

ABU DHABI'S POSITION IN THE **HYDROGEN** ECONOMY

JUNE 2026



غرفة أبوظبي
ABU DHABI CHAMBER



DISCLAIMER

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Recommendations and strategic insights are intended to inform and empower ADCCI members and private sector participants. Decisions based on this report remain the sole responsibility of the reader.

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EXECUTIVE SUMMARY

Hydrogen has significant potential in the energy transition

Hydrogen is rapidly emerging as a cornerstone of the global energy transition. As a clean, versatile energy carrier, it offers a pathway to decarbonize sectors that are difficult to electrify—such as heavy industry, long-haul transport, and aviation. Its potential lies not only in reducing emissions but also in reshaping global energy trade and industrial competitiveness. However, unlocking this potential requires overcoming infrastructure, cost, and global policy barriers that still constrain large-scale deployment.

However, global potential producers are navigating challenges

While global interest in hydrogen is growing, many countries face physical and resource constraints. Italy, Germany, India, Japan and South Korea have limited land availability or water scarcity, restricting renewable energy deployment for hydrogen production. In addition, policy uncertainty, fiscal constraints, political instability and weak infrastructure are adding to the challenges. These challenges in green hydrogen development are consistent with those faced across all capital projects globally.

UAE is positioned to outpace potential hydrogen producers by 2030

The UAE enjoys a strategic advantage: abundant solar resources, efficient infrastructure, strong industrial capabilities, and low capital costs. By 2030, the UAE is projected to have one of the lowest Levelized Cost of Hydrogen and ammonia, positioning it as a leading exporter to early buyers like the EU, Japan, and South Korea. Abu Dhabi is spearheading the UAE's hydrogen transformation. Since 2019, the emirate has expanded its renewable energy scaling efforts ending with a promising 2031 target of 1.4 Mt/year of low-carbon hydrogen production, hydrogen hubs, and 30% renewables in the energy mix.

Strategic short-term Shifts in Renewable-Rich Countries

Despite these global setbacks, the hydrogen industry is evolving toward more practical and sustainable strategies. Countries rich in renewables are shifting focus from exporting hydrogen molecules to maximizing hydrogen export value. Successful short-term strategies include: 1- producing hydrogen derivatives for domestic use, and 2- exporting hydrogen project technologies and equipment, and 3- securing offtake agreements. For the UAE and Abu Dhabi, this shift presents a strategic opportunity to lead in hydrogen innovation, trade, and technology deployment.

(1) Shift Toward Hydrogen Derivatives

Instead of exporting pure hydrogen—which remains costly and infrastructure-intensive—many countries are focusing on hydrogen derivatives like ammonia, methanol, and synthetic fuels. Europe, Australia, Brazil and Japan are leading movers. These shifts reflect a broader trend

toward value-added hydrogen applications that align with local industrial strengths and global demand. Abu Dhabi is embracing this global shift by a Masdar–Total Energies project that will convert green hydrogen and captured CO₂ into methanol for Sustainable Aviation Fuel (SAF). Masdar and Tadweer Group have signed a joint development agreement to advance Abu Dhabi's first commercial-scale waste-to-sustainable aviation fuel project. Agreements with Japanese and global partners aim to build bunkering and export infrastructure, unlocking AED 17 bn in unrealized export potential by 2029. Abu Dhabi is also advancing projects in e-methane and green ammonia to decarbonize power generation, and heavy industry.

(2) Exporting Hydrogen Project Technologies and Equipment

Beyond fuel and feedstock, Abu Dhabi is positioning itself as a global supplier of hydrogen-related technologies and equipment. Export/re-export opportunities span three key project types: green hydrogen production (AED 2.3 bn potential by 2029), port infrastructure (AED 1.2 bn), and blending systems (AED 1.3 bn). The UAE's industrial zones (KEZAD, JAFZA) and logistics hubs (Khalifa Port) support manufacturing and export. Promising export destinations for green hydrogen project equipment include China, Germany, the UK, the US among others.

(3) Securing Offtakers: The Missing Link in Hydrogen Project Viability

Despite a wave of global hydrogen project announcements, only 12% of low-carbon hydrogen plants have secured confirmed customers—and most of those agreements remain non-binding. Without committed offtakers, many projects struggle to secure financing and risk cancellation. The success of hydrogen ventures depends on aligning production with downstream industries that can absorb the "green premium," particularly where hydrogen-derived materials represent a small share of the final product's cost. The transport sector has emerged as a leader in securing offtake agreements for green steel in Sweden by Volvo Group and Mercedes-Benz, both succeeded because automakers could absorb or pass on the cost. Abu Dhabi's EMSTEEL–Masdar pilot project, now fully operational, signed offtake agreements with Modon and Aldar to supply green steel to sustainable construction projects, including Abu Dhabi's first net-zero carbon mosque. Long-term offtake agreements—committing to purchase green materials over several

years—are essential to reduce investment risk and ensure project viability. Selling off capacity before plant design begins, and forming strategic partnerships with high-margin industries, will be critical to scaling green hydrogen applications.

What Comes Next for Hydrogen in the long-term

The next phase of hydrogen development will focus on building regional hydrogen hubs, establishing cross-border pipelines, and creating industrial decarbonization zones. These initiatives aim to reduce costs, improve infrastructure, and accelerate green hydrogen adoption across sectors.

Abu Dhabi's competitive advantages in renewable energy, infrastructure, industrial capacity, and policy support position it as one of the most promising global hubs for low-carbon hydrogen and hydrogen-derived products.



HYDROGEN VALUE CHAIN (PRODUCTION AND SALES)



PRIMARY STOPS ALONG THE HYDROGEN VALUE CHAIN FOR PRODUCTION AND SALES

Hydrogen presents strong investment potential across its value chain, from scalable production to transport and derivative applications like ammonia and methanol. For ADCCI energy members, opportunities lie in infrastructure, electrolyzer technologies, and hydrogen-linked industries with strong performance in the downstream market and rising global demand.



Sources of power having very low or zero carbon emissions include wind, solar, hydro, nuclear, and battery energy storage. Electricity stored using batteries, or pumped hydro.

- Types of Hydrogen Produced:**
- **Grey:** It is produced by converting natural gas into hydrogen without carbon capture. It has a competitive price, high existing demand, high CO_2 emission.
 - **Blue:** It is produced by reforming of methane (SMR/ATR) with carbon capture and storage. It is highly priced, it has lower CO_2 emissions.
 - **Green:** It is produced by splitting water in an electrolyser using renewable power like wind or solar. It has a higher premium and lower CO_2 emissions.

- Hydrogen can be stored in multiple forms: as a compressed gas in high-pressure containers, as a liquid under extremely low (cryogenic) temperatures, or underground storage in salt caverns.
- Hydrogen can be transported using specialized vehicles, such as cryogenic tankers for its liquid form or high-pressure tube trailers for its gaseous state. On a broader scale, pipeline transport is also feasible, contingent on the development of suitable infrastructure and supportive regulatory frameworks.
- Ammonia is synthesized from hydrogen through the Haber-Bosch process, a method established in the 1930s. It plays a vital role in fertilizer production, supporting food supply for billions globally. Beyond agriculture, ammonia is gaining attention as a potential carrier for hydrogen energy and co-firing. Its production also demands substantial quantities of nitrogen, which is typically extracted from the air.
- Synthetic fuels, or eFuels, are created using hydrogen as a key ingredient. Methanol, a type of eFuel gaining increasing attention, also relies on green hydrogen along with a carbon source. This carbon can come from natural, biogenic or industrial origins or be extracted directly from the air through a process known as direct air capture (DAC). SAF is also an important type of eFuels.

KEY EXISTING CONSIDERATIONS FOR THE SUCCESS OF GREEN HYDROGEN PRODUCTION AND SALES

Green hydrogen's success depends on making it cost-competitive, storable, and transportable to compete with traditional fuels to encourage demand.

Hydrogen must be reasonably priced, adequately stored and viably transportable to compete with more traditional fuels to develop demand

Transportation Costs

Exporting green hydrogen to distant markets can increase expenses, requiring efficient supply chain development and infrastructure optimization to reduce costs.

Regulation and Safety

Success depends on robust regulations to support hydrogen trade, safety standards, and cross-border compatibility.

Capital-intensive Scale-up

Scaling production demands major investment in electrolyzers, renewable energy capacity, and hydrogen storage systems.

Technological Maturity

Advancements needed in hydrogen transport and conversion technologies. Dedicated hydrogen pipelines remain limited worldwide, with only about 5,000 km currently in operation, while developing new infrastructure is expected to take several years.

Water Scarcity

Although the absolute water requirement for electrolysis is modest, the need for high-purity water in regions already facing shortage can pose logistical and cost challenges for scaling green hydrogen.

