

Exploring Drivers of Beijing's CO₂ Emissions Increment: A comprehensive multi-level factor analysis

Topic: Regional energy & environment

Author: Junrong Zhang

To explore the determinants of energy related carbon emission increment in Beijing, Logarithmic Mean Divisia Index (LMDI) decomposition method based on the input-output model is applied, and a comprehensive analysis from overall & sectoral perspective with multi-level factor decomposition is provided. First, carbon emission drivers are decomposed into three first-level overall factors from general perspective, i.e., emissions coefficient (e), production structure (L), and final demand (Y). Second, decompose the drivers into eight second-level specific factors, to reveal the detailed driving mechanism. Based on the latest physical-monetary input-output table of Beijing, some interesting findings can be obtained via the empirical study. (1) The trajectory of CO₂ emissions in Beijing appeared an unstable trend from 1997 to 2012, which is associated with the extent of its coal consumption. (2) As for the first-level overall factors, emissions coefficient (e) is observed as the leading driver of Beijing's carbon emission mitigation, while final demand usually pull the emissions significantly. Specifically, production structure has become a strong factor to offset carbon emissions from 2007, which emerges an opposite effect during 1997-2007; As for the second-level specific factors, the final demands distribution (D) is consistently tested to be a key driver of Beijing's carbon reduction. (3) Regarding to the sectoral perspective, the sector of smelting and pressing of metals (S14) contributes to the emissions decline effectively, while the sector of production and supply of electric and heat power (S4) and the transportation sector (S19) promote the increase of emissions obviously. This study shed light on policy makers to choose the scientific and effective industrial structure adjustment strategies and provide some other policies which can conduce to Beijing's emission mitigation.