

Green Hydrogen in the Global South: Opportunities, Challenges, and Policy Pathways for Just Energy Transition and Sustainable Development

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Abstract

Green hydrogen is increasingly positioned as a strategic pathway for accelerating energy transition, industrial decarbonization, and advancing sustainable development. For countries in the Global South, it presents significant opportunities to leverage abundant renewable energy sources, diversify export portfolios, attract climate finance, and foster low-carbon industrialization in hard-to-abate sectors such as fertilizer, steel, shipping and heavy transport. However, these opportunities are accompanied by substantial challenges and deep uncertainties. Emerging expansion of green hydrogen projects may reproduce historical extractive trade patterns that create export-oriented enclave economies, exacerbate inequalities, intensify water and land pressures, and limiting local value creation. Furthermore, challenges related to energy access, environmental sustainability, financial constraints, and technological obsolescence raise critical questions about whether green hydrogen development in the Global South align with principles of just energy transition and broader sustainable development goals. This paper asks: (1) What opportunities does green hydrogen offer for industrial transformation and economic diversification? (2) What environmental, social, and economic risks may emerge from its deployment? (3) Which policy frameworks and governance mechanisms are needed to ensure equitable and sustainable outcomes? Drawing on recent academic and policy literature, the paper critically examines opportunities, risks, and trade-offs of green hydrogen development in Global South. It argues that green hydrogen should be embedded within integrated national development strategies rather than treated solely as a commodity for global decarbonisation. The paper concludes that equitable governance and strategic policy design are essential for ensuring that green hydrogen contributes meaningfully to sustainable development in the Global South.

Keywords: climate justice; decarbonisation; extractivism; global energy transition; green economy