Transportation Cost Optimization Model for the Petroleum Industry

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Abstract

The petroleum industry faced a two-pronged crisis in the past year, one of supply glut due to OPEC-Russia price war and second of lower demand due to COVID'19. During such supply chain disruptions, cost-effective strategies are a savior for any industry from bankruptcy. The logistic is one of the fertile areas to reduce the bottom line in the cost-intensive petroleum industries. In the present paper, we propose the multi-product, multi-modal transportation cost optimization model for the petroleum industry's downstream supply chain. The MILP model is proposed and solved on AMPL software with the MINOS solver. The comparison of the optimized solution with real practice is also proposed, and the reasons for choosing sub-optimal solutions by the managers are also enlisted. The relationship between the absolute and per-unit transportation cost with the demand and pipeline capacity is identified through different experiments and sensitivity analyses. We found that absolute and per-unit transportation cost decreases with an increase in pipeline capacity and increases with an increase in depot demand. We also proposed the decision support systems prototype for the managerial implementation of our model.

Keywords
Cost Reduction Strategies, MILP, Multi modal Transportation, Petroleum Industry, Supply Chain Disruptions

Biographies

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