

Contracts, Financing Are Key To 2023 Clean Hydrogen Growth

By **Omar Samji and Humzah Yazdani** (January 26, 2023)

The demand for clean hydrogen production is on the rise, particularly after the passage of the Inflation Reduction Act in the U.S. If 2022 was the year that hydrogen gained international focus as a potential conduit for clean energy in the energy transition, then 2023 is poised to be the year when legal and commercial structures to deploy clean hydrogen projects are developed.

In the rainbow of colors assigned to types of hydrogen, green hydrogen refers to hydrogen produced through the electrolysis of water using a renewable power source — i.e., wind or solar. Blue hydrogen refers to hydrogen produced using a steam methane reformer to separate hydrogen from natural gas, yielding significant CO₂ emissions that are then captured and sequestered.

As part of the U.S.' decarbonization toolkit, cleaner hydrogen development is essential to achieving domestic energy transition initiatives. Both green and blue hydrogen will play an important role in 2023 and beyond.

The U.S. Department of Energy's National Clean Hydrogen Strategy and Roadmap[1] outlines how clean hydrogen can contribute to national decarbonization and economic development goals. The DOE's Hydrogen Shot program aims to slash the cost of clean hydrogen to \$1 per kilogram by 2030.

Additionally, the IRA included a \$3 per kilogram tax credit for green hydrogen, subject to compliance with life cycle greenhouse gas emissions requirements, which is likely to make the U.S. the cheapest hydrogen production hub globally.[2]

Despite the IRA's unprecedented support to the hydrogen industry, the U.S. is still far from the investment levels needed to achieve its net-zero ambitions. The two largest impediments precluding widespread adoption of hydrogen are interlinked: offtake agreements and financing opportunities.

Financing

Project financiers need to coalesce around a set of terms and structures to finance large-scale clean hydrogen production projects.

To do so, sponsors and lenders will need to ensure that: (1) clean hydrogen projects demonstrate long-term contracted revenues sufficient to underwrite debt financing secured by collateralized assets, and (2) all the links in the value chain — from production, to transportation and delivery, to end use — are in synchronization, to ensure that revenues needed to make debt repayments are actually received.

In many cases, the financing structures will be complicated by the multiproject nature of clean hydrogen production — i.e., renewable power, electrolyzer, storage, transportation and delivery. To tackle these complexities, lenders should look to other similar precedents, such as onshore natural gas and liquefied natural gas-to-power projects, where the various



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components are often financed separately.

To move from the current Wild West environment to a more developed financing landscape with multiple constructed, financed and operating projects — complemented by a spot market for hydrogen — clean hydrogen producers will likely have to take significant merchant risk.

Offtake

The execution of long-term commercial agreements in the green hydrogen economy will be a key challenge in 2023. This is the classic chicken-and-egg problem of growing supply and demand in synchronization.

There exists an established market for hydrogen for use in the production of fertilizer and other industrial processes. The easier-to-tackle offtake arrangements will be those that displace existing gray hydrogen projects with cleaner — e.g., blue — hydrogen.

But in terms of incremental demand for clean hydrogen, a key new group of offtakers will be utilities and independent power producers. The future of the green hydrogen economy rests with this wider swath of hydrogen end users — and the ability of those end users to enter into long-term hydrogen supply contracts with agreed parameters around volume, price, credit risk, quality and delivery.

As production of clean hydrogen rises, increasingly longer-term volume commitments will be key to supporting additional investment. At present, the limited pool of creditworthy offtakers with the risk appetite and downstream distribution network to offtake green hydrogen at utility scale is preventing projects from obtaining financing. This will need to change.

Successful offtake agreements must also carefully assess and manage credit risk. Initially, producers may need offtake agreements to be underwritten by low-risk government and blue-chip corporate customers.

However, in time, direct offtakers — including offtakers with less secure credit profiles — will need to be able to contract. In those cases, the presence of creditworthy end users could help by enabling the hydrogen producer to step into some or all of the offtaking company's rights to collect from creditworthy customers.

In offtake contracts, parties will also need to address the risk of disruptions to feedstocks, particularly until robust supply chains are developed for critical components and materials necessary to build hydrogen production facilities and hydrogen hubs.

Conclusion

The combination of government support and political pressure continues to push clean hydrogen development to meaningful scale. However, the demand and end-use cases are less clear for clean hydrogen than they were for renewable power.

Once generated, the electrons produced from solar and wind do not differ from other generation sources, whereas hydrogen is a completely different product than the commodities it is aiming to displace. Additionally, hydrogen is not a broadly traded commodity like the electrons that wind and solar produce — and is today often produced onsite by its users for very specific applications.

For 2023 to be a successful year for clean hydrogen, projects need to advance from conceptualization and design phases to construction, by successfully entering into offtake arrangements and availing project financings.

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[1] <https://www.hydrogen.energy.gov/pdfs/clean-hydrogen-strategy-roadmap.pdf>.

[2] See Shearman & Sterling's recent presentation on this topic, "Maximizing Opportunities in Clean Hydrogen & Carbon Capture Under the U.S. Inflation Reduction Act": <https://www.shearman.com/en/perspectives/2022/11/maximizing-opportunities-in-clean-hydrogen-and-carbon-capture-under-the-us-inflation-reduction-act>.