

# **Optimizing Green Hydrogen: Out-of-Plant Levelized Cost of Hydrogen (LCOH) Reduction through Inflation Reduction Act and Oil & Gas Asset Integration**

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## **ABSTRACT**

Green hydrogen is increasingly seen as one of the key solutions for decarbonizing hard-to-abate sectors. To catalyze the widespread adoption of green hydrogen, an in-depth exploration of its economic viability and operational flexibility is essential. This research employs a Monte Carlo simulation to rigorously analyze the out-of-plant Levelized Cost of Hydrogen (LCOH), considering the variability in solar and wind energy, electrolyzer efficiency (60% to 80%), and then the technical feasibility of retrofitting oil and gas infrastructure for hydrogen transport. Key parameters like solar irradiance and wind speed (6-9 m/s) are explored within the study's parameter space, with the LCOH aimed to be reduced from \$4.36/kg to \$1.67/kg through the Inflation Reduction Act's intervention. Drawing on insights from key studies, this research also delves into the feasibility of transporting hydrogen through natural gas pipelines by repurposing them, addressing operational challenges such as the need for more powerful compressors and reduced distances between stations, as well as the potential for efficiency losses over long distances. This research demonstrates the viability of a strategic approach to repurpose existing infrastructure, addressing these challenges while advancing the hydrogen economy.

The findings highlight the dual benefits of integrating green hydrogen into the oil and gas sector: leveraging existing infrastructure for sustainable energy practices and reducing the carbon footprint, aligning with environmental sustainability goals. This study supports ongoing efforts for a clear, actionable roadmap for the oil and gas industry's transition to sustainability and underscores the critical role of policy and technological advancements in shaping a competitive and sustainable energy landscape.



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