First clean ammonia shipments lift Middle East's hydrogen ambitions

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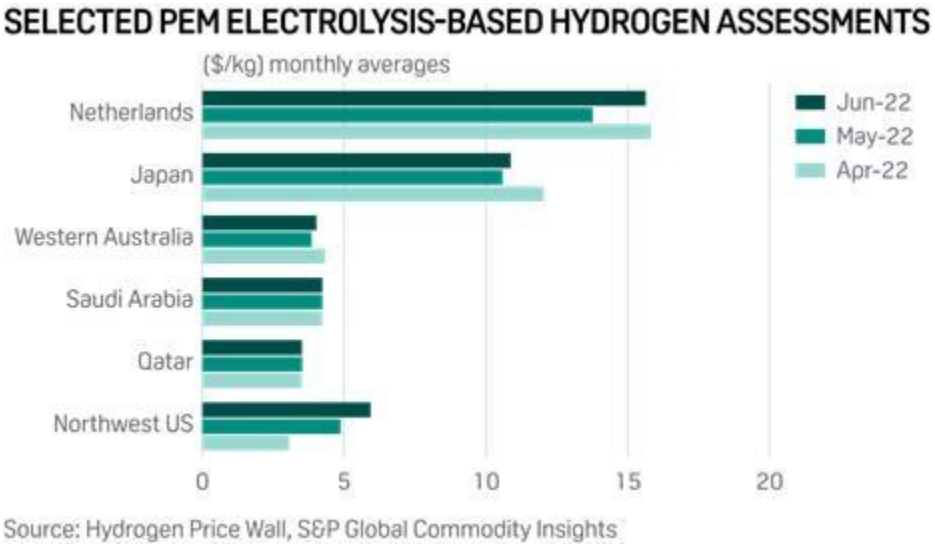
- **Exports to Germany, Japan**
- **H2 capacity 4.2 million mt/yr**
- **Oil firms target clean ammonia**

The Middle East is beginning to recognize the huge natural advantages it has in the race to supply commercial volumes of competitively priced conventional and renewable hydrogen and ammonia.

The start of clean ammonia shipments and a first large offtake agreement in July marked a significant step change in the development of the Middle East's low-carbon hydrogen ambitions. With electrolysis-based hydrogen prices in Qatar, Saudi Arabia and Oman among the cheapest assessed by Platts globally, there is no question the region is well placed to compete with Australia as a provider of low-cost exports to Japan and Europe.

Platts' Hydrogen Price Wall shows high production costs in Europe and Japan, making these regions likely importers of low-carbon hydrogen from cheaper hubs such as Australia, the Middle East and the US.



Australia has about a 100 hydrogen projects, including demonstration and lab projects, while the Middle East has 37 mainly industrial projects, according to the S&P Global Commodity Insights' Hydrogen Production Assets database.

The Middle East projects equate to 4.2 million mt/yr of low or zero carbon hydrogen production capacity, versus Australia's 9.1 million mt/yr, assuming normalized annual capacity factors. But while Australia would appear to have the edge in domestic volumes, the Middle East's recent shipments and offtake agreements show it has taken a first mover advantage in the commercial shipments space.

Huge RES potential

Rich in natural gas for potential conventional hydrogen production and conventional hydrogen with CCS, the Middle East is waking up to its renewable energy potential, with Saudi Arabia recently announcing strong wind and solar capacity growth plans.

This renewable power will first and foremost be needed to decarbonize direct electrification, freeing up fossil fuel capacity for exports, ahead of feeding electrolyzers for renewable hydrogen production. The region is, however, replete with large oil and gas companies more than capable of turning small pilot projects into commercial scale assets in short order, according to analysts and industry players. "I clearly see efforts in the Middle East being more purposeful (for renewable hydrogen)… There is a certain level of proactiveness in many of the oil-producing countries," Rajat Seksaria, Chief Executive Officer, ACME Group, told S&P Global Commodity Insights.

"They just want to ensure that they properly hedge themselves and they are at the front end of this transition not just in terms of their own usage but in terms of exports too," he said.

First offtake deal

ACME, in partnership with Norway's Scatec – both renewable energy firms – has one of the largest projects in the Middle East, aimed at producing 1.2 million mt/yr of renewable ammonia in phases in the Special Economic Zone at Duqm in Oman.