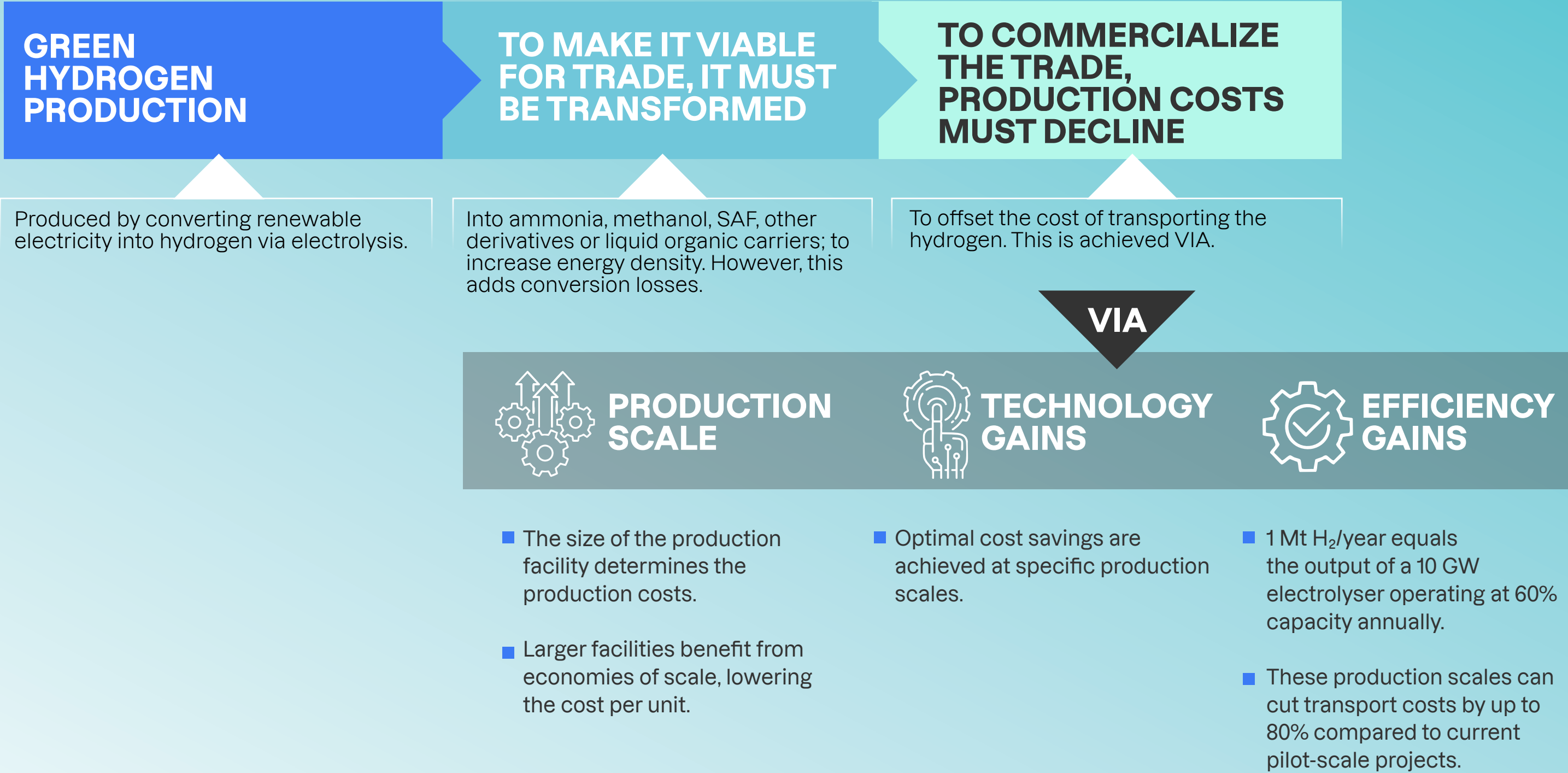
Policy Alignment

Requires coordinated policies across domestic and international stakeholders to unlock full market potential and ensure smooth integration.

HYDROGEN MARKET CONSIDERATIONS

VIABILITY OF HYDROGEN TRADE LIES IN LOW PRODUCTION COST ACHIEVED WITH SCALE, TECHNOLOGY AND EFFICIENCY GAINS

Green hydrogen trade becomes viable when production costs are reduced through scale, technology, and efficiency gains. Converting hydrogen into derivatives such as ammonia or methanol improves transport and storage, but introduces energy losses; making cost optimization essential



WHILE THE GLOBAL POTENTIAL FOR GREEN HYDROGEN PRODUCTION SCALE IS ENOUGH TO SATISFY DEMAND, THERE ARE CONSTRAINTS

While global green hydrogen production potential is technically sufficient to meet future demand, land and resource constraints limit scalability in many key markets. In contrast, the UAE's abundant solar resources, efficient infrastructure, and low capital costs position Abu Dhabi as a leading hydrogen producer with clear export advantages.

Potential Global Green Hydrogen Producers

Production Constraints

Italy

62%

- of land excluded due to:
- Steep terrain.
 - Dense population.
 - Agricultural land.

Germany

66%

- of land excluded, mainly because of:
- Forest coverage.
 - Agricultural land.

Japan

- Technical potential: 380 GW solar PV, 180 GW onshore wind, could produce ~20 Mt H₂/year.
- However, resource quality is low (PV <14%, wind <30% capacity factor), most renewable output is already used for general electricity needs.
- 91% of land excluded from renewable energy development.

South Korea

- Would need ~1/3 of its renewable potential to meet 2050 hydrogen demand.
- After accounting for other electricity needs, very little remains for hydrogen production.
- 87% of land excluded from renewable energy use.

India

89%

- of land excluded due to:
- High population density.
 - Agricultural land (cropland).
 - Natural areas (savannas, forests).

THE UAE HAS BEEN GLOBALLY POSITIONED AMONG HIGH HYDROGEN POTENTIAL PRODUCERS

UAE is enjoying a global competitive advantage in hydrogen production as all pillars are present



Access to **renewable energy**



Strength in **manufacturing and construction**



Efficiency of **electricity infrastructure**



Cost of **capital**

By 2030, UAE is projected to have the world's lowest Levelized Cost of Hydrogen and ammonia, positioning it as a key exporter for early buyers like the EU, Japan, and South Korea, capturing a significant share of future hydrogen trade.

UAE is likely to capture a substantial portion of future international trade

Shipping hydrogen is costly, so it's often converted into ammonia, which is easier to transport.

BY 2030

Export

UAE is positioned among potential major exporters of green hydrogen



Import

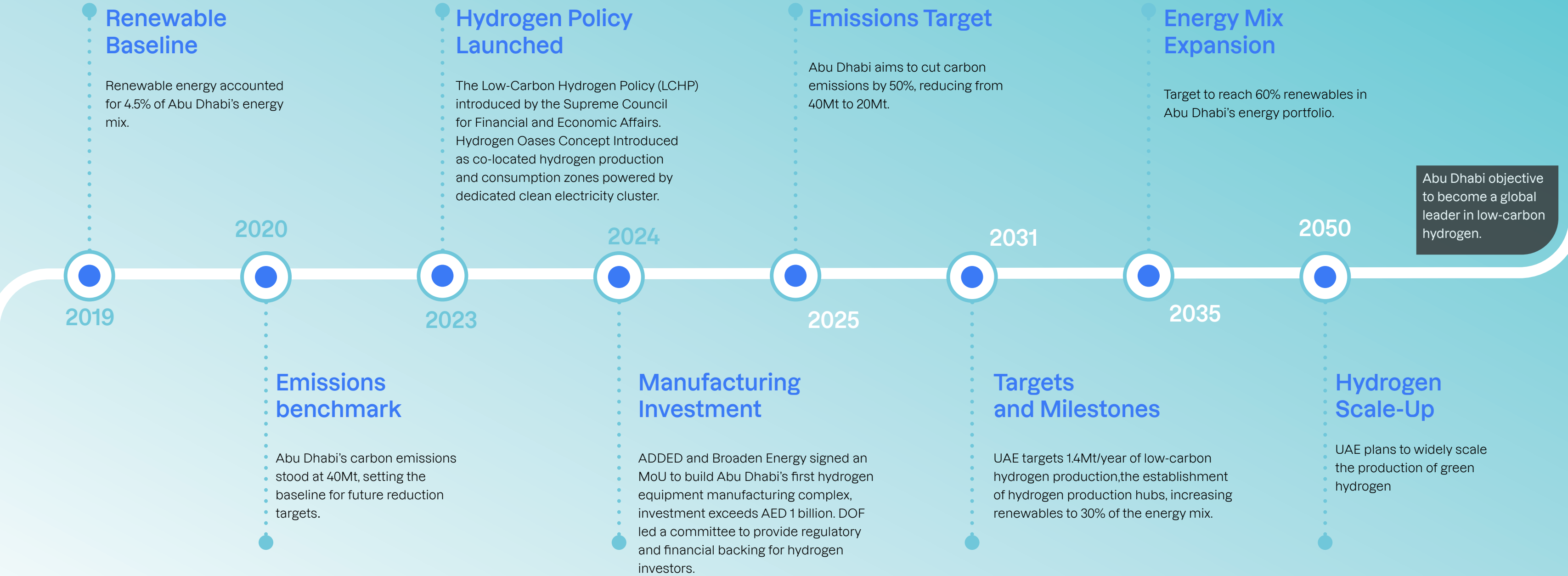
EU, Japan, and South Korea are expected to be early buyers, needing about 12Mt of green ammonia



