

## ● NORTH AMERICA | CARBON CAPTURE

# Carbon capture and green hydrogen: the renewables expansion continues



The US' traditional renewables sectors – wind, solar (and now even battery storage) – continue to be a mainstay, but the universe of investable renewables opportunities is expanding.

As we progress into 2024 with greater certainty in federal policy, continued support for ESG initiatives, and broader investor interest in the energy transition theme the trend for renewables is expected to kick up a notch.

Green hydrogen development took a giant stride towards bankability as the Department of Energy selected 7 green hydrogen hub winners across 16 states, handing out \$7 billion from the Bipartisan Infrastructure Law.

Together, the hubs aim to produce over 3 million metric tons of clean hydrogen annually and generate over \$40 billion in private investment in hydrogen.

Green hydrogen is not only a key component of the Biden-Harris administration's clean energy initiatives, but it's also a promising technology that companies, and other governments, are investing in.



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Coupled with the 45V tax credit, which awards up to \$3 per kg of hydrogen produced, the DOE financing has moved hydrogen from science fiction to science reality much faster than most expected.

LS Power made a move in the sector in November when it announced future investment up to \$400 million into green hydrogen projects developed by Monarch Energy.

As part of the newly established Clean Hydrogen Fuels platform the investment will be used to advance Monarch's pipeline of projects, expand to new regions within the US, and

continue to add top talent to the Monarch team.

German-based energy giant RWE will continue its €55 billion (\$60.2 billion) Growing Green initiative – investing in renewable energy, batteries, flexible generation and hydrogen – with an estimated €20 billion (\$21.9 billion) to be allocated to future US investments by 2030.

The construction of at least 3GW of hydrogen-ready gas-fired power plants and 2GW of electrolyser capacity is planned during this push.

Despite the positive talk project finance bankers tell PFR that it is still early stages for the space.

"Those projects are really in their partnership phases, on a project finance basis you're not getting involved until there's contracts and things, right now they're pretty conceptual," said Greg Hutton, head of project finance and ET strategy in North America for Rabobank. "We're excited to see that market grow but right now we're double capacity on wind, solar and storage and solar and it is a luxury to be able to work on these things."

The biggest hurdle to overcome for the green hydrogen space is that the economics for these projects is currently based in large part on the 45V tax credit, for which the final rules have yet to be articulated by the Department of Treasury.

"It's really hard to finance projects. People are developing them and there's work being done, but I don't think we're going to see any final investment decision soon, maybe at the end of 2024, because we're still waiting to know exactly what the economics are going to look like for these projects," said Tom Holmberg, partner at law firm Baker Botts.

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Adding to the challenges is that the market for green hydrogen does not yet exist at scale. Hydrogen is currently mostly used in refining petroleum and fertiliser production, but there are demand-based opportunities in other sectors as well, including transportation, power, and more. Compared to other incumbent technologies it is currently more expensive, while there is also a lack of hydrogen infrastructure, lack of manufacturing at scale, durability, reliability, and availability.

“Currently green ammonia and hydrogen are significantly more expensive to produce than hydrogen and ammonia made from natural gas,” said Erik Codrington, MUFG’s head of structured finance. “You have to find niche applications where maybe your offtaker is getting a special benefit from blending green feedstock into their mix, for instance blending green ammonia into their overall pool of ammonia or fuel to get tax benefits and reduce the carbon intensity of whatever the underlying product is.”

But looking ahead, and outside of the US, the global market is expected to top the value of the liquid natural gas trade by 2030 and grow further to \$1.4 trillion per year by 2050, according to a Deloitte study.

The study added that interregional trade is key in unlocking the full potential of the green hydrogen market. Regions that are able to produce cost-competitive hydrogen in quantities that exceed domestic needs are already positioning themselves as future hydrogen exporters—supplying other less-competitive regions and helping to smoothly facilitate the energy transition.

“I expect to see hydrogen from the US head to Asia,” said Lin-



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klaters’ co-head of energy and infrastructure, Americas, Ron Erlichman. “The Japanese and Korean, and to certain extent other parts of the Asian market, view that as the most economic source of meeting reduction and emission requirements or goals. There’s just not an ability to generate the renewable resources because of cost and scarcity of developable land in those regions.”

### CC-yes?

Another growing area for the clean energy sector is carbon sequestration. Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide and is one method of reducing the amount of carbon dioxide in the atmosphere, aiding the goal of reducing global climate change.

Pushing into the sector has been oil majors who benefit from pumping CO<sub>2</sub> into oil wells to make it easier to get crude out of the ground. ExxonMobil has closed on its November acquisition of Denbury, a carbon capture and sequestration (CCS) developer also specializing in oil recovery.

The \$4.9 billion all-stock transaction provides ExxonMobil access to its 1,300-mile US-owned and operated CO<sub>2</sub> pipeline, including 925 miles of CO<sub>2</sub> pipelines in Texas, Louisiana, and

Mississippi, as well as 10 sequestration sites.

Again, the IRA is lending a helping hand to carbon capture with an update to the 45Q tax credit which incentivizes the use of carbon capture and storage.

The 45Q increases a tax credit for power plants and other polluters who capture and store their carbon from \$50 to \$80 a ton. Those incentives climb even higher for carbon stored from direct air capture, a nascent technology to grab CO<sub>2</sub> from the ambient air. A tax credit that looks likely to benefit from the emergence of transferability tax credit deals.

“45Q is going to be a huge market for transfers. A lot of the major banks have not really gotten their arms around 45Q deals, as a result nobody wants to do those as a tax credit partnership,” said Ellen Friedman, tax partner at law firm Baker Botts. “I think that the volume of 45Q credits is going to become just astronomic once a lot of the deals that I’m aware of come to fruition, but it might be three years, four years down the road.”

Similarly to green hydrogen the current economics of carbon capture projects tend to be driven by these new tax credits making it difficult for banks to lend. Banks are factoring CCS into their medium-term green lending plans; however, most ar-

en’t providing nonrecourse debt finance currently. Most completed projects to date have been financed by their owners or by equity investors, including private equity firms and offtakers such as chemical and utility companies, rather than banks.

Whatever its societal benefits, carbon capture on its own doesn’t produce any cash flow. Economic viability for these projects will rest, in my opinion, on the ability to sign up credit worthy customers who will pay for this service (and related tax credits) because it facilitates or lowers the carbon intensity of their business” said MUFG’s Codrington.

“Lenders will likely shy away from deals that are only producing tax credits”. He added, “Various clients have also flagged very long-tailed liability for recapture of tax benefits in the event of migration of stored CO<sub>2</sub> as a significant obstacle to green-lighting new CCS projects.”

Despite some movement in 2023 it was still a drop in the ocean to the \$3 trillion the IEA estimates will be needed if the world is to capture between four and eight gigatons of CO<sub>2</sub> each year to achieve net-zero emissions by 2050.

The US is trying to help spur activity through the Bipartisan Infrastructure Law (BIL), which has \$12 billion in capital available for carbon capture project loans and grants, like the Carbon Capture Demonstration Projects Program which has so far put \$1.7 billion to work across six projects for commercial-scale carbon capture technologies.

Carbon capture and green hydrogen are certainly going to play a major part in the future of energy transition. But most financiers continue to wait until technology and policy improvements bring greater maturity to these markets. ■