The partners have recently tied up the first known offtake agreement in the region -- a non-binding deal with agriculture and chemicals firm Yara International for offtake of renewable ammonia from their Oman project.

"The green ammonia from Oman will go into our scalable distribution system and contribute to emission-free fuel for deep-sea shipping, power production and fertilizer globally," said Magnus Krogh Ankarstrand, President, Yara Clean Ammonia.

Growing preference

Meanwhile oil major Saudi Aramco recently announced a target of producing up to 11 million mt/yr of blue ammonia, a carrier of blue hydrogen, by 2030, partly reforming natural gas from its Jafurah field with the planned addition of carbon capture and storage.

It's a balanced mix of old and new for the company, announced by President and CEO Amin H Nasser as part of Aramco's largest capital program in its history, producing "the reliable energy and petrochemicals the world needs, while developing lower carbon solutions that can contribute to the broader energy transition."

Others are going down a similar route, indicating an emerging preference for ammonia for long distance transport with an existing market to address.

“We have seen four low-carbon ammonia trades between Abu Dhabi National Oil Co. (ADNOC) and Japanese and German companies. This signifies the start of the low-carbon hydrogen/hydrogen derivatives trade market,” said Ankit Sachan, Hydrogen Analyst at S&P Global Commodity Insights. “Looking ahead we expect more exports to Far East and European nations given the advantages the region has such as geographical proximity, low-cost production, existing ammonia export infrastructure and ammonia handling experience,” he said.

S&P Global Commodity Insights’ Platts Analytics forecasts global conventional ammonia production at 177.56 million mt in 2022, rising to 185.90 million mt by 2025.

Close to demand

Many of the region's projects are close to existing demand hubs, mainly refining and ammonia facilities, Sachan said.

The blue ammonia project in Ruwais Industrial Complex in the UAE emirate of Abu Dhabi was a case in point.

On Sept. 1 ADNOC said it had made its first shipment of low carbon ammonia from Ruwais to German metals group Aurubis.

"The Middle East appears to be on course to having firm offtake agreements," Sachan said, noting the region's strong energy and trade relations with EU and Asian demand centers.
Another advantage was the central involvement of national oil companies and sovereign wealth funds in many of the projects.

Masdar, wholly owned by the Abu Dhabi government’s Mubadala Investment Company, has three hydrogen projects in the UAE, while the Sovereign Fund of Egypt is a participant in the Ain Sokhna project.

Renewables picking up pace

A missing piece of the puzzle to date has been a responding growth in the region’s renewable energy development to support the transition.

Middle East green power capacity grew 5.4% in 2021 versus a global figure of 9.25% despite the Middle East’s wealth of solar and wind resource.

The International Renewable Energy Agency’s latest data to end-2021 shows a surprisingly low level of renewables adoption with the UAE’s 2.6 GW of mainly solar capacity a rare example of recent, dynamic growth, comparing favorably with Saudi Arabia’s mere 443 MW installed, or Oman’s 188 MW capacity.

But future ambition is more encouraging than past endeavor. Saudi Arabia’s capacity is set to rise sharply over the next few years with 7.1 GW awarded and in the development pipeline. The country has also just announced 15 GW of renewables capacity to be offered in 2022 and 2023 tenders.

SELECTED MIDDLE EAST HYDROGEN PROJECTS

Name	Participants	Target online date	Feedstock	Platts normalized annual capacity (mt/year)
Green Energy Oman, Oman	InterContinental Energy, Worley, EnerTech, OQ	2028	Renewables	1,800,000

Helios (Neom), Saudi Arabia	Air Products, ACWA Power, POSCO Holdings, NEOM	2026	Renewables	237,250
Duqm Special Economic Zone Phase I, Oman	ACME Group, Scatec ASA	2024	Renewables	48,487
Ruwais Blue Ammonia, UAE	ADNOC, Mitsui, GS Energy, Fertiglobe	2025	N/A	180,000
Suez Canal Economic Zone ReNew Power, Egypt	ReNew Power	2030	Renewables	20,000
East Port-Said, Egypt	H2-Industries	2022	Biomass/waste	300,000
Waste-to-hydrogen Oman, Oman	H2-Industries	2026	Biomass/waste	67,000

Source: Hydrogen Production Assets database, S&P Global Commodity Insights

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