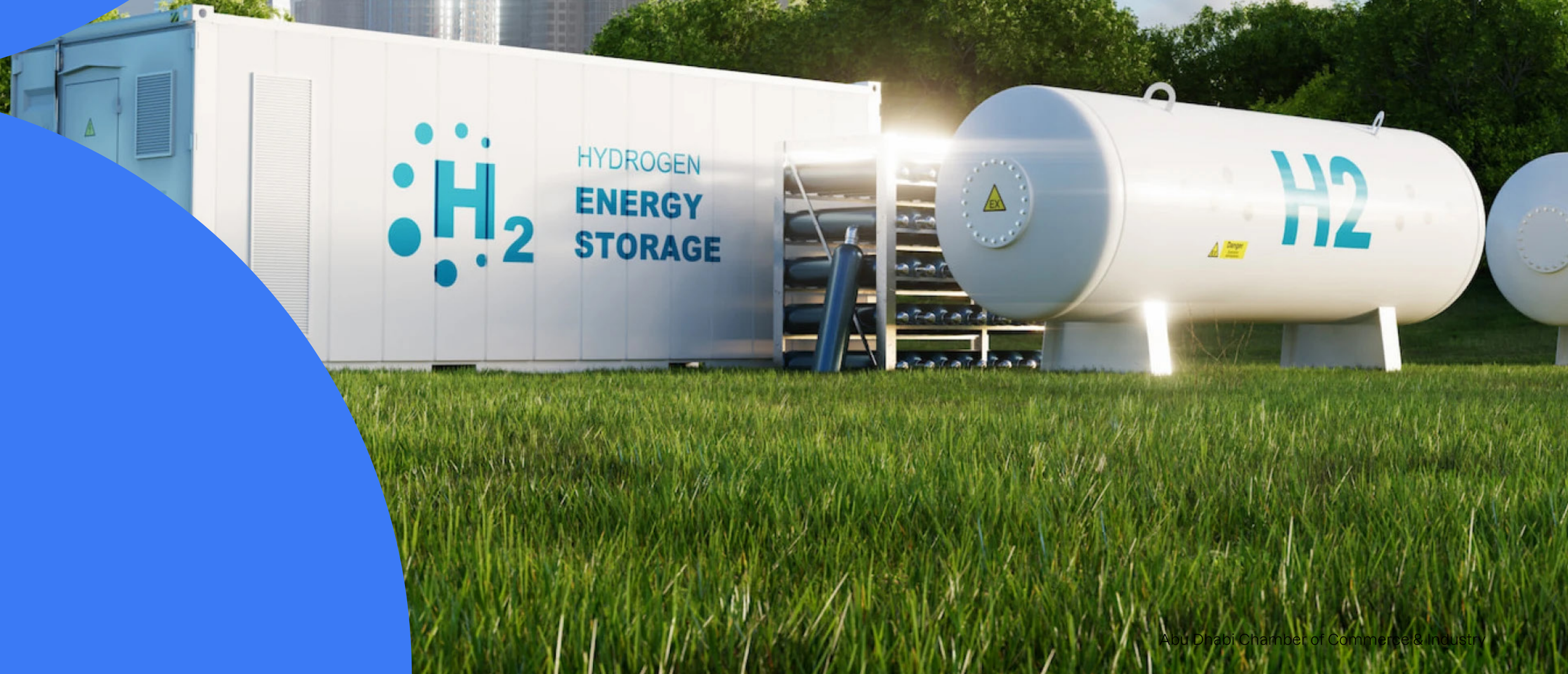
ABU DHABI TURNS HYDROGEN VISION INTO REALITY

WITH MASDAR GREEN HYDROGEN PROJECTS, GREEN STEEL PILOT, AND TEST FLIGHT ACHIEVEMENTS, TURNING GLOBAL VISION TO REALITY

Abu Dhabi is rapidly advancing its hydrogen strategy, transforming a global vision into actionable milestones backed by policy, infrastructure, and investment.



GLOBAL REVISIONS IN HYDROGEN PLANS



GLOBAL HYDROGEN PRICES SHOWED MIXED TRENDS IN 2025 SPURRED BY GEOPOLITICS AND CLIMATE CHANGE

Arrow direction indicates price trend

U.S. moving to blue hydrogen amid high costs

- Rising natural gas costs—a key input for hydrogen production—following cold weather and reduction in Russian gas imports, intensified the cost hike for green hydrogen.
- Industrial demand added to market volatility.
- Recent policy changes, including proposed cuts to federal tax credits, created uncertainty for clean hydrogen investments.
- These shifts encouraged a move toward blue hydrogen, made from fossil fuels with carbon capture (CCUS), which also influenced pricing.
- Infrastructure issues, such as pipeline maintenance and transport bottlenecks, further raised production costs.



Europe saw significant hydrogen price fluctuations

- EU climate commitments accelerated demand and investment in hydrogen, primarily to decarbonise industry and energy systems. Reduced reliance on natural gas is an indirect but strategic benefit of this transition.
- Increased competition and tech innovation helped lower production costs in some areas
- However, the region's dependence on natural gas, hiked electricity costs.

Hydrogen prices in 2025 showed mixed global trends, shaped by geopolitical shifts, climate events, and infrastructure challenges, raising costs in regions like US, Latin America and Asia-pacific. In contrast, the UAE saw falling hydrogen prices driven by strategic infrastructure investment, reinforcing its position as a competitive producer in a fragmented global market.

Asia Pacific seeing high demand and high production cost

- Hydrogen prices in India stayed stable in mid 2025, supported by:
 - Consistent demand from industries like fertilizers and steel.
 - Stable production costs and supportive government policies.
- Japan's hydrogen prices hiked in 2025, influenced by:
 - High renewable energy costs (solar and wind) powering electrolyzers.
 - Energy-intensive production methods (SMR and electrolysis)
 - Infrastructure limitations.
 - Heavy reliance on imported natural gas and electricity.

Latin America struggling with volatility

- The region has rich natural resources, making it well-positioned for green hydrogen production.
- However, several challenges hinder market development and raised the cost for green hydrogen, including:
 - Political instability, which creates uncertainty for investors.
 - Underdeveloped infrastructure, limiting large-scale production and export capabilities.
 - Currency volatility, which affects project financing and pricing stability.
- These factors contribute to price fluctuations and complicate long-term planning for hydrogen projects.

KSA seeing falling hydrogen prices in 2025

Hydrogen prices fell in 2025 amid cheaper renewables, economies of scale, and battery storage that lowered the cost.

UAE seeing falling hydrogen prices in 2025

- Hydrogen prices fell in 2025 amid technological innovations in electrolysis—like higher efficiency and cheaper catalysts.
- The UAE's National Hydrogen Strategy And Abu Dhabi Low-carbon Hydrogen Policy spurred investments in infrastructure development, which will put downward pressure on future prices.

MIXED PRICE TRENDS IN 2025 AND MISSED EXPECTATIONS HAD TRIGGERED FUTURE HYDROGEN COST REVISIONS

Mixed hydrogen price trends in 2025 have triggered global upward revisions in green hydrogen cost forecasts. Rising demand from AI and data centers continues to push energy prices higher, straining utilities and making cost-effective hydrogen production increasingly dependent on scale, technology, and strategic infrastructure investment.

