

Green hydrogen in Germany: Economic viability under alternative policy scenarios for a viable and just energy transition

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Extended Abstract

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Abstract Summary

The abstract analyzes whether green hydrogen can become economically viable in Germany under alternative policy scenarios and how this relates to a just energy transition. It starts from the observation that hydrogen deployment is currently constrained by a gap between delivered hydrogen costs and the prices potential offtakers are willing to pay. German and EU policy therefore focus on market creation through infrastructure expansion, buyer-supplier coordination, and targeted support mechanisms rather than on generic technology promotion alone.

Methodologically, the paper uses a scenario-based techno-economic and market-competitiveness analysis. It estimates delivered hydrogen costs for decentralized or regional supply under different assumptions, compares these costs with sector-specific willingness-to-pay thresholds from the literature, and then tests how alternative policy scenarios affect the remaining cost gap. The scenarios capture measures that influence capital costs, operating costs, electricity-related cost components, and transport or distribution costs.

The expected results suggest that the viability of green hydrogen in Germany depends mainly on whether policy and infrastructure conditions can reduce costs enough to approach sector-specific willingness to pay. Supportive scenarios improve competitiveness, but not uniformly: sectors with high willingness to pay or stronger regulatory pressure are more likely to become viable, while more price-sensitive applications may remain uncompetitive even under favorable assumptions.

The main conclusion is that Germany's hydrogen ramp-up should be understood primarily as a competitiveness problem shaped by policy and infrastructure. From a just energy transition perspective, this matters because, without targeted intervention, hydrogen deployment is likely to benefit mainly sectors that can already absorb higher costs. Policies

that reduce this gap can therefore support a more inclusive and more evenly distributed decarbonization process across sectors.

Presenting Author Biography

Mathias Garcia Lange is a research associate at RWTH Aachen University under the Chair of Energy System Economics and at the Institute for Future Energy Consumer Needs and Behavior. He currently works on the SAGE-BRIDGE project, developed in partnership with the SARChI Chair in Just Energy Transition in South Africa. His research focuses on energy system analysis, LCA and green hydrogen.