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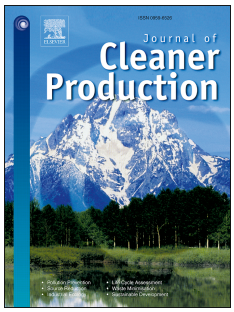

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A comprehensive enterprise classification approach based on three indicators of emissions, efficiency and location

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Abstract: Enterprises, which are[1] the entities that must implement emission reduction policies, as well as other regional management bodies exhibit significant differences with respect to certain indicators. Previous studies mainly focus on one-indicator or one-sector evaluation methods, which are overly simple and inadequate for enterprise analysis. To solve this problem, this paper selects three key indicators for enterprise evaluation and proposes an integrated classification approach grouping enterprises into sets. The proposed approach comprises one main model and three sub-models. The sub-models (Emission Model, Data Envelopment Analysis Model and Geo-spatial Model) pre-compute the indexation of emissions, overall efficiency and geo-location conditions as input data for the main model. The main model synthesizes these three sub-models' inputs and classifies enterprises into different classification sets. For verification, we conduct a case study of 8,106 manufacturing enterprises in Shanghai. In the case study, the proportions of enterprises in top set, middle-top set, middle-low set and low set were 19.5%, 47.5%, 29.4% and 3.6%, respectively. The classification approach provides adequate quantitative technical support for flexible policy design and has the potential to promote efficient regional emission reduction, optimize regional industrial structures and distribute enterprises rationally.

Key words: local air pollutants; greenhouse gases; overall efficiency; location condition; evaluation; classification

1. Introduction

China's rapid economic development, specifically its rapid urbanization and industrialization, has contributed to a considerable increase in the country's consumption of fossil energy. In the past two decades, an increasing number of serious air pollution issues (e.g., haze) have occurred in wealthier regions, such as the Yangtze River Delta, the Pearl River Delta, and the Beijing-Tianjin-Hebei Metropolitan Region. As one of the largest contributors to greenhouse gas

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