

Optimization of Hydrogen Supply Chain with Transportation and Pipeline Considering Risk Assessment

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Global climate change and exhaustion of fossil fuels have been making pressure to introduce renewable and sustainable energy sources. Hydrogen is one of the most promising energy carriers which can increase energy efficiency and reduce carbon emission. While the use of hydrogen fuel is expected to rapidly increase in transportation, energy storage system, and fuel cell for electricity generation, research on optimization methodology to design hydrogen supply chain is still required to minimize investment cost for hydrogen infrastructure. This study constructs an optimization model for hydrogen supply chain in case of South Korea and considers various production technologies (by-product hydrogen in petrochemical complexes, steam methane reforming, and renewable energy), transportation modes (Liquified hydrogen by tanker truck and pressurized gaseous hydrogen by tube trailer and pipeline), and storage facilities of which risk assessment was also performed.