UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

GLOBAL PROGRAMME
HYDROGEN IN INDUSTRY

Green ammonia for low-carbon fertilizer production

Case Studies from Egypt and Morocco

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22 September 2026

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Africa’s fertilizer constraint is a food, trade and energy challenge

22 kg/ha

Average fertilizer use in Africa

146 kg/ha

Global average fertilizer use

>90%

Share of fertilizer inputs imported

The result

Low input use constrains yields, while import dependence transmits global energy and supply-chain shocks directly to farmers and public budgets.

Green ammonia links fertilizer security, industrial decarbonization and energy sovereignty.

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The development case rests on outcomes—not hydrogen volumes

Green hydrogen is a means

1

Fertilizer resilience

Reduce exposure to imported ammonia and fossil-feedstock shocks.

2

Clean industrialization

Decarbonize existing production and build competitive new capacity.

3

Domestic capability

Create skills, suppliers and infrastructure that serve the wider economy.

The relevant question is not “How much hydrogen?” but “What development problem does it solve?”

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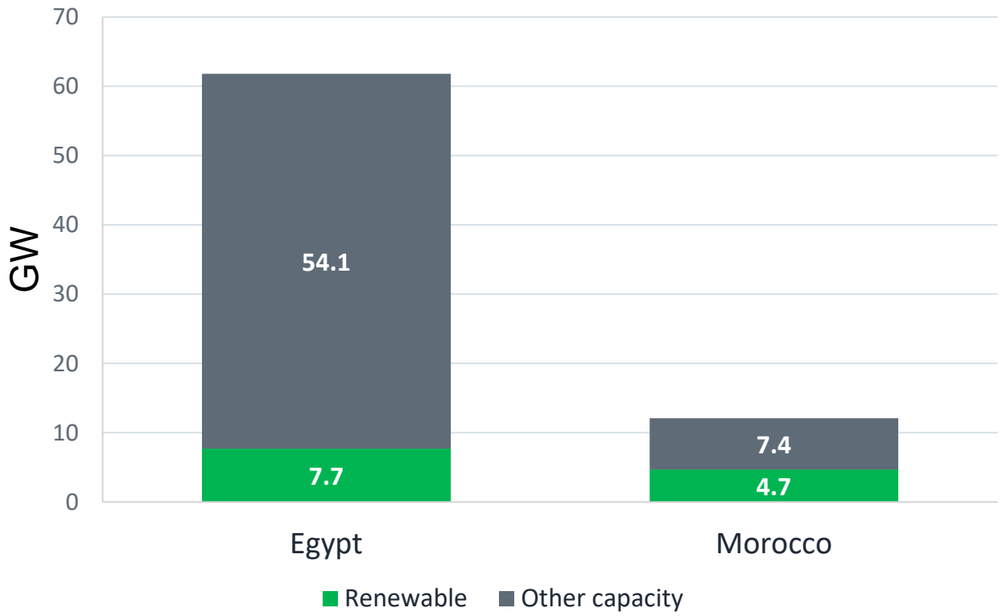
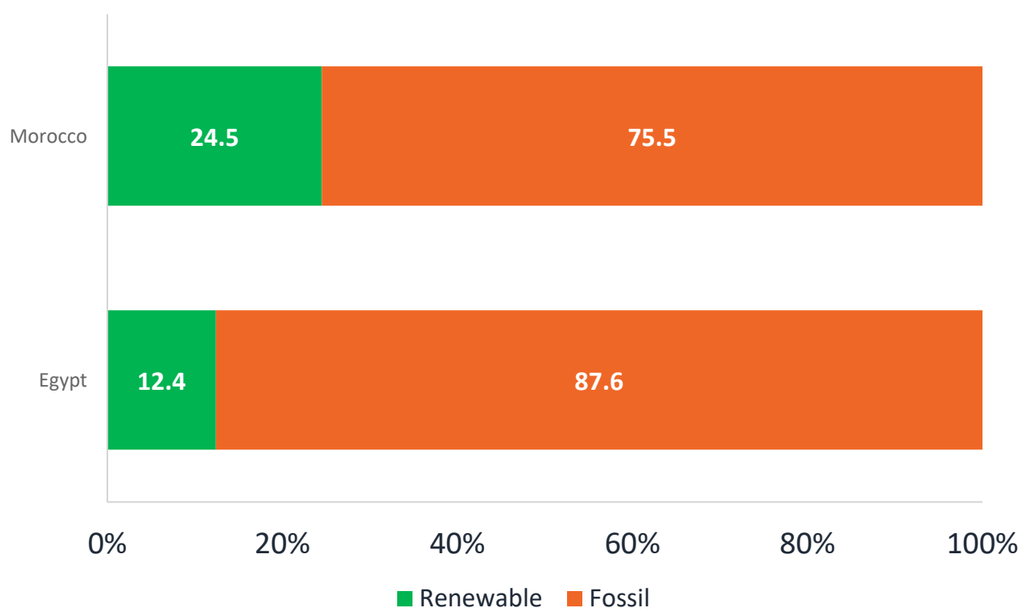
Green hydrogen cannot scale independently of clean electricity

