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Germany Takes The Lead In Pivotal Year For Hydrogen

By [Alan Mammoser](#) - Jun 28, 2021, 12:00 PM CDT



Announcements of large new electrolyser projects, and the formation of consortia to build them, are appearing in the news almost daily. What began as a few announcements a year ago is now

reaching a crescendo. The growing number of projects would indicate that capacity to produce green hydrogen will increase sharply in the next few years. Indeed, according to recent report of the International Renewable Energy Agency (IRENA), entitled 'Green Hydrogen Supply, A Guide to Policy Making,' electrolyser manufacturing capacity worldwide is expected to rise to 3.1GW per year by the end of 2021.

Should this ramp up occur it will mark an impressive gain on current capacity. But it pales in comparison to what IRENA says is needed. According to that agency, global manufacturing capacity of 130-160GW per year will be needed for a carbon-free economy, in order to achieve total installed electrolyser capacity of 5TW producing some 400 million metric tons (Mt) of green hydrogen annually in 2050.

The challenge is daunting but signs are on the horizon that a take-off could occur. It will bear watching whether the current news bubble extends into a steady stream or, as has happened in decades past with hydrogen, fizzles out.

A good explosion

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Hydrogen's leap forward started last summer. It was just last June when Germany announced a "National Hydrogen Strategy" to create a domestic market with 5GW of renewable energy dedicated to hydrogen production by 2030. The same month, Germany signed a cooperative agreement with Morocco to develop a 100MW green hydrogen facility in the North African country.

A month later the EU announced its 'Hydrogen strategy for a climate-neutral Europe,' setting the ambitious target of 6GW of hydrogen electrolysis to produce close to 1 Mt annually by 2024 (and 40GW of electrolysis capacity producing 10 Mt by 2030).

News of the first real megaproject came almost simultaneously. In July the Helios Green Fuels project was announced with an intention to deploy 4GW of renewable power to produce 650 metric tons of hydrogen per day, supporting the production of 1.2 Mt of ammonia annually at the planned NEOM city in Saudi Arabia (with production to begin in 2025).

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In a year, the world for hydrogen has completely changed, with announced projects rising from MW to double-digit GW-scale. A recent listing has 22 major projects of 1GW or greater at various locations around the world. Another has 34 'hydrogen valleys,' where production, storage, distribution and final use are in one area of relatively close proximity.

The concept of hydrogen valleys appears in a new report, 'The Potential for Green Hydrogen in the GCC Region,' by Dubai-based think tank Dii Desert Energy and the consultancy Roland Berger. The 34 are in different stages of development worldwide, with more than 20 in Europe, others in Australia, China, Japan, Thailand, Saudi Arabia, Oman, Chile, and the US.

"You can add more specific large-scale projects for the production of green hydrogen/molecules in countries like Mauritania, Morocco, Egypt," says Cornelius Matthes, CEO of the Dubai-based think tank Dii Desert Energy.

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"There has been a huge explosion of announcements since last year which is generally good for the market," he adds.

Matthes cautions that many of the projects are at a very early stage, conceptual, without clear paths to funding. Still the growing list is significant.

"It creates the right momentum, the right fantasy," says Matthes. "It shows hydrogen will have a major role in the energy transition."

Gray to green: filling the gap

Matthes' cautious optimism about the recent spate of project announcements is abetted by what he perceives as an important transition now occurring. An earlier phase of planning and testing is giving way to actual development of projects for market, as evidenced by new kinds of creative investment programs beginning to appear.

He points to the recent launch of the German government's H2Global Foundation, a market-oriented funding program that is focused on the development of hydrogen for export in 'partner

countries’.

The new foundation, governed by a special independent H2Global Commission with 16 founding members, is a vehicle to create a market-based mechanism, acting as offtaker to help develop international markets. It is working with EUR 900 million funding provided by the Federal Ministry for Economic Affairs and Energy (BMWi).

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“It’s an announcement of extreme relevance,” says Matthes. “It is basically a vehicle to support the creation of a market in general, overcoming the financing gaps between gray and green (hydrogen) via ‘Contracts for Difference.’”

The concept is to bring supply and demand together by covering the difference between the purchase and selling prices for green hydrogen and hydrogen-derived products. It creates an intermediary, the Hydrogen Intermediary Network Company (HINT.CO), which deploys a funding mechanism based on the ‘Contracts for Difference’ approach, in which the lowest offer price and the highest selling price are each awarded the contract, making the price difference to be compensated as small as possible.

HINT.CO will use this ‘double auction’ mechanism and compensate for the difference between the supply and demand prices, making it possible for buyers to integrate green hydrogen and derivatives into their operations at market-reflective prices. The auctions will be targeted in countries that can supply Germany and the EU with renewable energy and hydrogen.

Programs such as this, with targeted funds that level the field for investment in green hydrogen generation capacities, are what distinguish the H2Global concept from previous investment promotion programs, which primarily enabled the development and testing of technologies. They may come to play a critical role as mechanisms to support regional auctions of green molecules, not unlike the auctions that have been instrumental to ensuring competition-based prices on both buy and sell sides in utility-scale solar and wind power development.

Matthes thinks the market-based aspect will help emerging hydrogen markets to avoid the kind of overpayment that occurred with feed-in tariffs in Europe.

He compares this moment with that in 2009, when his organization Dii Desert Energy (initially called ‘Desertec Industrial Initiative’) was launched as an industrial initiative in Germany to act as a unique public-private sector network. Then, its focus was to begin to explore the potential of renewables in the Middle East and North Africa and connecting local markets for green electrons to Europe. Its work reached a high point last year when, working closely with Brussels, it saw key elements of its 2 x 40GW scheme (which was developed in partnership with industry group Hydrogen Europe) integrated into the EU’s new hydrogen strategy.

Home grown hydrogen

While the government's H2Global Foundation will apply unique financial mechanisms to foster green hydrogen for import, there is much debate in Germany over how much non-carbon hydrogen (green or blue) can be produced domestically. Industry groups have been calling for public support to spur production and the government now appears ready to pour direct subsidies into projects in the homeland.

The country's EUR 9 billion national hydrogen strategy, announced a year ago, includes EUR 7 billion for national projects and EUR 2 billion for international projects (out of which the EUR 900 million H2Global is funded). In fact the government is already committing to more than this.

In May, the BMWi and the federal ministry of transport and digital infrastructure (BMVI) selected 62 hydrogen production and infrastructure projects. The government was careful to name these as Important Projects of Common European Interest (IPCEI), to gain EU clearance and open the way for EUR 8 billion (\$9.6 billion) of national subsidies.

The 8bn is expected to spur overall investment of some EUR 30 billion for projects that will cover the entire value chain, from hydrogen generation and transport to industrial applications.

The list includes electrolyser projects with a combined capacity of over 2GW and hydrogen pipelines of 1,700 km in length. There are 12 projects in the mobility sector for development and production of fuel cell systems and vehicles and for refueling infrastructure. The German energy group RWE will be involved with three of the largest projects named, developing over 400MW electrolyser capacity.

"These are not strategies anymore," says Cornelius Matthes. "These are creating the market."

And, while debate continues in Germany over the potential role of the so-called blue hydrogen (with carbon capture), the Germans are currently taking a somewhat different approach from the EU as a whole, where blue hydrogen is seen as a 'bridge' fuel.

"In Germany, the color is green 100%," says Matthes.

By Alan Mammoser for Oilprice.com