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Kenya Should Prioritize Grid-Integrated Hydrogen

BLUF: Kenya's current green hydrogen strategy prioritizes standalone production and fertilizer end-use, in lieu of a grid-integrated approach. But Kenya's energy and food-security goals would be best served by integrating hydrogen into the power system, as flexible demand and storage that lowers overall system cost.

Why this matters: Kenya launched its Green Hydrogen Strategy in 2023 with a goal of applying its renewable resources to the domestic production of hydrogen-derived products like fertilizer, focusing on standalone energy sources disconnected from the grid. Since then, the government has introduced incentives and regulatory guidelines to encourage investment. At the end of 2025 — with hydrogen costs still high, global investment cooling, and four proposed projects stalled in early development — the Kenyan government announced the start of construction on just one project, powered by a dedicated 165 MW geothermal power plant. This memo uses recent modeling work by Xi Xi and co-authors to argue against a standalone hydrogen production strategy in Kenya, and for a more integrated approach.

Kenya's standalone hydrogen production strategy is costly

Kenya's hydrogen strategy has three core problems:

1. **Using dedicated renewables for hydrogen production raises costs.** Most of the Kenyan hydrogen projects announced since 2023 rely on new geothermal or solar capacity (see table below). Electricity accounts for up to 70% of hydrogen production costs, and large-scale renewables remain 2–3 times more expensive than what is needed for low-cost hydrogen. While scaling can reduce costs, it requires high upfront capital and risks locking in production without confirmed buyers. Storage and transport infrastructure further increase cost. Hydrogen will remain expensive without major cost reductions in electrolyzers and renewables.
2. **Renewable hydrogen-based fertilizer would remain unaffordable for locals.** Estimates from the World Resources Institute show fertilizer produced in Kenya from renewable hydrogen would cost well above current prices (excluding the impacts of shocks associated with the U.S.-Israeli attack on Iran in March 2026). For local farmers, who already pay nearly twice as much as global prices, high-production costs would mean a prohibitively inaccessible fertilizer market.
3. **Treating hydrogen as a standalone sector to be built at any cost is risky.** Kenya's hydrogen strategy narrowly focuses on fertilizer and methanol production, without considering cost, viability, demand, early adoption risks, or interaction with the broader

energy and industrial sector. Without a serious account of these factors, Kenya is on the path to building a sector that is high cost, high risk, and has limited spillover benefits.

Project Name	Announced Project Details	Final End Use	Energy Source for H_2	Status (2026)
Fortescue Project	Proposed 300 MW green ammonia and fertilizer facility using geothermal resources from the Olkaria field in Naivasha.	Ammonia / Fertilizer	Standalone, Geothermal	Feasibility study
Naivasha–Olkaria Project	100 MW facility expected to produce ~300,000 tonnes of fertilizer annually. Estimated investment $800 million.	Local Fertilizer Production	Standalone, Geothermal	Construction began in 2025
Mombasa Port Project	Concept proposal for a 1 GW electrolyzer facility located near Mombasa Port for hydrogen-to-ammonia production.	Not specificed	Not specified (likely renewables)	Concept stage
Renewstable Project	180 MW solar PV project with storage supporting hydrogen production. Estimated $500 million investment.	Power + Local Fertilizer	Standalone, Solar PV + Storage	Feasibility study
Talus Project	2.1 MW solar to produce 1.1 ton of fertilizer a day.	Local Fertilizer Production	Standalone, Solar	Feasibility study, Offtake secured

Source: Energy for Growth Hub & IEA Hydrogen Production Database(2025) • Created with Datawrapper

Grid-integrated hydrogen provides greater benefits than standalone

Xi Xi and co-authors modeled Kenya's future electricity system with grid-connected hydrogen and standalone hydrogen. They found that grid-connected hydrogen, with technology cost declines, lowers both hydrogen production costs and total electricity system costs by:

- consuming excess power and producing hydrogen during low-cost electricity times,
- enabling demand shifting for Kenya's growing variable solar and wind adoption,
- allowing generators to operate at higher utilization, lowering the cost of electricity, and
- being deployed as local power sinks near expanding generation sites where transmission development is either difficult or more expensive.

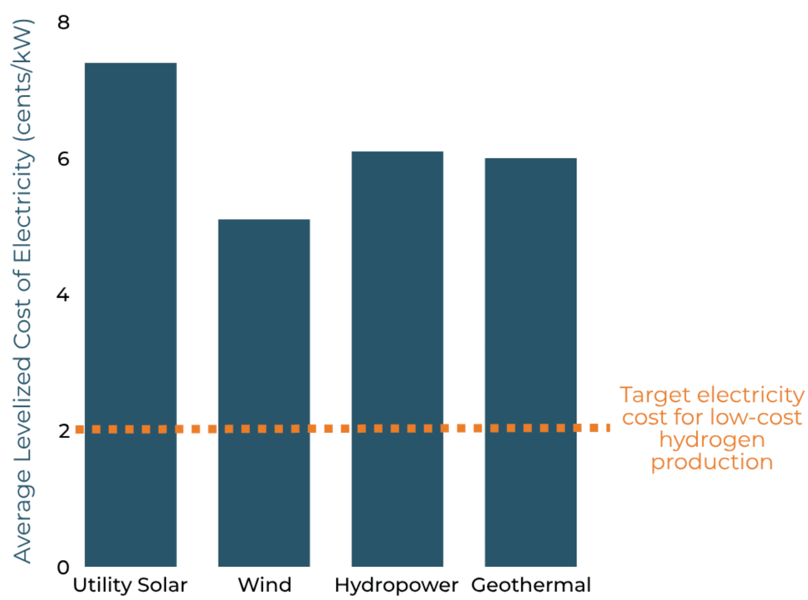
This study showed grid-connected electrolyzers reduce levelized electricity costs in Kenya by more than 17% and generate more than $135 million in cumulative system cost savings by 2050, while producing hydrogen that is at least as cost-competitive as standalone projects.

Kenya: Ditch standalone solutions; grid-integrate hydrogen instead

To meet its long-term food security and affordable power goals, Kenya should pursue grid-integrated hydrogen, where it fits within industrial strategy. In the near-term, Kenya should:

- **Avoid promoting green fertilizer before costs fall to sustainable levels** through technological breakthroughs, risk reduction, or a decline in energy project costs in Africa.
- **Focus on reducing the cost and improving the reliability of the grid**, as it is the largest cost determinant for hydrogen production and a bottleneck for economic growth.
- **Be a regional first-mover but a global second-mover on hydrogen.** Technology risks and costs have to decline to make hydrogen projects (on- or off-grid) financially viable. Kenya can avoid the costs and risks of early adoption while developing readiness by : (1) using pilot projects to build technical and institutional capacity and reduce soft costs in permitting, procurement, and project development and (2) monitoring global advancements, maintaining partnerships with other countries, and shaping hydrogen certification standards.

High electricity cost keeps hydrogen unaffordable in Africa



Source: IRENA RENEWABLE POWER GENERATION COSTS IN 2024.
All values are African regional averages except for Geothermal.

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Endnotes

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