

A Blending and Inter-Modal Transportation Model for the Coal Distribution Problem

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Abstract—The problem of how to plan coal fuel blending and distribution from overseas coal sources to domestic power plants through some possible seaports by certain types of fleet in order to meet operational and environmental requirements is a complex task. The aspects under consideration includes each coal source contract's supply, quality and price, each power plant's demand, environmental requirements and limit on maximum number of different coal sources that can supply it, installation of blending facilities, selection of fleet types, and transient seaport's capacity limit on fleet types. A coal blending and inter-modal transportation model is explored to find optimal blending and distribution decisions for coal fuel from overseas contracts to domestic power plants. The objective in this study is to minimize total logistics costs, including procurement cost, shipping cost, and inland delivery cost. The developed model is one type of mix-integer zero-one programming problems. A real-world case problem is presented using the coal logistics system of a local electric utility company to demonstrate the benefit of the proposed approach. A well-known optimization package, AMPL-CPLEX, is utilized to solve this problem. Results from this study suggest that the obtained solution is better than the rule-of-thumb solution and the developed model provides a tool for management to conduct capacity expansion planning and power generation options.

Keywords—Blending and inter-modal transportation model, Integer programming, Coal fuel.

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