Installed electricity capacity, 2024



Renewable share of electricity generation, 2024



Egypt produced 231.3 TWh in 2024; Morocco produced 42.5 TWh. Renewable capacity reached 9.3 GW and 4.9 GW, respectively, in 2025.

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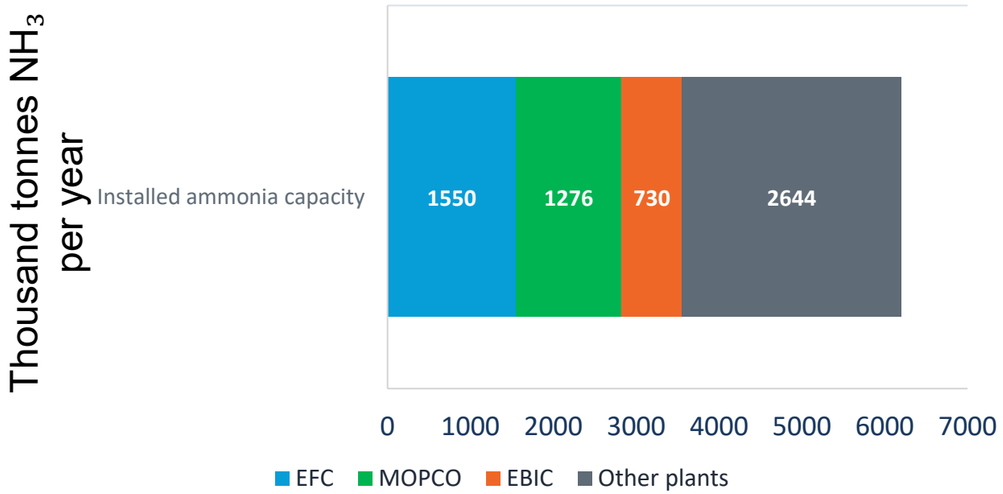
Two industrial vulnerabilities create distinct green ammonia pathways

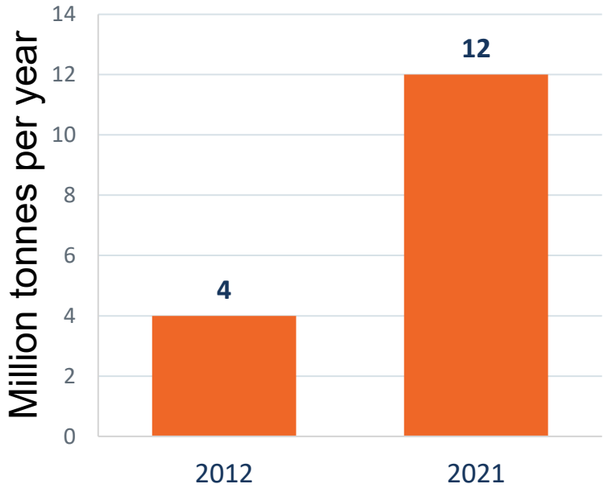
EGYPT: CONVERT AN EXISTING AMMONIA BASE



5.441 Mt

Ammonia produced in 2023
≈960 kt H_2 embodied annually

MOROCCO: COMPLETE THE FERTILIZER VALUE CHAIN



70%

of global phosphate-rock reserves

1.558 Mt

ammonia imported in 2023
≈275 kt H_2 embodied in imports

A world-scale fertiliser base still depends on imported ammonia.

