

Some Enlightenments of "Beautiful Rural Construction" on Rural Energy Policy in Beijing—Applying Informatization Means

Wang Zhi^{1,*}, Wu Kongan²

¹Institute of Agricultural Information and Economics, Beijing Academy of Agricultural and Forestry Sciences, China

²Beijing's Tongzhou District Lucheng Towns Government, China

Abstract. "Beautiful rural construction" is a systematic project, rural energy is one of the important contents of its construction. In accordance with the concept of eco-friendly construction, Beijing carried out a thorough "structural adjustment of rural energy optimization," "Earthquake energy-saving projects of rural housing" and other measures. By conventional heating technology research in Beijing 13 counties and 142 villages, we predict the future of rural energy will further the implementation of solar heating, electric heating and other new green energy technologies. It is suggested to establish the "Beijing Rural Information Service Platform" and "Beautiful Rural Information Resource Bank" through the means of informatization, which will greatly strengthen the regulation and control of rural people-land relationship and realize the systematic optimization, making the cities and villages have. Space for human survival and sustainable development.

1. Introduction

Digital City is the use of spatial information to build virtual platforms, including urban natural resources, social resources, infrastructure, cultural, economic and other information about the city, in order to obtain and load up the digital form, so as to provide a wide range of aspects of government and society service [1-3]. Through advanced means of information, support Beijing new rural planning, construction, operation, management and emergency, can effectively improve the government management and service levels, improve the new rural management efficiency[4], conserve resources, promote the development of the beautiful countryside.

2. "Beautiful Rural Construction" is an important basis for the construction of "ecological civilization and beauty of China"

Chinese capital of Beijing, an area of 16,400 square kilometres in rural areas accounted for 1.5 million square kilometres, if rural development is not good, ecological Beijing will be no barrier, there will be no space environment, and sustainable development will be on the lack of foundation [5].

3. The Main Measures and Measures of Rural Energy Construction in "Beautiful Rural Construction"

We recognize the importance and urgency of the beautiful countryside construction, but also, perceive that the complexity and difficulty to build a beautiful countryside. In recent years, Beijing launched a series of livelihood projects, including farmhouse seismic energy-saving projects, risk village and insurance households from mountain relocation project, Clean Air Initiative in rural areas reducing coal, Agricultural non-point source pollution control projects, Rural Ecological Environment Construction Engineering, and so on, rural environment continues to improve, rural infrastructure and public service facilities gradually improved, the rural energy structure was further optimized, farmer housing conditions and income levels are rising[5,6]. New Rural Construction of Beijing has been built a beautiful countryside and laid a good foundation. At the same time we should also see that although the new rural construction of Beijing has made remarkable achievements, yet, with the urgent needs of the majority of farmers, and the requirements of building world-class city, there is still a big gap, but also need to be improved in the following areas.

3.1. Rural energy structure adjustment and optimizations

In recent years, the Beijing government has been to actively promote the use of new energy sources, new technologies in rural areas, and started to implement the "Reducing Coal and Replaced Coal, Clean air" Initiative. Preliminary accounting, in 2013 heating season, the Beijing rural areas completed 2954 tons of sulphur dioxide emissions, nitrogen oxides 3512 tons emissions,

* Corresponding author: angelwang1009@163.com

and 7397 tons of carbon dioxide emissions, accounting for 22% of the city's rural areas, 4.3 million tons of total coal-fired. but there are still nearly 80% of farmers are still using low-grade coal[5], as well as a large number of public facilities in rural areas, enterprises and institutions were not clean energy transformation. Therefore, we should continue to promote the rural areas "Reducing Coal and Replaced Coal, Clean air" Initiative. Through the joint action of government, market and society, at a rate of about 1 million tons per year, with a further three years to complete rural clean alternative, while by replacing heating coal to electricity, sending natural gas to home, as well as using liquefied petroleum

gas, appliances solar, biomass, air energy, geothermal energy utilization, etc., to realize gasification of rural areas for cooking, heating and clean [7, 8].

