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Determinants of Green Hydrogen Project Progression to Final Investment Decision and Operation: Evidence from Global Project-Level Data

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Extended Abstract

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Abstract Summary

This paper examines why some green hydrogen projects move from announcement to implementation while many remain stalled in early stages. Focusing on hydrogen electrolysis projects with dedicated renewable electricity supply, it asks which project-level and country-level characteristics increase the probability of reaching the final investment decision (FID) or operation. This question is important for energy economics because the implementation gap in green hydrogen affects the speed, cost, and reliability of industrial decarbonization.

The analysis combines project-level data from the IEA Hydrogen Production Projects Database with country-level information on infrastructure, renewable energy readiness, renewable electricity cost proxies, hydrogen policy intensity, governance quality, water stress, and investment conditions. Infrastructure variables are aggregated to the country-year level before merging to preserve the project structure of the sample. The baseline model estimates a logit specification in which project success equals one if a project has reached FID/Construction or Operational status, and zero otherwise.

The full merged dataset contains 2,617 hydrogen projects globally, including 1,371 dedicated renewable projects. Preliminary results suggest that technology is a strong predictor of advancement: PEM and alkaline electrolysis projects show higher odds of reaching FID or operation than the reference category. Renewable energy readiness is also positively associated with project progression, while large project scale is negatively associated in the baseline model, likely reflecting maturity effects because many very large projects are still recent announcements.

The findings suggest that green hydrogen deployment depends not only on project ambition but also on technology maturity and supportive national energy-system conditions. The paper contributes new global project-level evidence to debates on affordability, sustainability, and implementation in the low-carbon energy transition.

Presenting Author Biography

Zainab Sheikh is a Master's student at the Graduate School of Green Growth and Sustainability, KAIST, and a member of the ETP Lab (Energy, Technology, and Policy). Her research focuses on the determinants of hydrogen project development and the clean energy transition, using global project-level evidence on hydrogen economics, investment, infrastructure, and policy. She is particularly interested in how announced projects move toward implementation and in extending these insights to support energy transition and project deployment in MENA countries.