China's spatial and temporal disparities in energy efficiency and influencing factors

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ABSTRACT

With the rapid development of China's economy, a large number of non-renewable resources are continuously consumed, and the ecological environment is deteriorating gradually. Primary energy, as the main body of GDP, plays a decisive role in China's economic development. However, the long-term and high-intensity economic development has made the primary energy face serious resource and environment problems, especially energy shortage and environment pollution. The severe situation of resources and environment has become a hard constraint that restricts China's sustainable development. Therefore, while maintaining the sustained economic growth, the efficient utilization and green utilization of energy are objective requirement to solve the energy crisis and realize the sustainable development of the environment. To solve this challenge, this paper proposes the two-step analysis of EBM-Tobit model to measure the energy efficiency of 30 provinces in China from 2007 to 2016. The first stage analyses the characteristics of spatial differences in energy efficiency and the root causes of regional gaps, and then calculates China's energy conservation and emission reduction potential. The second stage uses the panel Tobit model to test the energy efficiency influencing mechanism in China. The results show that energy efficiency of the overall regional disparity varies greatly. What's more, China's energy efficiency shows a gradient distribution, which means the eastern region has the best performance of average energy efficiency, and followed by the central and western regions. In terms of energy-saving and emission-reduction potential, the potential of energy saving and air pollutant emission reduction are at a relatively high level. Energy endowment, industrial structure, government influence and technological progress have a certain impact on China's energy efficiency, but there are disparities in the degree of influence and significance among regions in China.

Keywords: energy efficiency; EBM-Tobit model; two-step analysis; spatial and temporal disparities; influencing factors