

Evaluation of green hydrogen transportation strategy considering regional conditions and purposes of hydrogen usage

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Hydrogen is an attractive candidate for substituting carbon-based energy due to its environmental sustainability. Especially, many researchers take renewable energy integrated hydrogen production into primary option. However, the production capacity of renewable energy integrated hydrogen (green hydrogen) is geographically restricted (regional weather conditions), mass production of green hydrogen is only available in restricted regions. Thus, transportation of hydrogen should be simultaneously considered to evaluate actual viability of hydrogen economy. There are currently four methods to transport hydrogen are currently available on a large-scale. Cryogenic tanker truck (liquid hydrogen), tube trailer (compressed gas hydrogen), pipeline, and off-site hydrogen production. In our research, transport-considered energy performance of hydrogen is analyzed depending on the characteristics of hydrogen usage (e.g., distance from green hydrogen plant, purpose of usage, etc.). Furthermore, optimal transportation strategy is proposed via optimization-based analysis.