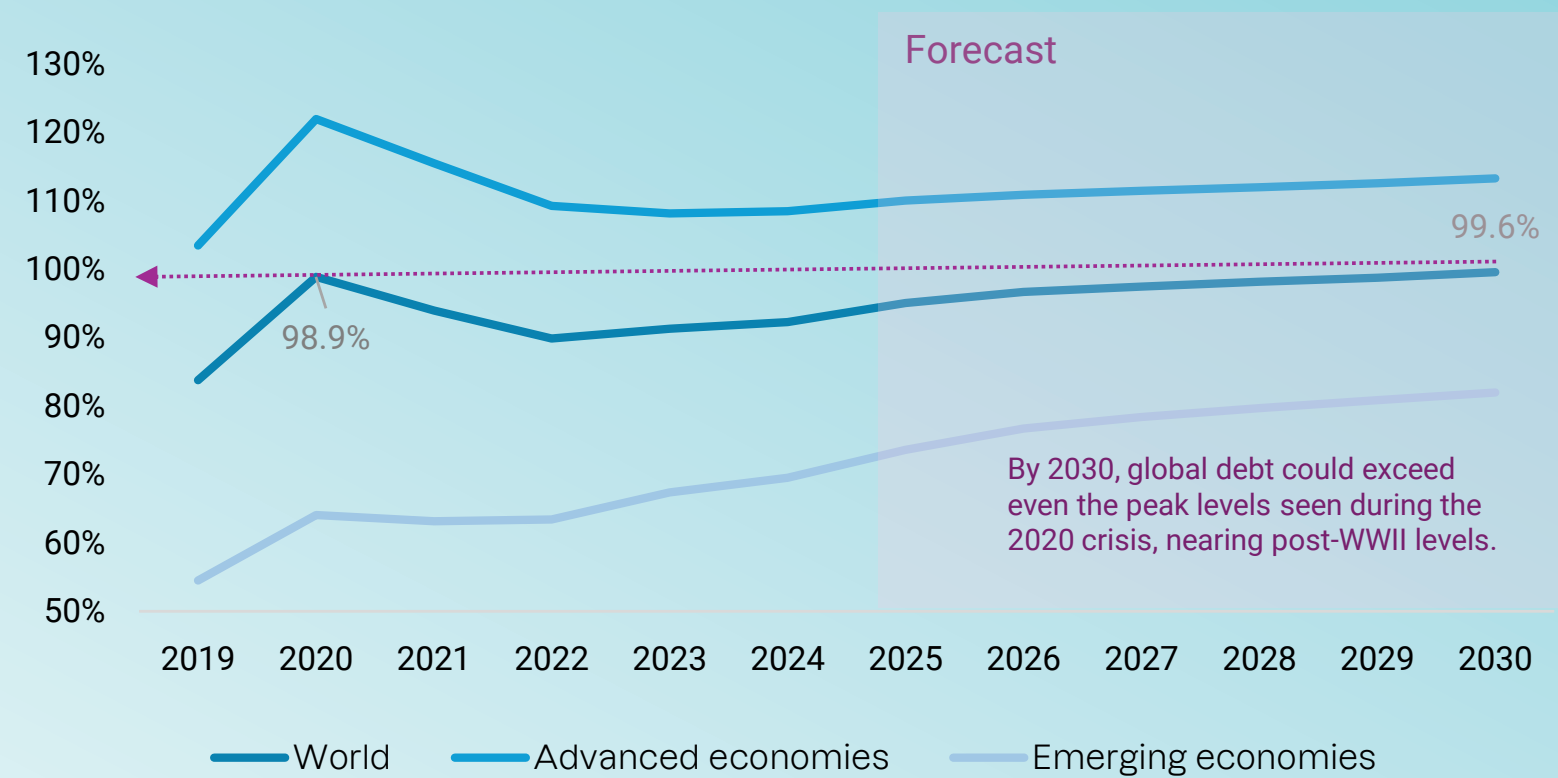
- Major organizations like IEA, IRENA, BNEF, and Hydrogen Council provided lower cost estimates of hydrogen electrolyzer systems in their early projections.
- Moreover, geopolitical shifts, policy incentives and financing had altered the cost trajectories.
- In 2020, the U.S. Department of Energy set a goal to produce green hydrogen at \$1/kg, based on preliminary assumptions.
- However, the global average electricity price has remained around 10 cents/kWh for decades.
- Moreover, AI and data centers are driving up electricity demand, making prices rise, not fall.
 - A Bloomberg analysis found current electricity costs in the U.S. have risen up to 267% for a single month more than it did five years ago in areas near major data center activity.
 - Over 70% of price spikes occurred within 50 miles of significant data center clusters, meaning even distant consumers are affected, as wholesale costs are passed on through utility bills.
 - These rising energy costs are adding pressure to households already burdened by inflation in food, housing, and essentials.
 - Utilities and governments are struggling globally to manage and distribute the financial impact.

EARLY ADOPTION OF GREEN HYDROGEN NEEDS SUPPORT, BUT GOVERNMENT FISCAL SPACE IS LIMITED GLOBALLY

High production costs and uncertain demand are slowing the global rollout of green hydrogen. IEA states that only 11% of planned hydrogen capacity for 2030 has received a final investment decision (FID). The challenge is no longer about technology readiness—the tools exist. Instead, the future of green hydrogen hinges on strong government support.

Ratio of general government debt to GDP - Bloomberg

IMF warns of rising public debt to historic highs, urging countries to reduce deficits



Green hydrogen production remains costly and dependent on substantial government subsidies. However, rising global debt is limiting fiscal space. Without strong and sustained policy support, many clean hydrogen projects risk stalling before reaching commercial scale.

- In 2020, global budget deficits jumped from 3.5% to 9.5% of GDP due to pandemic-related spending and reduced tax revenue.
- Governments increased spending to protect vulnerable populations during lockdowns.
- While necessary at the time, researchers argued this fiscal expansion should have been reversed gradually—but it wasn't.
- In countries like the U.S., U.K., and EU, debt is growing faster than economic output.
- Rising debt reduces fiscal flexibility for future crises/innovations.
- Persistent deficits, economic shocks, and instability could lead to debt defaults—either directly or indirectly via high inflation (by printing money).

Key drivers of limited future fiscal space:

Aging populations, increasing dependency ratios.

Higher defense spending.

Urgent infrastructure needs, especially for green energy.

Inevitable future recessions or pandemics.



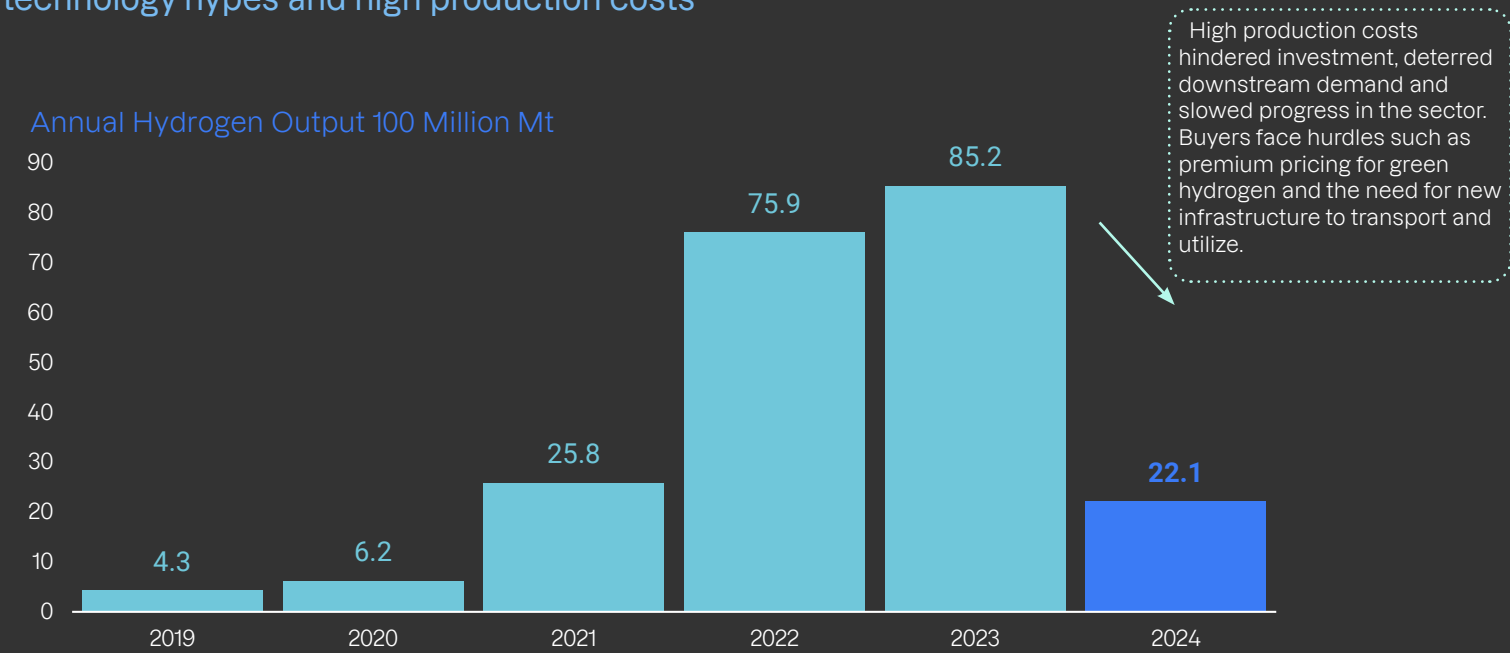
Policymakers are currently focusing on fiscal consolidation efforts, limiting spending needed for decarbonization.

