Characteristics Analysis of Carbon Emissions Based on Carbon Emission Efficiency for Low-carbon Pilot Cities of China

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Global carbon dioxide (CO_2) reduction work has been promoted significantly by the approved document of Paris Agreement, which was submitted by China and the United States to the United Nations before the G20 Hangzhou Summit in September 2016. Considering the current global economic and social situation, the inevitable way for the economy development of China is to develop the low-carbon economy since China is still in the rapid development stage of industrialization and urbanization. Therefore, low-carbon pilot cities as well as its effectiveness investigation should be should be carried out to guide the development of low-carbon cities in China. In order to study the carbon emission efficiency in thirty-two pilot cities, data envelopment analysis (DEA) method is employed based on three invest indices of the total carbon emission, urbanization rate, and the industrialization rate. In addition, carbon emission characteristics are further studied by classification with different cities based on the clustering method. Study results show that all the pilot cities are clustered to be four categories, i.e. developed low-carbon cities (highest economy, lowest emissions), pursuing low-carbon cities (higher economy, lower emissions), developing high-carbon cities (lower economy, higher emissions), and resource-developing high-carbon cities (lowest economy, highest emissions). Furthermore, suggestions and strategies are proposed according to these four different categories to better construct the low-carbon pilot city, which can provide a fundamental theory basis for the economy policy establishment and the low-carbon development strategy formulation of different local governments.