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EUROPEAN HYDROGEN ENERGY CONFERENCE

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SEVILLE

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Plenary Session 3:
Aligning Green Hydrogen with People, Planet, and Prosperity

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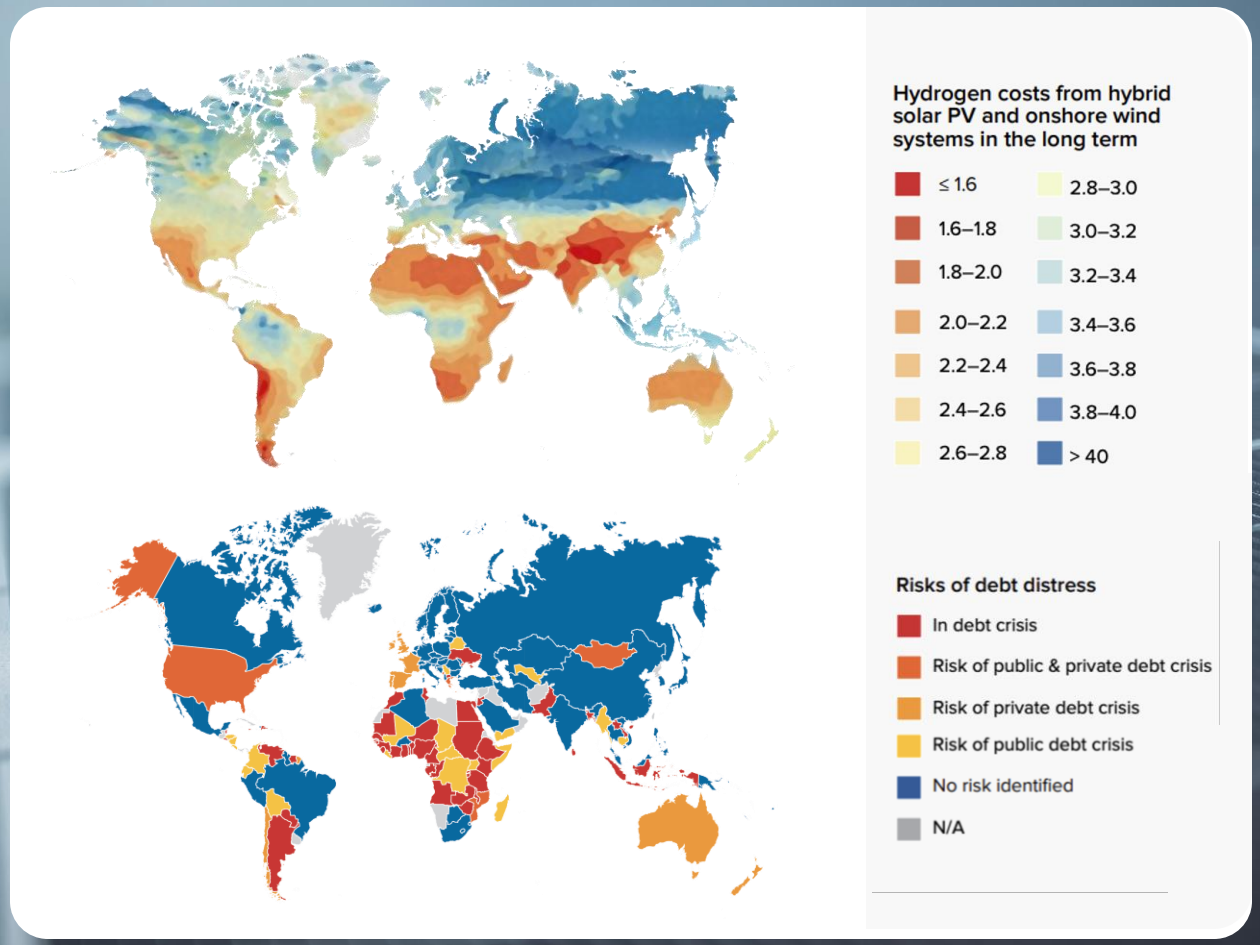
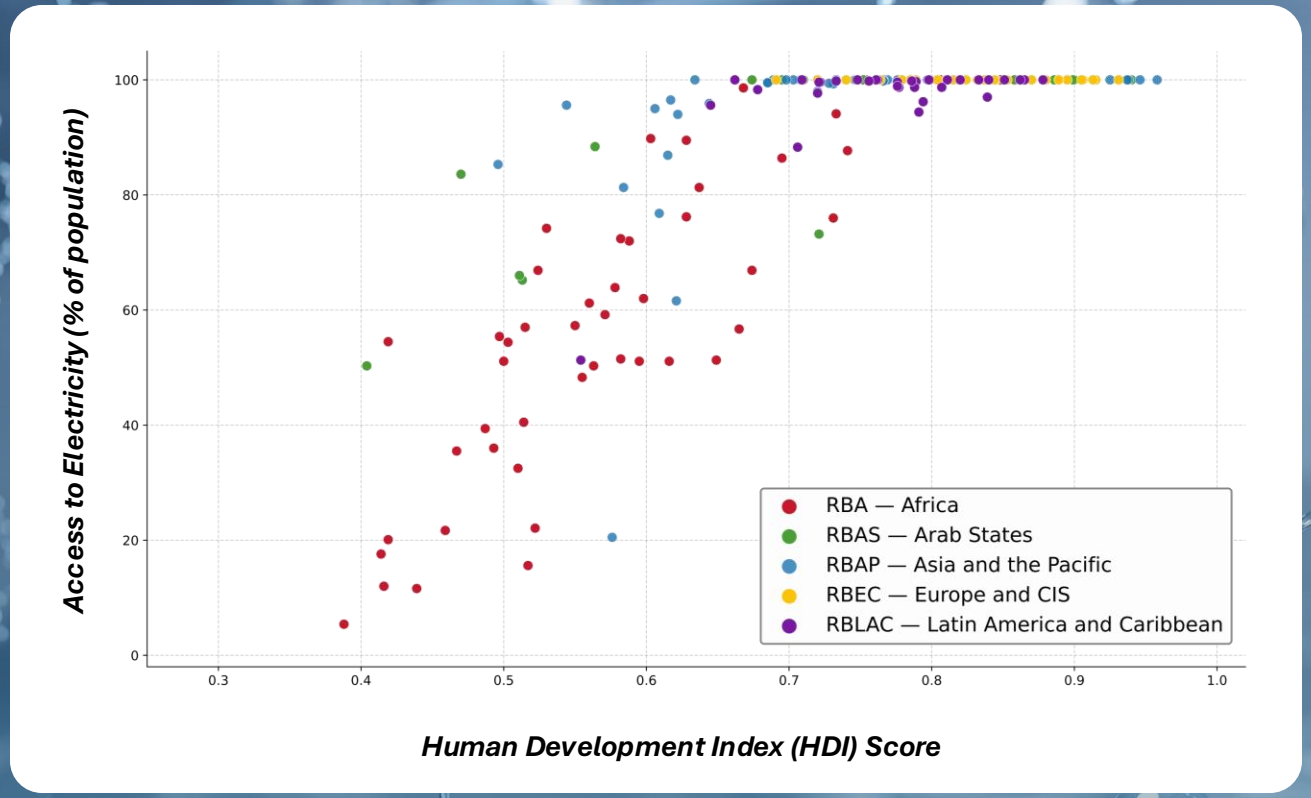
Sustainable Energy Hub
UNDP