However, without **policy support**, decarbonization projects may stall, despite their potential to decarbonise key sectors

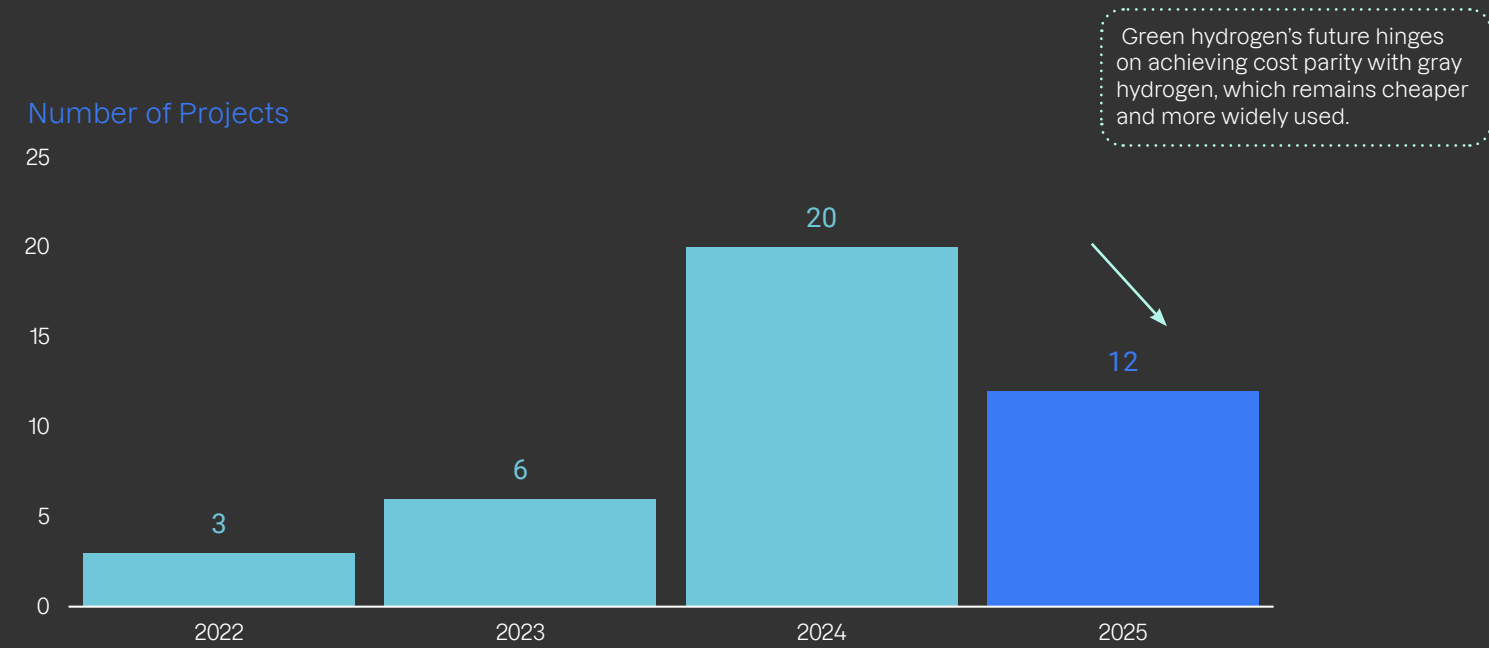
COST REVISIONS, LIMITED SUPPORT, AND WEAK OFFTAKE DEMAND SLOWED HYDROGEN PROJECT MOMENTUM, DESPITE THIS, SEVERAL PROJECTS REACHED THE FID STAGE

Recent Highlights

New Hydrogen Project Announcements Fell in 2024 amid new technology hypes and high production costs



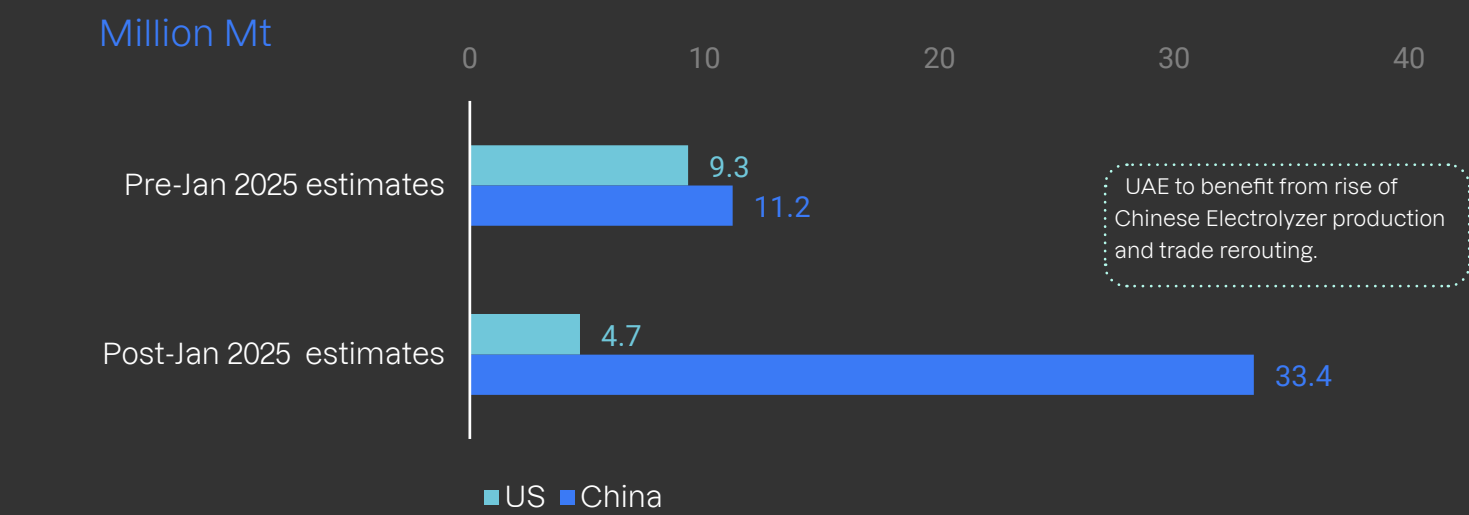
Global Spike In Green Hydrogen Project Cancellations



A global spike in green hydrogen project cancellations in 2025 was driven by high production costs, weak offtake demand, and reduced government support

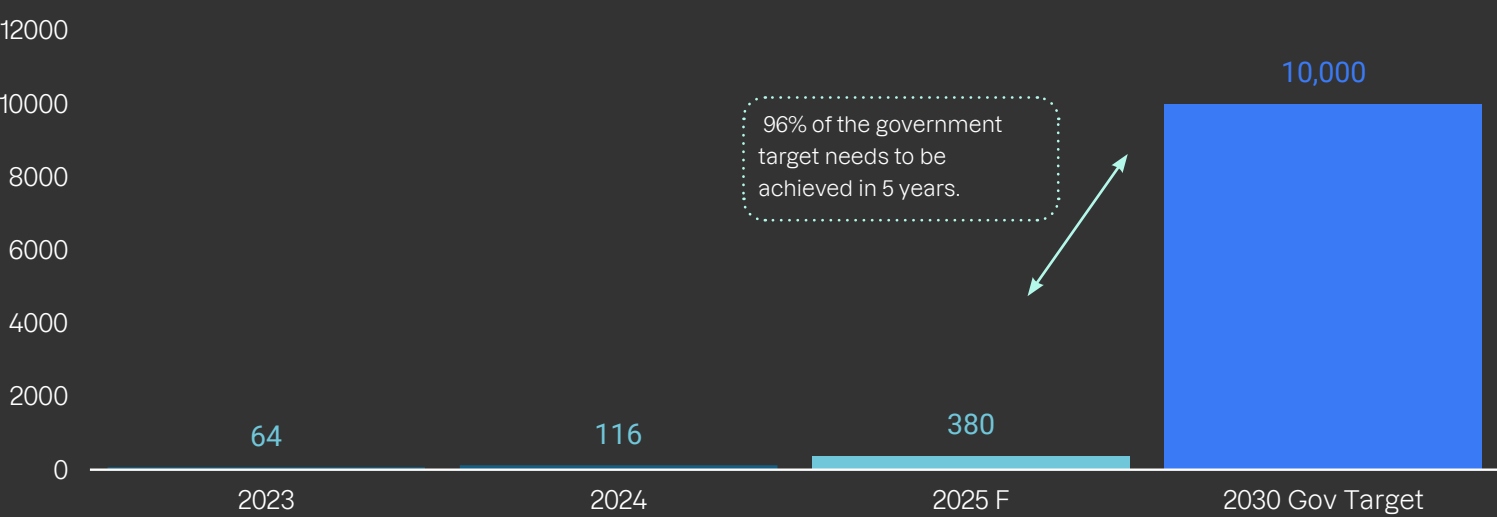
Oct 2025: The U.S. Department of Energy revealed it will withdraw \$2.2 bn in funding previously designated for two hydrogen hub projects on the West Coast, signaling a shift in federal support for early-stage clean energy infrastructure.

Green Hydrogen Production Estimates (in Million tons) for 2050 Change With The New U.S. Policies



Aug 2025: EU is struggling to find takers for subsidies to accelerate green hydrogen as initial rounds allowed participation of small developers with no track record of delivery from awarded funding citing inflexible timelines and misaligned conditions.