Through the survey of rural areas in Beijing found that the residents of the current application of the main heating technologies are electric heating, heat pump heating, gas heating, clean coal heating and solar heating in five ways[5]. According to the survey data, combined with the application of the Beijing area and product technology maturity, the existing mainstream rural areas in Beijing can be used for rural use of clean energy technologies in Table 1.

Table 1. Commonly used in rural areas heating technology

Serial number	Heating mode			
	category	Heat source (priority)	Auxiliary heat source (alternate)	Terminal
1	Heat pump	Low temperature air source heat pump	—	Floor heating
2		Ground source heat pump	—	Floor heating
3	Solar composite heating category	Solar hot water heating	Clean coal boilers	Floor heating
4		Solar hot water heating	Gas boiler	Floor heating
5		Solar hot water heating	Low temperature air source heat pump	Floor heating
6		Solar hot water heating	Ground source heat pump	Floor heating
7		Solar hot water heating	Electric heating	Floor heating
8	Gas category	Gas boiler	—	Radiator / floor heating
9	Coal-fired class	Clean coal heating stove	—	Radiator / floor heating
10		Electric hot water boiler	—	Radiator / floor heating
11	Electric heating	Heat storage type electric boiler	—	Radiator / floor heating
12		Carbon crystal plate class	—	—
13		Energy storage electric heating	—	—

Low temperature hot water terminal

High temperature / low temperature hot water terminal

3.2. Rural Residential Seismic energy-saving projects

Beijing government started farmhouse seismic energy-saving projects since 2007, it has supported 380,000 rural residents in the implementation of energy-saving residential earthquake. Through the implementation of seismic energy-saving projects, farmers housing winter indoor temperature has increased by 4 to 6 degrees, saving more than 30% of coal-fired[9,10]. In summer, obviously feeling the cool interior, indoor temperature is relatively low outside temperatures 5 to 6 degrees [11].

According to statistics, only this thermal insulation, has an annual saving of coal-fired nearly 55 million tons, a significant reduction in carbon dioxide emissions, effectively improve air quality. According to surveys, there are still 530,000 rural residents in Beijing have seismic energy-saving requirements. Therefore, to further increase the Farmhouse seismic energy-saving efforts, using of 5 years, at a rate of about 100,000 a year, it will complete the city's Farmhouse seismic energy-saving task.

3.3. Sewage treatment works in rural areas

In recent years, new rural construction in Beijing, more than 500 villages have been built sewage treatment facilities in 1010, but due to complex process, facilities scattered layout, unfocused, factory network is not complete, the high cost of operation and maintenance, management operation is not in place and other reasons, rural sewage treatment facilities, 30% did not run or intermittent operation. In Beijing rural area, annual output of sewage is more than 100 million tons, but, treatment rate is only about 50%. Large amounts of sewage is discharged directly [12]. With the rapid development of urbanization and rural economic and social, supply and demand contradictions in rural city sewage treatment facilities have become increasingly prominent. Therefore, the reality requires us to rural sewage treatment as an important part of the construction of the beautiful countryside. For facilities that have been built to run on to assess the situation, according to local conditions to transform and strengthen the operation and maintenance, and ensure that the newly built sewage treatment facilities operating normally, the basic objectives of rural sewage discharge standards may successfully achieve in 2020.

4. Beijing's rural energy demand forecast

4.1. Analysis of energy - using factors

4.1.1 Farmers own needs

With the development of rural economy, farmers' concept of energy use is gradually changing. The higher income level of farmers, the more emphasis on the convenience and comfort with energy, and then health, the last is the economy. Therefore, in cooking, the farmers are more willing to use the cleanliness of liquefied petroleum gas or biogas, rather than coal. In the heating, according to affordability, farmers will focus on electricity, solar and other clean energy heating.