Countries with the lowest production costs often face the highest debt distress risks
(Source : Debt Justice Data Portal, IEA)

Green hydrogen is gaining momentum, but who benefits from the transition?

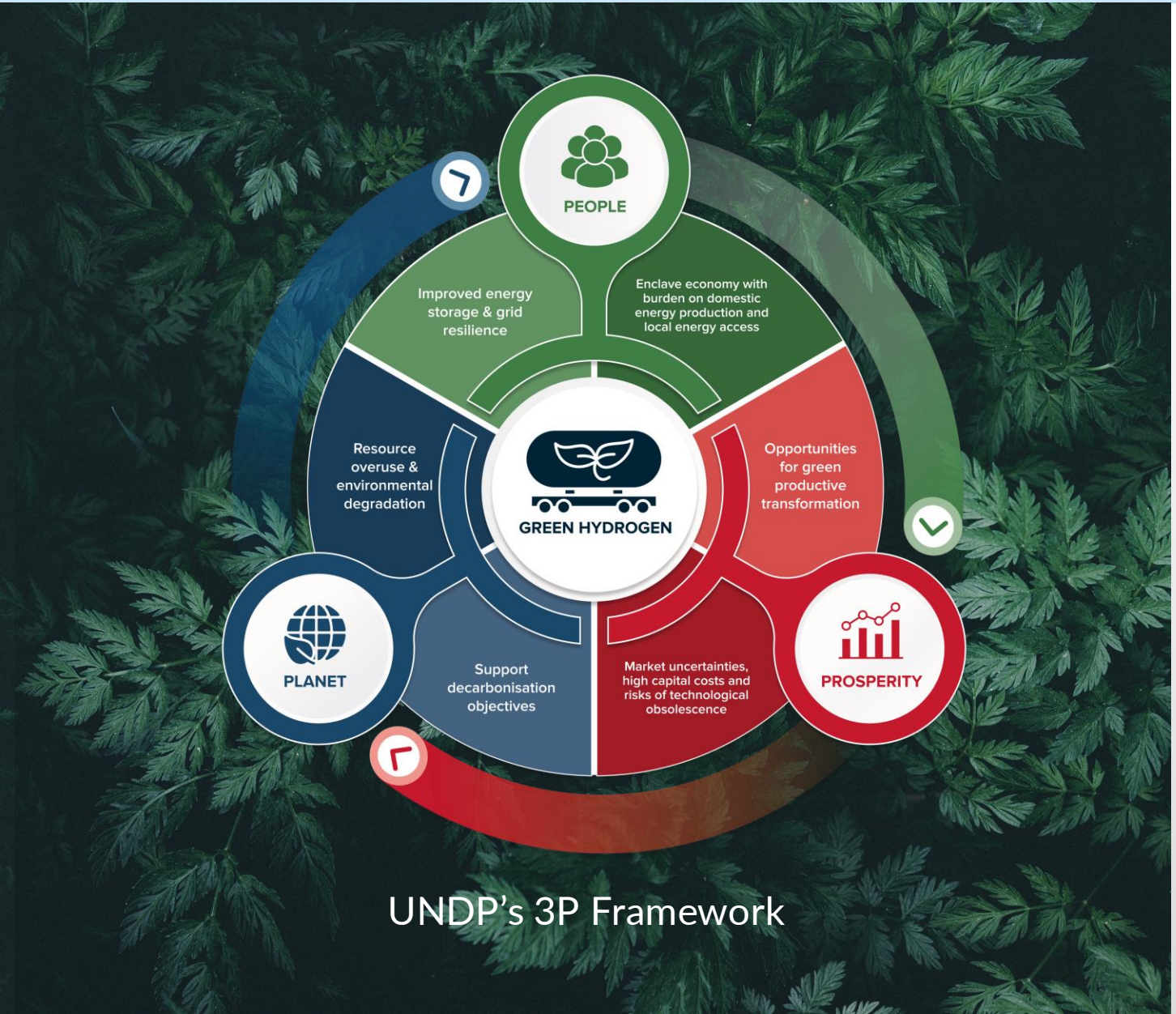
- 95–100 Mt of hydrogen demand today; <1% is low-carbon
- Demand could reach 430+ Mt by 2050; 71% in major economies
- €1–1.5/kg cost potential across parts of the Global South
- Yet 83% of investment is concentrated in Europe and China



