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REGIONAL FORECAST OF CHINA'S CARBON EMISSION PEAK IN 2030 AND ANALYSIS OF INFLUENCE FACTORS

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Abstract

China has been the world's largest carbon emitter since 2003, especially in 2018, China's carbon dioxide emissions have exceeded 10 billion tons, accounting for more than a quarter of the world's total carbon dioxide emissions. Therefore, China's government had set the target to achieve the 'carbon peak' in year of 2030. In this study, we firstly analyzed the historical development trend, regional economy, population, urbanization and carbon emissions of the four major regions, including the East, the Middle, the North-east and the West China, respectively. Then, we used the IPAT model to design 48 peak CO_2 emission scenarios, and used the centralized DEA to evaluate the allocative efficiency of scenario-based CO_2 emission paths. Consequently, we found that maintaining relatively high GDP growth (around 6%), reducing energy intensity by about 75% of average annual decline rate (around 4%) and increasing non-fossil energy to 21% to meet the requirements of the Innovation plan of energy technology revolution 2016-2030 is the most efficient low-carbon behaviors towards 2030 peak CO_2 emissions of 10.57Gt. The results obviously indicate the A1B2C2 scenario has the highest potential emission efficiency in scenarios where carbon emissions peak by 2030. In the peak scenario in 2025, A1B2C1 has more stringent requirements for optimizing the energy structure than A1B2C2, and the potential output efficiency of CO_2 emissions is slightly lower than other scenarios. It is also found that in the future path of the predicted optimal scenario, only economic scale and low carbon per unit output value make a great contribution to the changes in carbon dioxide emissions.

Key words: CO_2 emissions peak, DEA, four regions in China, generalized division index method, scenario analysis

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