Germany's current hydrogen capacity remains below the levels needed to meet its 2030 targets. Installed electrolyzer capacity in Germany, in megawatts



ALTERNATIVE PRACTICAL SOLUTIONS BY RENEWABLE-RICH COUNTRIES



HYDROGEN INDUSTRY IS SHIFTING TOWARDS MORE REALISTIC EXPECTATIONS AND SUSTAINABLE GROWTH STRATEGIES

Countries Rich In Renewable Energy Are Shifting Their Short-term Focus From Hydrogen Molecules To Hydrogen Value However, long-term potential of hydrogen molecules is still high as indicated by Bloomberg Hydrogen Screened Total Return Index

Bloomberg Hydrogen Screened Total Return Index



- Despite the challenges, green hydrogen is still gaining momentum thanks to a powerful mix of geopolitical concerns, industrial need and technological advances.
- The Bloomberg Hydrogen Screened Index (BHJENET) tracks the performance of companies directly involved in:
 - Hydrogen production and distribution.
 - Electrolyzer and fuel cell manufacturing.
 - Industrial applications in energy, chemicals, and transport.
- The increase in the index reflects growing investor belief that hydrogen-related companies are poised for strong growth, yet with many alternative opportunities over the short-term and direct hydrogen export success over the long-term.

While currently, direct hydrogen export is costly, infrastructure-heavy, and faces uncertain demand, the key question now is which countries will lead over the short and long-term.

What is currently working?

Producing green H₂ derivatives for domestic use or export.

Engaging in technologies and equipment trade used in global green H₂ projects.

Securing off takers for H₂ molecules production.

What is next?

Establishing regional hydrogen hubs

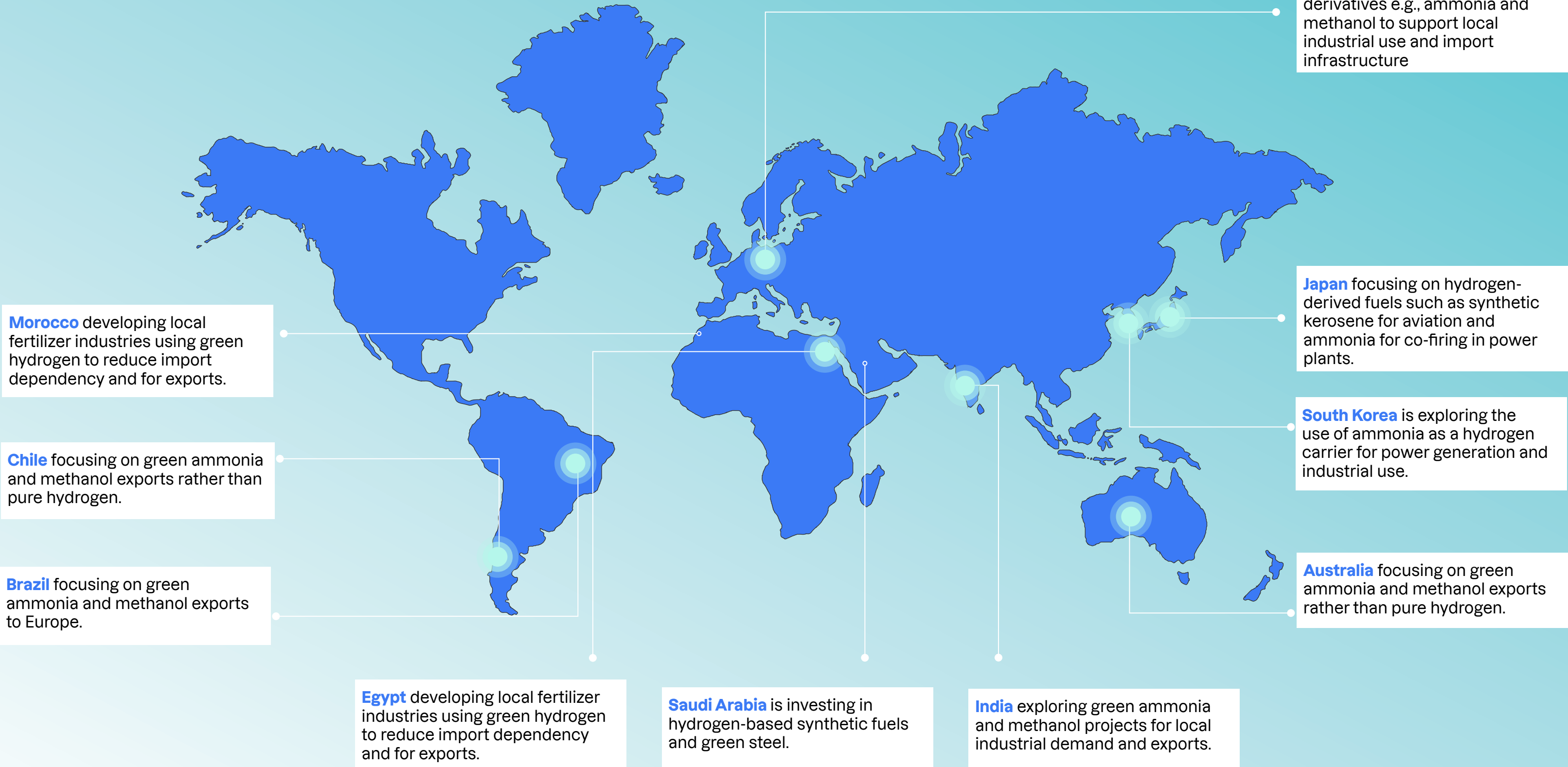
Expanding cross-border pipelines

Establishing industrial decarbonization zones

The hydrogen industry is shifting toward realistic alternatives over the short-term, with investors favoring derivatives, hydrogen value chain exports, and renewable integration. Investors targeting direct hydrogen exports over the long term.

RENEWABLE-RICH COUNTRIES ARE ADAPTING TO NEW MARKET REALITIES AND ADOPTING ALTERNATIVE SOLUTIONS

Renewable-rich countries are adapting priorities, shifting from pure hydrogen exports to derivatives, supporting domestic industries, reducing import dependency, and aligning with evolving global market realities.



ASSESSING ABU DHABI'S POTENTIAL TO DEPLOY PRACTICAL GREEN HYDROGEN SOLUTIONS



1- PRODUCING GREEN H₂ DERIVATIVES FOR LOCAL USE AND FOR EXPORT

Abu Dhabi is advancing practical green hydrogen solutions across SAF, e-methanol, e-methane, and Green ammonia—unlocking major export potential, industrial decarbonization, and thousands of jobs through global partnerships and infrastructure investment.