HDI vs electricity access chart
(Source : 2025 UNDP Human Development Index (HDI) and Worldbank)

Hydrogen must first serve national development gains and energy security

- 58 countries and 2 regional organisations have hydrogen strategies
- Hydrogen can support energy security, jobs, and industry
- Namibia: 56% electrification; 7 GW renewables for 3 GW electrolysers
- At $4.5–12/kg, export-led projects can become energy enclaves



UNDP's 3P Framework

A 3P framework can align green hydrogen with sustainable development

- Hydrogen must be assessed beyond technical feasibility and market potential
- People: energy access, jobs, and local skills
- Planet: water, land, and biodiversity
- Prosperity: domestic value chains and inclusive growth


Chile

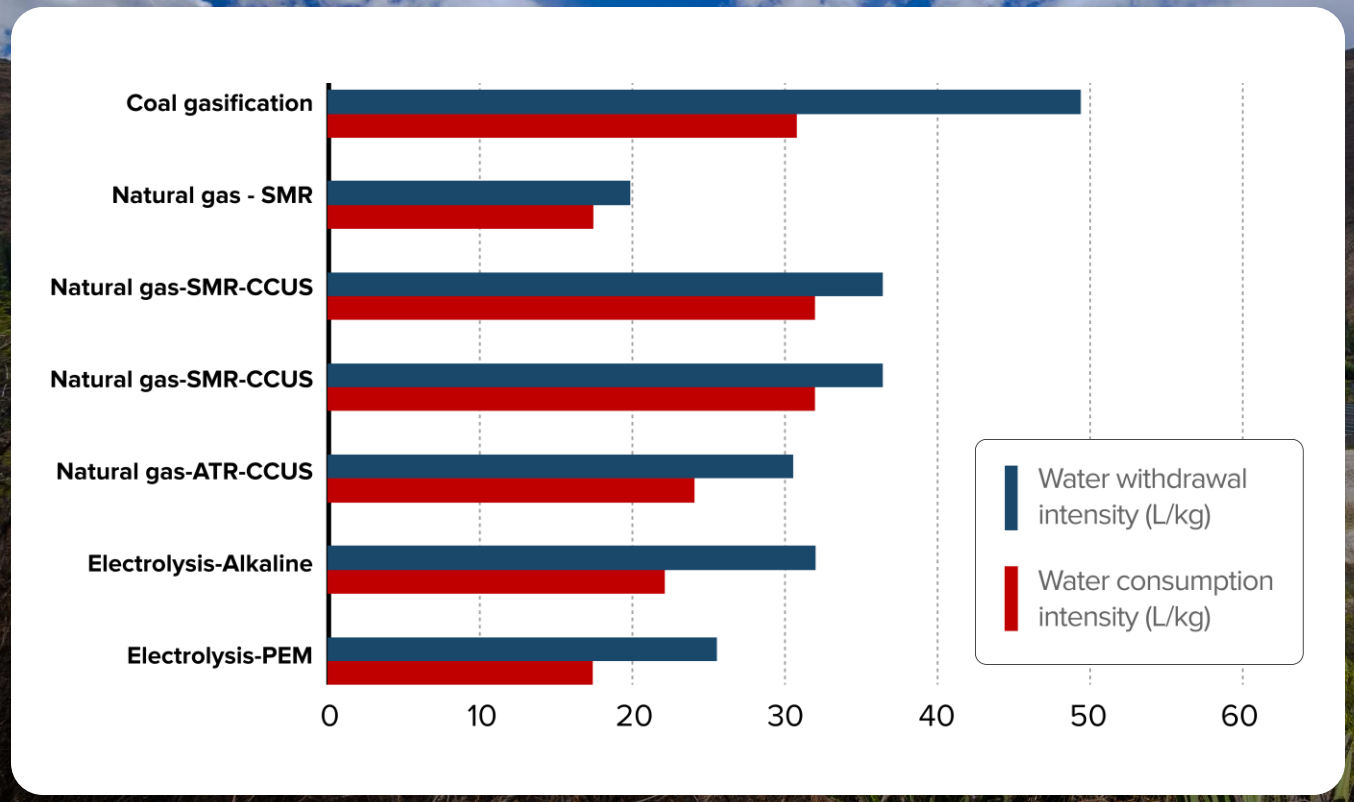

Namibia


India

PEOPLE: Hydrogen must improve human capital and energy access

Examples already shown this potential:

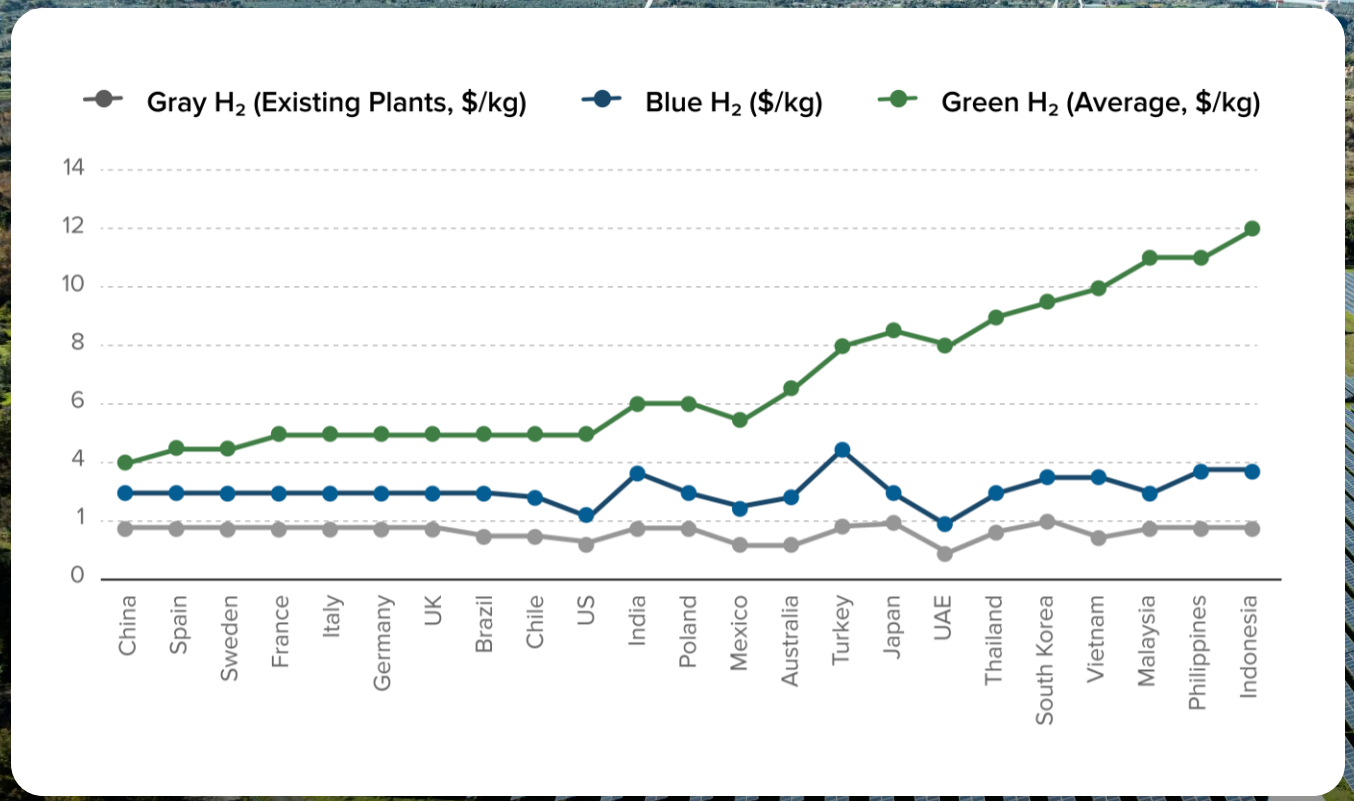
- Namibia: 56% electrification;
  7 GW renewables for 3 GW electrolysers
- Chile: 100,000+ jobs; Namibia: 15,000 construction jobs & 3,000 operations jobs
- India: 5 Mt by 2030, 500,000 jobs,
  125 GW enabled



