

Modelling Global Hydrogen Supply: Incorporating Green Hydrogen Export Potentials into Supply Curves

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Extended Abstract

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Abstract Summary

Hydrogen is emerging as a key energy carrier in the transition to low-carbon energy systems, highlighting the need for robust modelling of global hydrogen trade. Existing supply curve approaches typically combine levelized costs of hydrogen (LCOH) with technical production potentials, which often overestimate feasible supply by neglecting political, economic, and strategic constraints.

This study introduces the concept of *green hydrogen export potentials*, representing the quantities countries are likely to allocate for export based on national strategies, planned capacities, and domestic demand. By integrating these export potentials with LCOH data collected through a systematic literature review, the study develops a more realistic framework for global hydrogen supply modelling. Export potentials are estimated using three approaches: analysis of national hydrogen strategies, assessment of planned production capacities alongside domestic demand projections under alternative scenarios, and approximation through availability factors where direct data are lacking.

The analysis identifies 90 countries with hydrogen strategies, of which 72 consider themselves potential exporters, though only 18 define quantitative export targets. Data availability varies significantly across regions, with limited forward-looking projections and sparse hydrogen demand data outside the EU. Availability factors also show high variability, limiting their reliability for global application.

Overall, incorporating export potentials yields a more policy-relevant representation of global hydrogen supply. The findings highlight limited specificity in trade targets and evolving participation in hydrogen markets, with implications for price formation and international trade. Future work should integrate infrastructure constraints and renewable expansion pathways to further refine market modelling.

Presenting Author Biography

Dhakshain Balaji Venkatesh completed his Master of Science in Power Engineering at the Technical University of Munich (TUM) in February 2025. During his studies, he researched the global production and transport of renewable energy carriers. Since November 2025, he is part of the Energy Systems and Market Design research group at the University of Technology Nuremberg (UTN), where he specializes in international hydrogen markets. His research interests include techno-economic analyses of energy systems, renewable energy markets and policy, and hydrogen economy.