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"Gheorghe Asachi" Technical University of Iasi, Romania

A DR-DEA PRODUCTION SUPPLIER SELECTION MODEL FOR GREEN MANUFACTURING CONSIDERING POLLUTANT DISCHARGE

Yi Qu[1], Zhengkui Lin[1], Xiaonan Zhang[2], Honglei Li[2*]

[1]School of Maritime Economics and Management, Dalian Maritime University, Dalian, 116026, China
[2]School of Government Management, Liaoning Normal University, Dalian ,116029,China

Abstract

The coal-fired heating pours a large volume of sulfur dioxide, nitrogen oxides, dust and other pollutants to the atmosphere, resulting in a serious impact to environmental air quality. It is not economic to improve the filtration technology simply, so controlling the source discharge is a method to be explored. As the main source of coal, suppliers' coal quality should be the guarantee of pollutant emission control. Thus, how to select a fewer pollutants of coal suppliers while considering economic benefit has become a critical question. Combining with the characteristics of government procurement, the research converts the supplier selection of coal procurement to the efficiency evaluation of decision-making units. On the bases of traditional Data envelopment analysis (DEA), this research introduces a pollutant-type attribute as undesirable outputs of DEA and then presents a model for supplier evaluation considering pollutant discharge (DR-DEA, Directional Russell-DEA). This model, which combined the advantages of directional distance function and enhanced Russell measure, can be quickly convergent solution space and effectively avoid unfairness caused by decision maker's corruption subjectivity during the supplier selection. It is found that when considering the emission of pollutants, within the range of low calorific value and paying a certain capital cost to choose the environmental protection coal supplier can greatly reduce the emission of pollutants, thus reducing the environmental pollution. Finally, the objectivity and validity of the presented model are verified by analyzing and comparing some examples.

Keywords: data envelopment analysis (DEA), government pprocurement, ppollutant ddischarge, supplier selection

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[*] Authors to whom all correspondence should be addressed: e-mail: lhl@lnnu.edu.cn