Egypt can decarbonise an existing input. Morocco can localise a missing one. Both pathways require additional renewable electricity.

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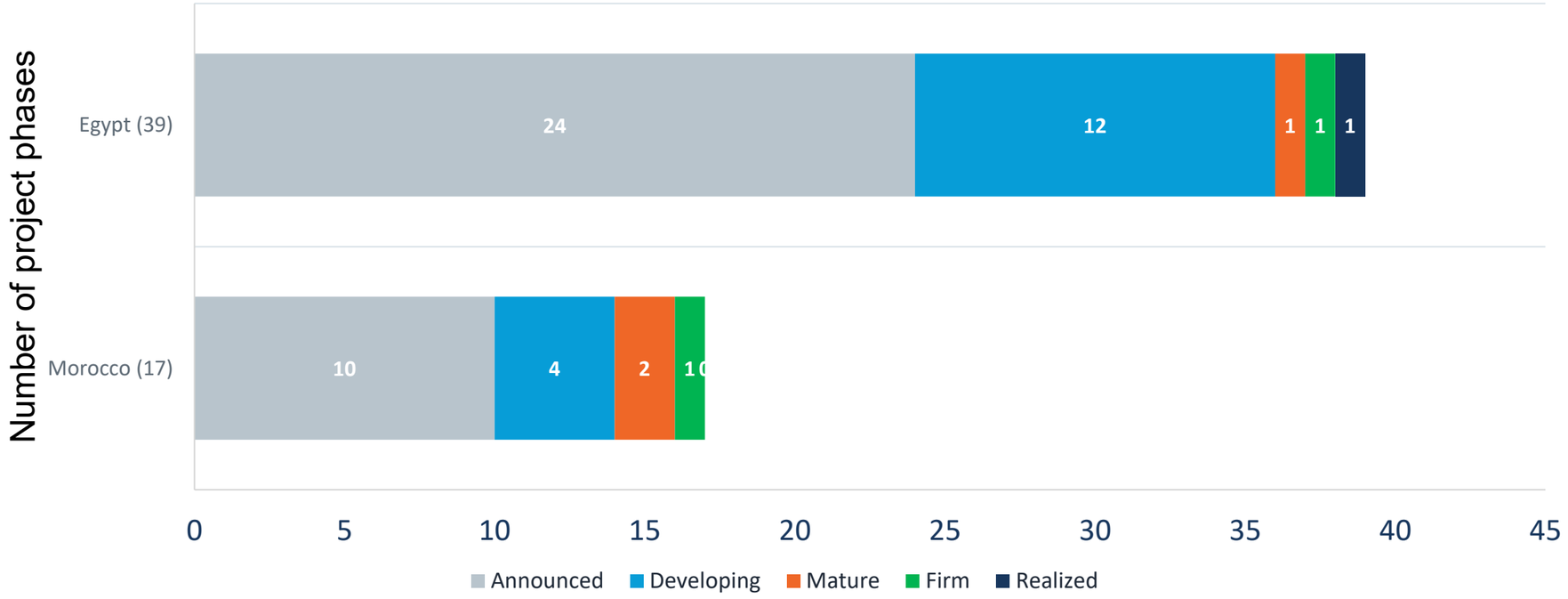
Most projects remain well short of operation