4.1.2 The Impact of Urbanization Policy

With the acceleration of urbanization in the rural areas and the implementation of ecological resettlement, the rural energy structure has also been greatly affected.

(1) Heating will be converted into centralized heating. The Beijing municipal government proposed that by 2020 the city will make about two-thirds of the farmers into urban residents, the living conditions of farmers will be dispersed from the living, into a centralized way to live, therefore, the corresponding heating will focus on the form heating mode change, which will help save energy consumption of heating [13-15].

(2) Farmers' choice of energy will become more commoditized and cleaner. Due to the concentration of living forms and the difficulty in obtaining biomass resources such as straw, farmers will tend to favour commercialized energy sources for energy selection [13-15]. With the popularization and cleaning of public

facilities such as heat and gas, the proportion of the use of energy will be a substantial increase.

(3) Housing construction will become more energy-saving. With the process of urbanization, the new farmers will focus on energy-saving housing and comfort [16], thus directly reduce the heating load and reduce the use of heating energy.

(4) Energy use will become more low-carbon and comfortable [17]. Urbanization directly promote the increase of farmers' income, and with the construction of new houses, solar energy and geothermal energy and other low-carbon new energy and renewable energy in the proportion of domestic energy consumption will gradually increase.

4.2. Potential evaluation of coal adjustment in rural energy structure

In the heating, through the existing energy-saving transformation of rural households, the annual heating coal can be saved about 62.76 million tons of standard coal (in accordance with the energy-saving transformation to save 40% of the heating coal to calculate). On this basis, by 2020, 952,000 farmers will live in the cities and towns of residence, so that the original decentralized heating will transform into a central heating. This way can reduce heating coal-burning 94,100 tons of standard coal per year.

In addition, for the remaining decentralized heating farmers, the Government can actively promote solar heating, electric heating and other new green energy-saving technologies, which can reduce the heating coal-fired 25.10 million tons of standard coal.

From the adjustment potential, based on full use of existing resources and actively promote green energy-saving technology, respect for heating and cooking, the total coal pressure reduction will be more than 1.1451 million tons of standard coal per year.

5. Reflections on "Beautiful Rural Construction" by Using Information

In the capital, to promote the digital city construction process, the author has deeply thinking for rural energy policies and beautiful countryside construction as follows:

First, the establishment of Beijing rural information service platform and the beautiful countryside of information resource library. It will cover many aspects of rural infrastructure, rural economy, industry characteristics, population health, culture, education, grass-roots organizations and other resources for effective integration of information and data, and establish a cover Beijing, connecting Beijing, Tianjin city, county, township and village "digital village" information network platform.

The second is the establishment of "Beijing Digital Village" platform, its function should have a strong practical and advanced. It can form in a variety of vivid visual image, data, icons and text, etc., it can provide information on all aspects of rural work for the

government at all levels in Beijing, so as to provide a reliable basis for the scientific and democratic decision-making of new rural construction. Beautiful countryside construction in every measure can be demonstrated and information management, the establishment of relevant information platform. Moreover, with the continuous improvement platform, which will provide reliable first-hand information for all agricultural sectors and investment units, it lay a solid foundation for the economic development of Beijing Rural Development and Investment, the same time, the Present Situation can be shown by the platform the beautiful countryside as a window, it can be to promote the rural areas this emerging e-commerce business model, so as to promote the exchange of agricultural products and accelerate rural economic development has laid a good foundation.

The third, pay attention to the establishment of several information platform, focusing on people's livelihood and ecological protection. The main measures "optimal adjustment of rural energy structure, agricultural nonpoint source pollution control, rural residential seismic energy-saving projects, sewage treatment works in rural areas" and other beautiful countryside construction are to be monitored and managed through the information platform to maximize for the construction of ecological civilization provide effective protection, as well as the national new rural construction to enhance digital play a leading and exemplary role.

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