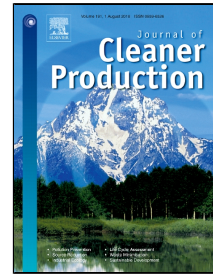


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# An Extended DEA-based measurement for eco-efficiency from the viewpoint of limited preparation

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**Abstract:** Eco-efficiency is an important index to measure the degree of sustainable development, and is now attracting emerging attentions from both academia and industry. Based on previous data envelopment analysis (DEA) studies on environmental performance, this paper combines the big data environment, specific environmental issues in recent years, and related environmental policies. This study illustrates a more specific production process for pursuing higher environmental performance (it is not possible to further reduce undesired outputs by remodelling the process) and proposes a dynamic environmental performance evaluation model that considers the use of environmental inputs multiple times based on DEA. Our model can achieve dynamic and forward-looking evaluations of environmental performance in all stages based on real-time data that contains environmental protection inputs in sustainable cycles. Due to the dynamic and forward-looking results of the model evaluation, our model can also assist DMUs (decision-making units) in selecting schemes to enable them to have higher eco-efficiency from numerous schemes of environmental protection and achieve scientific decisions in the era of big data. This paper also demonstrates an illustration of real-world data of China's major coal-fired power plants. Besides quantitatively showing how the power plants to adjust their production plans and environment protection plans, the results imply that there exists a positive correlation between the redundant inputs and the scales as well.

**Keywords:** DEA, eco-efficiency, redundant-input, dynamic evaluation

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