

Feasibility of repurposing trans-mediterranean natural gas pipelines for green hydrogen transport: a techno – economic assessment of the Morocco – Europe corridor

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Abstract

The decarbonization of European energy supply has renewed interest in North Africa as a strategic source of renewable energy. Morocco, endowed with exceptional solar and wind resources and proximity to European markets, represents one of the most viable candidate export nations. However, the economic feasibility of hydrogen delivery hinges critically on transport infrastructure specifically, whether the existing trans-Mediterranean natural gas pipeline network can be repurposed for hydrogen service. This paper presents a techno-economic assessment of pipeline repurposing feasibility for the Morocco-Europe hydrogen corridor, combining materials integrity analysis, hydrogen embrittlement risk evaluation, and cost modelling. Three transport scenarios are evaluated: direct pipeline repurposing, new dedicated hydrogen pipeline, and ammonia carrier shipping as a benchmark alternative. Results indicated repurposing is technically feasible for a subset of the existing pipeline infrastructure, subject to operating pressure reductions and targeted material upgrades, with levelized transport costs ranging between 0.8-1.4/kg H₂ compared to 1.1-1.8/kg H₂ for ammonia shipping. Policy implications and conditions for cost competitiveness are discussed.

Keywords: green hydrogen, pipeline repurposing; hydrogen embrittle; Morocco; energy transition; transition corridor; techno-economic analysis.

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