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DYNAMIC SIMULATION OF CHINA'S CARBON INTENSITY AND ENERGY INTENSITY EVALUATION FOCUSING ON INDUSTRY AND ENERGY STRUCTURE ADJUSTMENTS BY 2020

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Abstract

Along with the rapid economic development of China, the large amount of carbon dioxide (CO_2) emission has become constraint on future sustainable development. The Chinese government has established a series of policies to come with the high CO_2-emission resulting from economic development with the target to reduce its carbon intensity (CO_2-emissions per unit of gross domestic product (GDP)) by 40-45%, and to decrease the energy intensity (energy consumption per unit of GDP) by 20% by the year 2020, compared with 2005 levels. Industry and energy structure adjustment are the most important factors that impact on a low carbon economy, and therefore, it is necessary to pursue a comprehensive evaluation of carbon and energy intensity changes with a focus on their influences.

This study aims to offer results from a comprehensive simulation modelling of China's economic development, CO_2-emission, and energy flows. Through a dynamic simulation analysis based on LINGO programming, our study suggests that the carbon intensity and energy intensity in China can be reduced with 43% and 46%, respectively, while maintaining an 8% GDP annual growth rate, a proper adjustment on industry structure in term of primary, secondary and tertiary shares according to a ratio to 6:34:60, and an increase in non-fossil energy's share to 15% in 2020. Dynamic simulation appears to be an effective approach for assessing environmental impacts and sustainable development.

Key words: CO_2 emission, carbon intensity, energy intensity, optimization dynamic simulation

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