

Hydrogen supply chain optimization utilizing existing infrastructure

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Establishing a hydrogen infrastructure is essential to achieve a future hydrogen economy. However, the levelized cost of hydrogen is expensive in the near- and midterms due to the absence of infrastructure. In this study, we aimed to minimize the installation cost of the hydrogen supply chain by utilizing the existing infrastructure, including byproduct hydrogen and natural gas pipeline networks. Compared to the scenario in which existing infrastructure is not used, the average levelized cost of hydrogen decreased by 0.93 \$/kg H<sub>2</sub> when using byproduct hydrogen and by 1.4 \$/kg H<sub>2</sub> when using the natural gas pipeline network. When both the natural gas pipeline network and byproduct hydrogen were utilized, the cost decreased by 2.03 \$/kg H<sub>2</sub>. Our results indicate that utilizing the natural gas pipeline network lowers the supply cost more effectively than utilizing byproduct hydrogen. In the case of countries with fully developed natural gas pipeline networks in which large amounts of byproduct hydrogen are available, this planning will be adequate to buffer infrastructure construction costs in the early market.