Research on Rural Low-Carbon Economy Under the Strategy of Rural Revitalization

Xiangchen Sun, Hong Zhang and Zihong Chen

ABSTRACT

At the 19th CPC national congress in 2017, President Xi put forward the rural revitalization strategy, including five aspects: ecology, organization, industry, talents and culture. Low-carbon economy is a new production pattern combining industry revitalization and ecology revitalization. Firstly, this paper points out the importance of developing low-carbon economy in rural areas, and then finds out that rural areas are faced with the problems of unreasonable energy structure, low level of environmental technology, and high-carbon characteristics of agriculture. In the end, the paper puts forward some suggestions to promote the development of low-carbon economy in rural areas.1

INTRODUCTION

Agriculture, countryside and farmers have always been the key issues of China's development. At the 19th National Congress of the Communist Party of China held in 2017, the CPC central committee put forward the "rural revitalization strategy", including "organization revitalization, talent revitalization, industry revitalization, culture revitalization, ecology revitalization". In the process of rural development, the improvement of rural economic system, the development of sustainable economy and low-carbon economy might be the top priorities of rural revitalization.

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As a country with a large population in the world, China has a low per capita possession of resources, so it is extremely urgent to develop a resource-saving and low-carbon economy. Besides, as the basic areas of agriculture, rural areas are now facing the situation of ecological destruction and disordered use of resources. Therefore, under the new strategic opportunity of "rural revitalization", it is very important to change the rural economy mode and develop low-carbon economy.

THE NECESSITY OF LOW-CARBON ECONOMY

The transition from rural traditional economy to low-carbon economy is conducive to fulfilling China's commitments at the UN climate conference. From 2010 to 2017, China’s carbon emissions have reduced obviously, and the growth rate of emissions gradually decreased. But China made a commitment to peak carbon dioxide emissions around 2030 and strive to reach the peak as soon as possible at the 2015 United Nations climate conference in Paris, This commitment demanded China's low-carbon economy shouldn’t be lax, especially in countryside.

Low-carbon economy in rural areas conforms to national strategies. In 2012, President Xi proposed the overall layout of “Five-point Strategy” at the 18th National Congress, highlighting the necessity of ecological construction. Then at the 19th National Congress in 2017, President Xi proposed "rural revitalization" to guide rural economic development and environmental protection. Therefore, under the background of strategy implementation, reducing carbon emissions and protecting environment might be an inevitable requirement for rural development.

Low-carbon economy also can help the overall development of rural areas. The low-carbon economy is conducive to improving the utilization rate of resources, popularizing clean energy, reducing pollutants and protecting the ecological environment, so as to ensure that rural economic development toward a scientific, sustainable, environmental direction. Especially, as the basic part of China's economy, it is necessary for agricultural economy to develop towards the direction of green and low-carbon. [1]

CURRENT PROBLEMS OF RURAL LOW-CARBON ECONOMY

China's energy structure limits the development of low-carbon economy. Coal-major structure determines that China's energy production and consumption is coal-based. Table I shows the change in energy production and consumption in China over the last five years. As shown in table I, the total amount of coal production and consumption has decreased year by year. The productivity of natural gas and other new energy sources is steadily increasing, and the consumption of crude oil, natural gas and other new energy sources is also increasing. These information all show the trend of energy structure’s optimization. But coal production and consumption still account for the majority. [2]
TABLE I. PROPORTION OF TOTAL ENERGY PRODUCTION AND CONSUMPTION IN CHINA FROM 2013 TO 2017.