Number of listed project phases by maturity



EGYPT

1

realized pilot

MOROCCO

3

mature or firm

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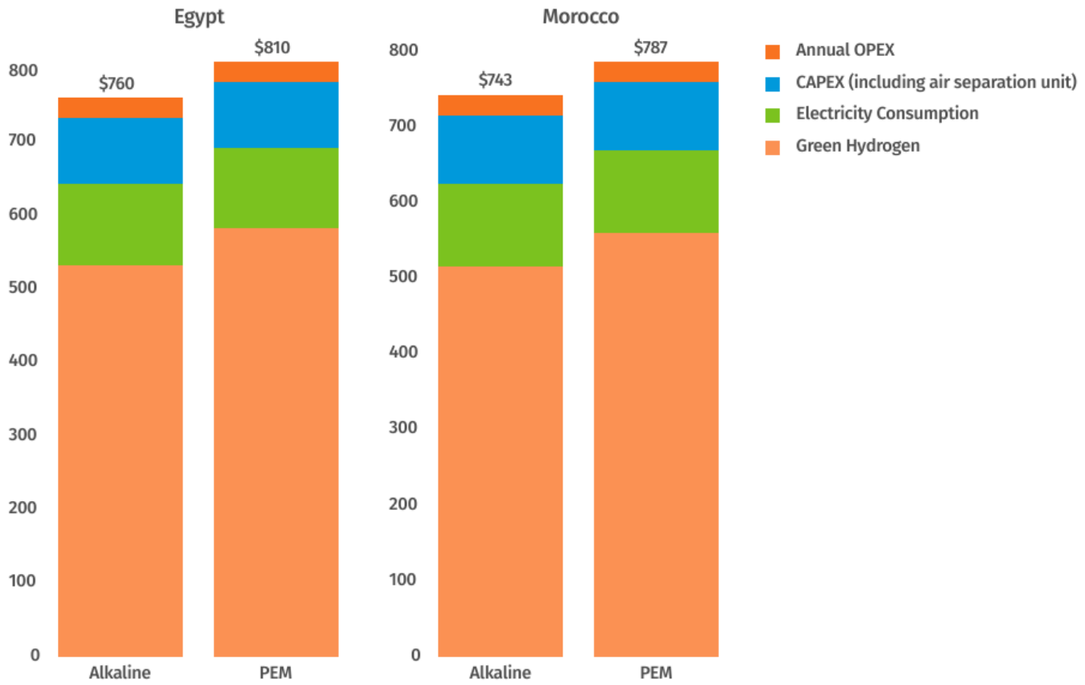
Green hydrogen drives the green premium

Figure 40. Cost breakdown of green ammonia production by electrolyser type



2030 COST

$743–810

per tonne NH_3

- Hydrogen is the largest component
- PEM remains costlier

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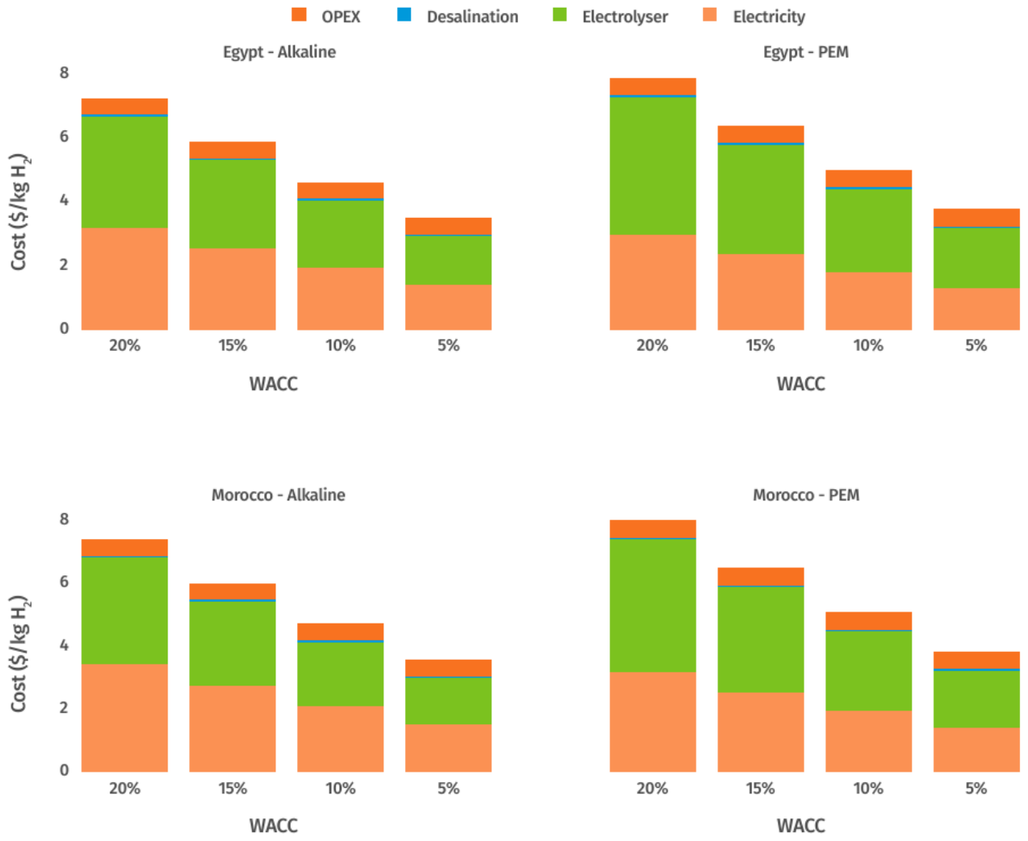
Lower capital costs can convert potential into investable projects

