

Supply chain optimization of a hydrogen infrastructure under demand uncertainty

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This study addresses the design problem of the hydrogen supply chain consisting of various activities such as production, storage and transportation. The purpose of this study is to (1) develop a stochastic model to take into account the effect of the uncertainty in the hydrogen activities and (2) to examine the total network costs of various configurations of a hydrogen supply chain using the proposed model. A deterministic optimization model was first improved from previously existed model. A stochastic formulation based on the two-stage programming approach was then proposed to assure more realistic results. Uncertainty was introduced in the hydrogen demand of each region, which is estimated with an energy economy model and statistic data. This model was applied to evaluate a future hydrogen supply chain of Korea. Results include not only the investment strategy for the optimal supply chain configuration but also the effect of uncertain demands.