Performance measurement for incineration plants using multi-activity network data envelopment analysis: The case of Taiwan

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Abstract

This study proposes the use of multi-activity network data envelopment analysis to appraise how incineration plants in Taiwan perform. Sample data from 2006 is used to examine the trade-offs between efficiency enhancement and pollution abatement. The respective efficiencies of the waste treatment and electricity generation are also assessed in a unified framework. The empirical results indicate that it is more important to improve the efficiency of waste treatment activity than of electricity generation activity in order to enhance the overall performance of Taiwan's incinerators. Since ownership, location and length of operations do not in general affect their performance, any improvement has to come from the careful monitoring of each process of the waste treatment operations. Furthermore, given that the policy in Taiwan has moved away from incineration to recycling, the problem of an over-supply of incinerators may become apparent in the near future. Our results indicate that the availability of capacity size may be an important factor when policy-makers consider whether to close down some existing incinerators.

Keyword：Incinerator, Russell multi-activity network data envelopment analysis, Undesirable outputs, Directional distance function