosphere for the utilization of renewable energy

Adequate media publicity is also a key element to promote the use and development of renewable energy in rural areas. On the one hand, we should make full use of traditional and new media such as television, media and the Internet to vigorously publicize the value and significance of renewable energy for rural development and construction, and show the realistic foreground overview of rural living conditions, agricultural income increase and industrial improvement through demonstration villages and pilot cases. On the other hand, it is also necessary to publicize within the village, through party members' meetings, villagers' meetings, new farmers' training activities and other ways to create a good rural atmosphere to ensure that villagers can realize the advantages and value of renewable energy, and then take the initiative to accept and apply renewable energy products, in order to achieve better results.

4. Conclusion

To sum up, the development and utilization of rural renewable energy needs to solve the current practical problems, while the need to strengthen the planning program and management mechanism, and then create a new development model, establish a sound management mechanism, improve the quality of relevant talents, in order to create a sustainable development, balanced development, universal implementation of the use of rural renewable energy to create a good environment.

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