<table>
<thead>
<tr>
<th>year</th>
<th>Raw coal</th>
<th>Crude oil</th>
<th>Natural gas</th>
<th>Other energies</th>
<th>Raw coal</th>
<th>Crude oil</th>
<th>Natural gas</th>
<th>Other energies</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>75.4</td>
<td>8.4</td>
<td>4.4</td>
<td>11.8</td>
<td>67.4</td>
<td>17.1</td>
<td>5.3</td>
<td>10.2</td>
</tr>
<tr>
<td>2014</td>
<td>73.6</td>
<td>8.4</td>
<td>4.7</td>
<td>13.3</td>
<td>65.6</td>
<td>17.4</td>
<td>5.7</td>
<td>11.3</td>
</tr>
<tr>
<td>2015</td>
<td>72.2</td>
<td>8.5</td>
<td>4.8</td>
<td>14.5</td>
<td>63.7</td>
<td>18.3</td>
<td>5.9</td>
<td>12.1</td>
</tr>
<tr>
<td>2016</td>
<td>69.8</td>
<td>8.2</td>
<td>5.2</td>
<td>16.8</td>
<td>62</td>
<td>18.5</td>
<td>6.2</td>
<td>13.3</td>
</tr>
<tr>
<td>2017</td>
<td>69.6</td>
<td>7.6</td>
<td>5.4</td>
<td>17.4</td>
<td>60.4</td>
<td>18.8</td>
<td>7</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Low-carbon technologies in rural areas are not mature. Low-carbon economy is an emerging economic development mode. And new mode needs new technologies. However, China's scientific achievements and patents in environmental protection are not enough. As shown in table II, although the number of PCT patent applications in China has been increasing year by year from 2013 to 2017, which means the gap with America and Japan has been narrowing, China’s patents are still less than America and Japan. In addition, most of the low-carbon technologies are used in urban rather than rural areas. Therefore, the development of low-carbon economy in rural areas is limited by the technology.

The high-carbon characteristics of agricultural production do not adapt to the low-carbon economy. In order to raise revenue, many farmers tend to increase grain yield by fertilizing and spraying insecticide. The heavy use of chemical fertilizers and pesticides leads to the increase of land’s carbon emissions. For example, studies have shown that carbon dioxide emissions from urea-fed land are greater than those from non-urea-fed land. [3] In addition, farmers' high demand leads to increasing fertilizer production. Fertilizer’s production requires energy consumption, and a large amount of carbon dioxide is emitted in the process. For instance, producing one ton of nitrogen requires about three tons of standard coal and produces six tons of carbon dioxide. So the unreasonable use of chemical fertilizers has resulted in a large amount of CO2 emissions, which is bad to rural ecological construction.

TABLE II. PATENT APPLICATIONS OF PCT ENVIRONMENTAL PROTECTION TECHNOLOGY IN CHINA, JAPAN AND AMERICA FROM 2013 TO 2017.

<table>
<thead>
<tr>
<th>region</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>176</td>
<td>132</td>
<td>190</td>
<td>237</td>
<td>356</td>
</tr>
<tr>
<td>Japan</td>
<td>643</td>
<td>655</td>
<td>571</td>
<td>550</td>
<td>546</td>
</tr>
<tr>
<td>America</td>
<td>614</td>
<td>708</td>
<td>532</td>
<td>589</td>
<td>536</td>
</tr>
</tbody>
</table>
SUGGESTIONS ON HOW TO DEVELOP LOW-CARBON ECONOMY

It is very important to develop new energy sources and adjust the energy structure. At present, China's energy structure is dominated by coal. But clean energy, such as water, wind, solar and tidal energy, will not generate a large amount of carbon emissions in the process of using. Therefore, relevant experts should explore and develop clean energy, improve the utilization efficiency of clean energy and reduce the utilization cost. And the government should restrict the use of traditional energy and organize enterprises and villagers to try to use new energy.

The second suggestion is using low-carbon technologies. For this part, government can bring in foreign low-carbon technologies. [4] Besides, the government should invest in low-carbon technology innovation and talent training, and help technology popularizing to ensure that low-carbon technologies can be applied into rural production at a low cost and on a large scale.

Finally, rural low-carbon economy should be guided by “rural revitalization” strategy. In this regard, the government and experts should make full investigation, find out the disadvantages of the rural low-carbon economy and formulate countermeasures to fill the loopholes. [5] Besides, the government should restrict the villagers’ agricultural production by making laws and regulations, and prohibit the behaviors that damage the environment.

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