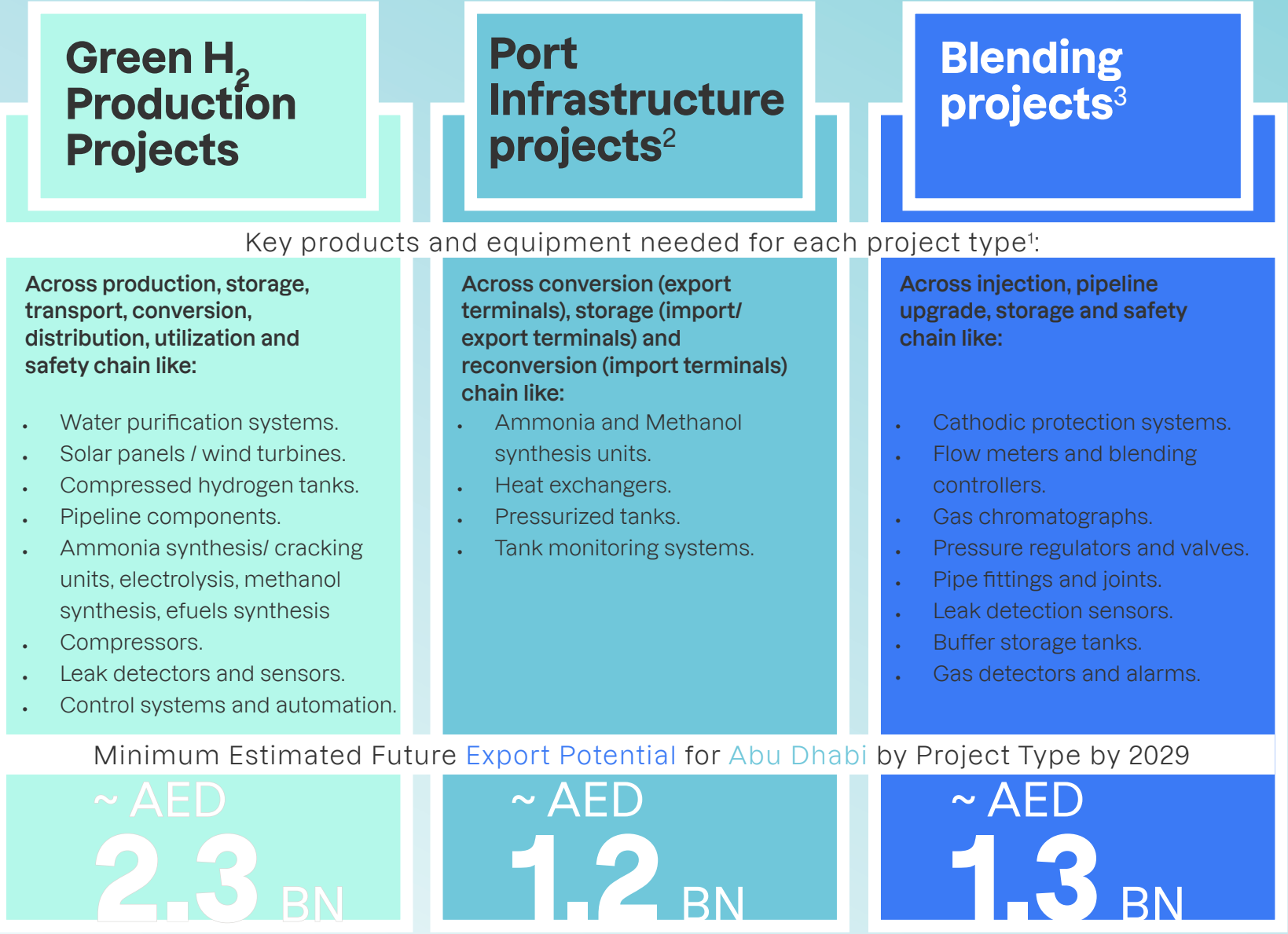


Key Highlights and UAE Action Plan		Key Applications	Abu Dhabi Potential*
Sustainable Aviation Fuel (SAF)	• The UAE aims to produce 700 million liters of SAF annually by 2030, produced at up to five facilities, to reduce emissions in the UAE aviation. • Actions in place: - Providing financial incentives to accelerate SAF technology deployment and innovation, building local capacity to boost ICV via a dedicated SAF department in MOEI among others and global technology collaboration. - Masdar and TotalEnergies signed an agreement to explore a commercial project converting green hydrogen to methanol to SAF in 2024, to capture CO₂ from industrial sources and use it as feedstock alongside green hydrogen produced via renewable-powered electrolysis. Moreover, Masdar and Tadweer Group have signed a joint development agreement to advance Abu Dhabi's first commercial-scale waste-to-sustainable aviation fuel project.	• Commercial Aviation. • Cargo and Freight Aviation. • Military Aviation. • Private and Business Jets.	By 2030** • Cumulative 4.8Mt of CO₂ emission cuts. • Up to 18,000 new jobs across the value chain. • AED 6.2bn accumulated export revenue.
E-methanol	• A type of e-Fuel produced by combining Green hydrogen and captured CO₂ (from biogenic or industrial sources) that can be used in shipping, aviation and heavy manufacturing. It is a versatile feedstock that can be transformed into a wide range of products across multiple industries, it is compatible with existing bunkering infrastructure and existing combustion technologies. It is also a chemical feedstock. • Actions in place: - Masdar, Mitsubishi Chemical Group (Japan), and INPEX have signed an agreement to explore the world's first commercial-scale production of polypropylene using green hydrogen and captured CO₂ in Abu Dhabi. Green hydrogen and CO₂ will be converted into e-methanol, which will then be transformed into propylene and polypropylene, a widely used plastic in packaging, containers, and consumer goods. - AD Ports Group, Masdar, Advorio, and CMA CGM Group signed an agreement to assess the feasibility of building an e-methanol bunkering and export facility at Khalifa Port and KEZAD in Abu Dhabi.	• Used directly as Marine fuel, can be converted into SAF for aviation or blended with gasoline. Used as a fuel for road transportation as well. • Used to produce propylene and polypropylene, a widely used plastic in packaging, containers, and consumer goods.	By 2029 Around AED 17 Bn unrealized export potential for Abu Dhabi in plastics and a bigger unrealized potential for commercial methanol.
E-methane	• A synthetic gas made from green hydrogen and captured CO₂ — and used as a low-carbon substitute for fossil natural gas in power generation, heating, heavy industry, and transport. It enables decarbonization without changing existing infrastructure. • Actions in place: - Masdar, INPEX, Tokyo Gas, and Osaka Gas signed an agreement on July 17, 2023, to assess the viability of producing e-methane in Abu Dhabi using green hydrogen and captured CO₂. Off takers secured, Tokyo Gas and Osaka Gas joined the initiative, aiming to source e-methane to meet 1% of their annual city gas demand by 2030, with plans to scale up by 2050.	• Renewable power Generation with existing infrastructure, replacing natural gas. • Residential and Commercial Heating. • Industrial Processes (Steel, cement and glass) . • Transport Fuels following liquification into LNG for heavy-duty trucking and maritime shipping. • Storing and transporting hydrogen in a stable, energy-dense form, for long-distance pipelines.	By 2050 Abu Dhabi has the potential to capture a minimum of 3% of global green steel demand.
E-ammonia	• Made from green hydrogen and nitrogen. It is used as a clean fuel for shipping and power generation, a hydrogen carrier, and a feedstock for fertilizers and industrial chemicals. It plays a central role in decarbonizing energy and agriculture.	• Clean Maritime Fuel for cargo ships and tankers. • Power Generation: can be burned mainly through co-firing or used in fuel cells to generate electricity. • Hydrogen transport and storage. • Fertilizer Production: it is the base for nitrogen fertilizers like urea and ammonium nitrate. • Chemicals: used in producing refrigerants, explosives, cleaning agents, plastics and synthetic fibers.	By 2029 Around AED 187 Mn unrealized export potential for Abu Dhabi in fertilizers.

2- ENGAGING IN TECHNOLOGIES AND EQUIPMENT TRADE USED IN GLOBAL GREEN H₂ PROJECTS

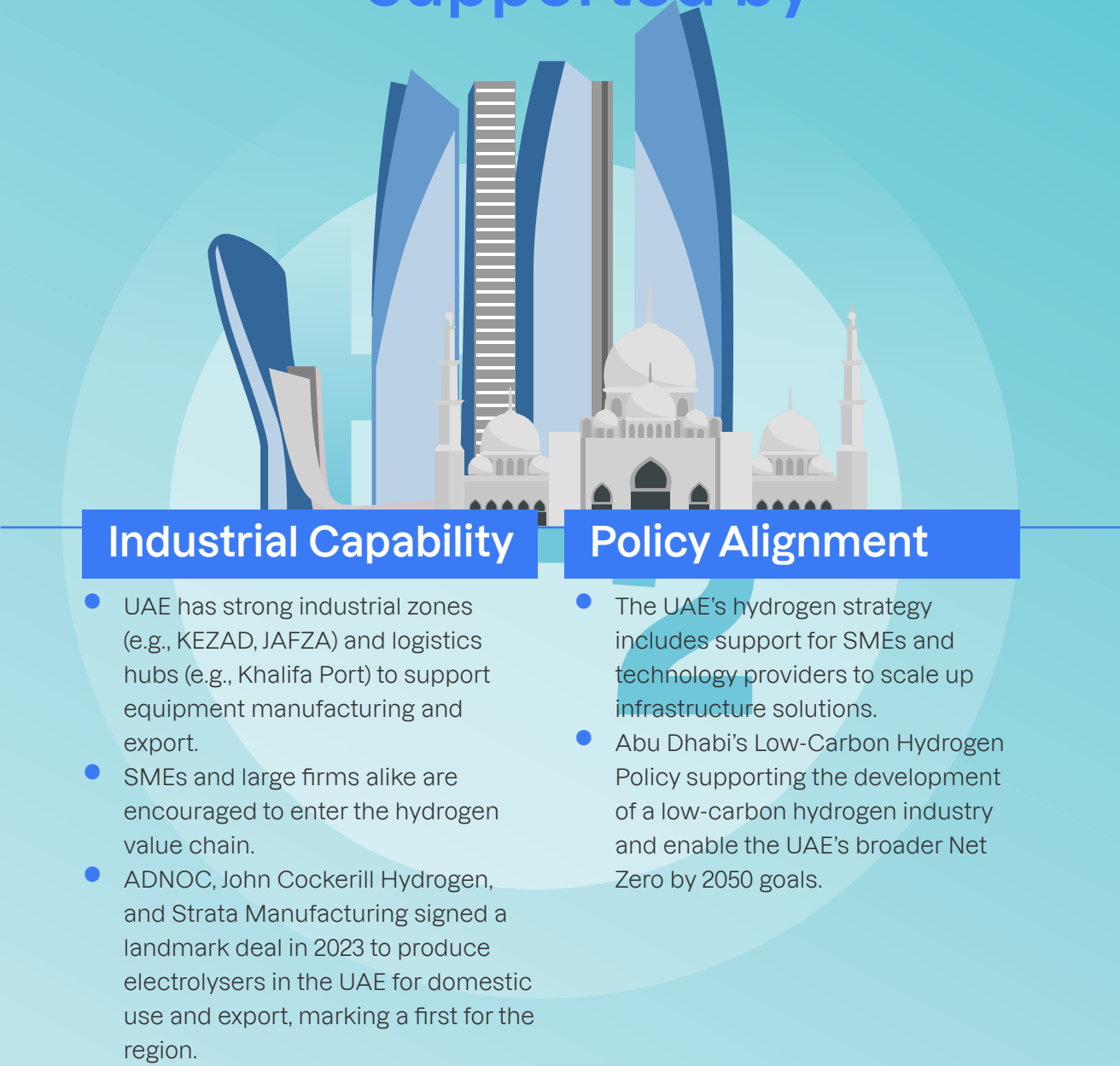
Exporting key products and equipment needed for hydrogen-related projects helps prepare global industries to adopt green hydrogen. This builds future demand for UAE-produced hydrogen and derivatives like green ammonia and e-methanol. UAE manufacturers can tap into early-stage hydrogen projects globally across three main project routes:

Green Hydrogen Projects



Abu Dhabi has a golden opportunity to scale up production and export along the hydrogen value chain given the high global demand and the challenges faced by leading producers stemming from high production costs, geopolitics and shifting trade policies.