Figure 39. Impact of cost of capital on green hydrogen production costs



WACC

15% → 5%

≈45%

lower LCOH

De-risking should purchase implementation and domestic value—not merely transfer risk.

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Shared infrastructure determines who captures the benefits

23,733 km

Operational gas-pipeline network in North Africa

77.4%

Share of Africa’s operational gas pipelines

Strategic assets

- Ammonia-handling ports
- LNG terminals and storage
- Industrial fertilizer sites

Priority: assess what can be repurposed safely, where new infrastructure is required, and who pays for shared assets.

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Morocco has moved from a hydrogen roadmap to an investor-facing offer

2021

National roadmap

Targets hydrogen derivatives and import substitution for OCP's fertilizer production.

2024

Morocco Offer

A six-pillar framework covering land, infrastructure, incentives, investor selection and governance.

DELIVERY

MASEN + Steering Committee

A central investor interface and cross-government coordination mechanism.

ENABLERS

Investment Charter

Tax and customs exemptions; 300,000 ha initially earmarked; shared ports, grids, desalination and pipelines planned.

Policy direction

Domestic green-ammonia demand is projected at 0.5 Mt in 2030, 2.5 Mt in 2040 and 3.8 Mt in 2050—making fertilizer decarbonization the early industrial anchor.

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Egypt pairs production targets with unusually strong statutory incentives

LOW-CARBON HYDROGEN STRATEGY (2024)

1.5 Mt

green H_2 in 2030
central scenario

3.2 Mt

green H_2 in 2030
green scenario

- Central scenario: 19 GW renewables + 13 GW electrolysers by 2030
- Export orientation is explicit in both scenarios

GREEN HYDROGEN INCENTIVES LAW No. 2 (2024)

- 33–55% cash rebate on income tax from eligible activities
- VAT relief on imported inputs and zero VAT on exports
- Port-service, industrial-land and storage-fee reductions
- Golden License consolidates establishment and operating permits

Governance: the Prime Minister–chaired National Council for Green Hydrogen oversees implementation.

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One technology, two development pathways

EGYPT: SUBSTITUTE FOSSIL HYDROGEN

- Prioritize retrofits at operating ammonia plants
- Make new renewable generation an explicit condition
- Use guarantees to ease gas and financing constraints
- Link incentives to verified emissions reductions

MOROCCO: SUBSTITUTE AMMONIA IMPORTS

- Anchor offtake in OCP’s fertilizer value chain
- Prioritize domestic ammonia replacement alongside exports
- Coordinate renewable power, desalination and ports
- Use the Morocco Offer to deepen supplier linkages

Common test for public support: additional clean power + credible implementation + domestic industrial value.

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Green ammonia delivers development only when the links are designed

Credible projects

Prioritize financing, offtake, permits and implementation milestones.

Competitive production

Combine hybrid renewables, lower electrolyser costs and cheaper capital.

Developmental value

Connect production to domestic fertilizer demand, infrastructure, skills and suppliers.

The opportunity is real. The development outcome is a policy choice.

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