A summary of water withdrawal and consumption intensities by hydrogen production technology
(Source : IRENA 2023)

PLANET: Hydrogen expansion must operate within environmental & climate limits

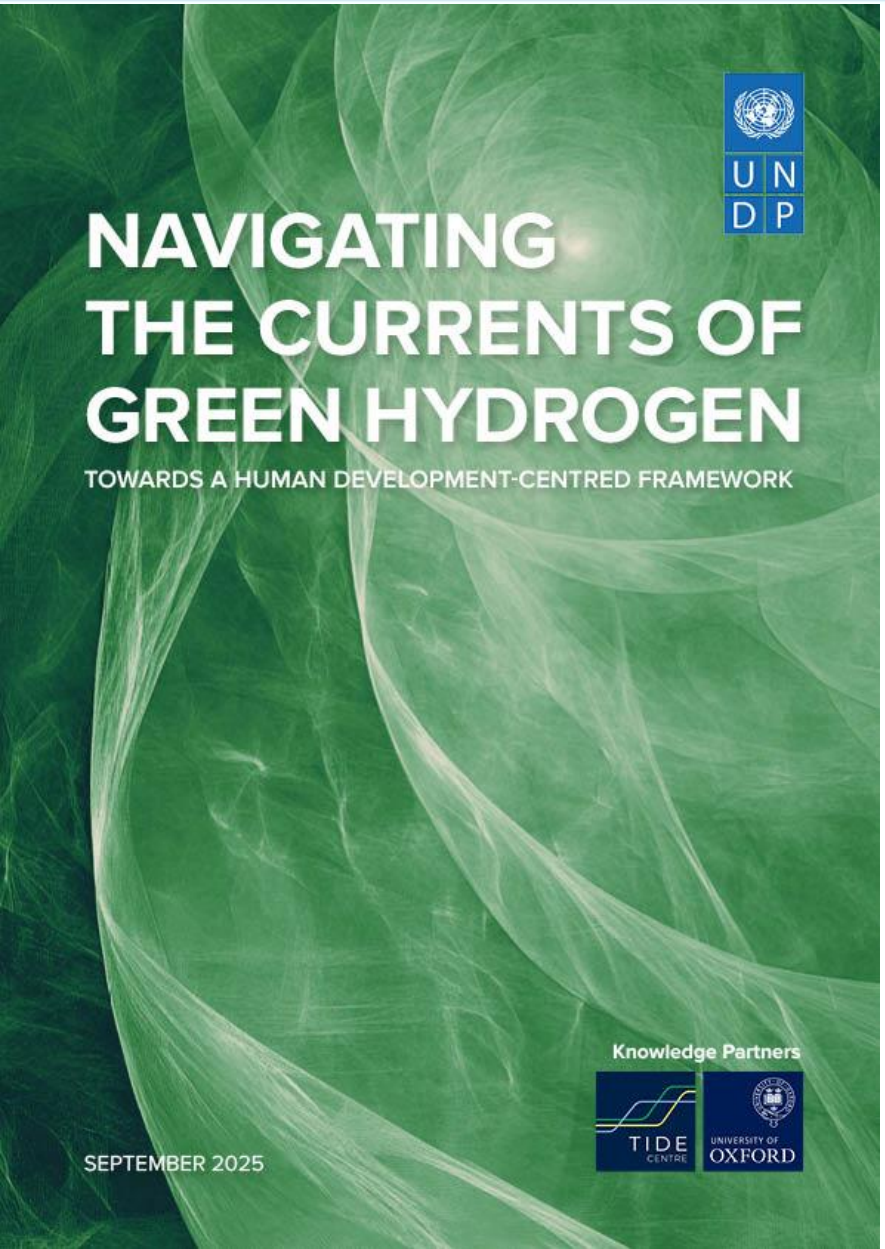
- 30,000 ha of solar panels may be needed per 1 Mt of hydrogen
- 70% of planned electrolyser capacity is in water-stressed regions
- 2 Mt of hydrogen can require 18 million m^3 of water
- Hydrogen also depends on critical minerals, with value chains still highly unequal