UAE can use its leverage to tap global green H₂ projects supported by



2- ENGAGING IN TECHNOLOGIES AND EQUIPMENT TRADE USED IN GLOBAL GREEN H₂ PROJECTS

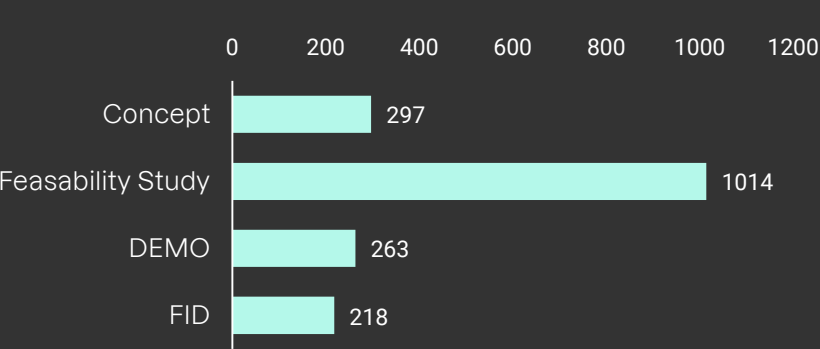
Promising Export Markets For The UAE

Top 5 Countries with FID project status
1–Bubble Size indicates project count
(as of Sep 2025)

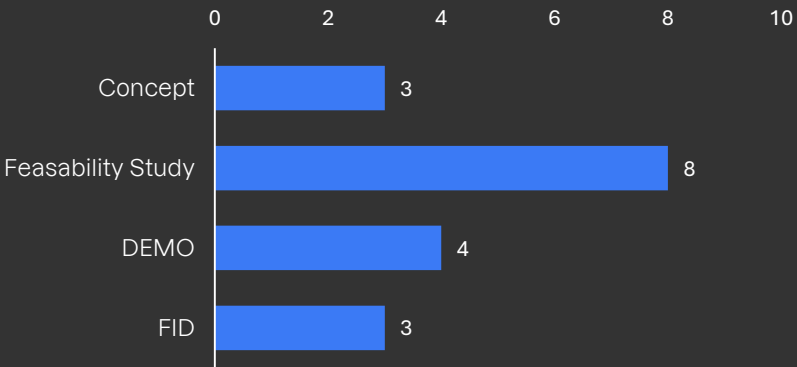
The UAE can engage in hydrogen equipment trade with key markets like China, Germany, and the U.S. leveraging its industrial and logistics strength and policy alignment.



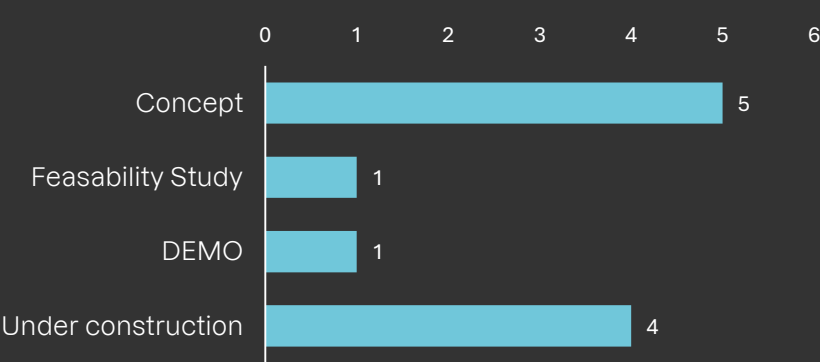
Global Green Hydrogen Production Projects
Count by Stage (as of Sep 2025)



Global Green Hydrogen Port Infrastructure Projects
Count by Stage (as of Sep 2025)



Global Green Hydrogen Blending Projects
Count by Stage (as of Sep 2025)



Sources: IEA. Notes: -1 All projects mentioned on the map are at FID stage except for Global Green Hydrogen Blending Projects which are under construction, ADCCI Research.

3 - SECURING OFF TAKERS FOR H₂ MOLECULES PRODUCTION

- Multiple hydrogen projects have been announced worldwide, yet only 12% of low-carbon hydrogen plants have confirmed customers, and most agreements are non-binding or vague.
- Unlike oil or gas, hydrogen lacks a global shipping network; it must be supercooled, compressed, or converted to ammonia. Pipelines are viable for regional supply, but cross-ocean transport is complex and costly.
- Without committed buyers, many projects are unlikely to be built.
- Financing depends on demand and demand will depend on downstream financial strength.

What's Working is “**Customer-Aligned Projects**” in “**High-Margin**” Downstream Industries where the “**Share of Green Material Cost From The Total Cost of The Product is Low**”

Successful hydrogen ventures are built around specific, committed buyers and local clean energy sources.

Green products derived from hydrogen require secured and predictable demand to attract investment and initiate large-scale deployment.

DEMAND EXISTS BUT INVESTORS NEED ASSURANCE

- Global automakers, equipment manufacturers, and consumer goods companies are under pressure to decarbonize their supply chains, especially materials like steel.
- However, there are two main challenges:

01 Supply of green materials need secured demand

- Numerous technologies capable of producing green materials at large scale are still not commercially viable.
- Policy momentum is building around low-carbon goods, and the UAE is leading with the National Green Certificates Program launched by the UAE's Ministry of Energy and Infrastructure to promote sustainable building practices in the downstream sectors.
- However, securing demand will largely depend on private sector demand over the next few years.

02 Green products will come with a green premium

The price premium needs to be absorbed or passed on to consumers with little resistance. This will be doable in high-margin downstream industries that can absorb the cost or pass it on to end-users.

Only 12% of hydrogen projects have confirmed buyers; securing offtake agreements and and selling off capacity, even before the plant is designed is critical for financing. Success depends on customer-aligned ventures in high-margin industries that can absorb green premiums and ensure predictable demand.

3 - SECURING OFF TAKERS FOR H₂ MOLECULES PRODUCTION

Success Stories

Globally, transport sector was successful with automakers absorbing green steel costs. The UAE is pioneering hydrogen in construction, supplying green steel for Abu Dhabi's first net-zero mosque.

So far, the model is globally successful in the transport sector with off take agreements signed ahead. However, transport sector comprises around 20% of steel consumption only .

The UAE is piloting on construction sector (~50% of steel consumption) .

	Green H ₂ production and Supply	Green Material production	Green Material Downstream Demand	End-user acceptance
 Sweden	HYBRIT project, a joint venture with Vattenfall (energy company) and LKAB (iron ore producer).		Volvo Group and SSAB agreed to begin producing green trucks using fossil-free steel starting in 2026, with an initial volume of approximately 12,000 trucks. 	HIGH - High acceptance as downstream margins (automakers) were not affected as green steel cost is a small portion of the total cost of the final product. - Automakers were able to absorb or pass on to consumers with little resistance. - A 25% steel price increase would lead to only 1% increase in vehicle production costs.
 Sweden	H ₂ Green Steel (H ₂ GS) produces its green hydrogen on-site using electrolysis powered entirely by renewable energy sources, primarily hydropower and wind.		Mercedes Benz has signed an agreement with H ₂ Green Steel for 50,000 tons of steel made with hydrogen. 	HIGH - On average, current green steel costs 40% more than fossil-fuel based production. - A 40% increase in steel price would translate into an increase of 2.5% and 5.2% in the unit price (~ AED 31-64/sqft). - Given the limited share of the unit price rise, developers will be able to absorb and pass it on to end-users.
 Abu Dhabi	The pilot project uses 2.1MW of green hydrogen to produce 5kt of green steel. 	MENA's first green hydrogen-based steel project. The pilot project is now fully operational and has successfully commenced the production of green steel. 	EMSTEEL Group, has signed an agreement with Modon to advance sustainable construction in the UAE by using green steel made with certified renewable hydrogen. Another agreement signed with Aldar to supply green steel to be used in constructing Abu Dhabi's first net zero carbon mosque in Sustainable City Yas Island.  	



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