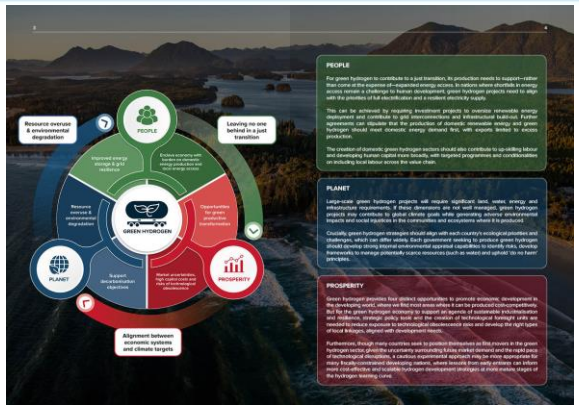


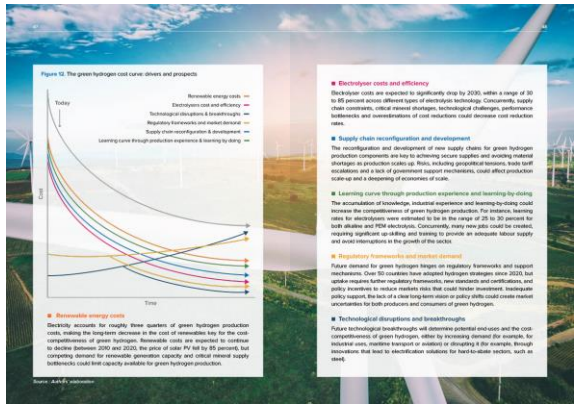
Estimated differentials in the levelized cost of hydrogen by energy source and market
(UNDP, 2025, based on BloombergNEF data)

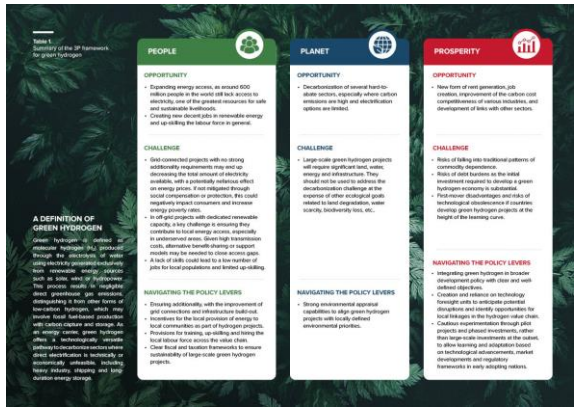
PROSPERITY: Financing hydrogen must generate inclusive economic growth

- Green hydrogen still costs $4.5–12/kg
- Cost gaps range from < $4/kg to > $7/kg across markets
- Abatement costs are $500–1,250 per ton of CO_2
- Finance alone does not ensure inclusive growth









UNDP helps countries align green hydrogen with People, Planet, and Prosperity

- UNDP and the Oxford TIDE Centre's 3P framework helps align hydrogen with people, planet, and prosperity
- UNDP supports regulation, permitting, and investment design
- The transition must centre people and ecosystems

Thank You!

For further information, please contact:

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