



CONNECTING THE DOTS: how pipelines can help scale Europe's green hydrogen market

Joost Sandberg, Chief Development Officer, HyCC, The Netherlands

Pierre-Germain Marlier, Investment Director, Hy24 and Co-Founder at FiveT Hydrogen, France

Michael Timm, Senior Director, Corporate Transformation Services, Alvarez & Marsal, Germany

Introduction

Hydrogen is a central pillar in Europe's vision for a greener future, accelerating decarbonization and offering a viable alternative to fossil fuels.

Green hydrogen in particular – produced by means of electrolysis using renewable energy – is anticipated to help decarbonize sectors that have struggled to cut emissions, such as industrials and long-haul transportation. It is also expected to serve as a chemical feedstock and energy store.

The European Union (EU) has set ambitious targets for renewable hydrogen. It aims to produce 10 million tonnes and import the same volume of the gas every year by 2030, requiring investments of over 100 billion euros in generation capacity only.

It's a tall order: renewable hydrogen production in the region was just 20,000 tonnes in 2022. Less than 1% of the global hydrogen production and use today is green.

In our view, a major roadblock in reaching these goals is the transport infrastructure. Ensuring that production is delivered to end-users across Europe in a cost-effective manner is vital to unlock the full potential of demand and subsequent investments in the sector.

MIDSTREAM INFRASTRUCTURE IS KEY TO UNLOCK LARGE-SCALE DEMAND

Despite a growing pipeline of projects, just 7% of the announced capacity for hydrogen in the EU has reached a final investment decision (FID). Many project developers struggle to secure financing because of the lack of long-term off-take agreements.

Investor hesitancy regarding future demand is not unfounded. So far, hydrogen demand has been concentrated in traditional applications within hard-to-abate industrial sectors. The advent of new uses – critical for demand to scale up – is constrained by the current distribution model, where green hydrogen is mostly produced and consumed in the same location.

To meet larger demand requirements and provide developers the security they need, this model must evolve. Hydrogen needs to be produced at a competitive scale in locations where renewable electricity is most available and cost-effective. From these low-cost production hubs, supply can then be connected to demand centers across Europe.

¹ [Global Hydrogen Review 2023. International Energy Agency \(IEA\).](#)

² [Bright spots for hydrogen project development emerge amid investment delays. S&P Global Commodity Insights. May, 2024.](#)

Midstream infrastructure plays a critical role in matching supply and demand in a resilient, low-cost manner. Pipeline networks, in particular, are the most economical option for long-distance, high-volume hydrogen transport. At a cost of €0.11-0.21/kg (€3.3-6.3/MWh) per 1,000 km, they outcompete transport by ship for all reasonable distances within Europe and neighbouring regions.

Transporting hydrogen via pipelines to demand sites is also significantly less complex than relocating end-users, such as steel mills or chemical plants, closer to production hubs. In addition, producing large volumes of the gas next to the point of consumption is limited by electricity grid capacity, making the transmission of energy as hydrogen molecules through pipelines more cost-competitive.

A pipeline system can also facilitate cross-border trading as the European market develops further, helping reconcile regional differences in supply and demand. The infrastructure would allow countries to import hydrogen to meet national requirements, particularly those with low domestic supply potential compared to expected demand, such as Germany or Belgium.

CHALLENGES AND SOLUTIONS IN BUILDING HYDROGEN INFRASTRUCTURE

So what is currently in place to support the development of a hydrogen infrastructure that can trigger demand? And what additional measures are necessary?

The planned European Hydrogen Backbone (EHB), being built by a group of 31 energy operators, is a significant step forward. By 2030, the network is expected to span 31,500 km, potentially reducing supply costs by 330 billion euros compared with a localized model of regional supply and demand.

Countries like Germany and the Netherlands have also begun developing their national pipeline networks, which includes cross-border connections. Companies such as Everfuel, HyCC and HH2E are aligning their strategies with this model, launching large-scale production plans optimized for pipeline connection.

While these are positive signals, bolder action is needed to break the infrastructure logjam and accelerate the hydrogen market in Europe. Notably, there have been no projects delivering green hydrogen to cross-border customers yet.

One potential solution is for governments and transmission system operators (TSOs) to provide guarantees on pipeline availability and timelines. In return, producers would commit to specific volumes and utilization, especially during these early stages of the sector's development.

Without such assurances, investment decisions and project development will be delayed until the pipelines are built and fully operational, a process that can take several years. Currently, the weighted average cost of capital (WACC) and other fixed costs for hydrogen producers are estimated at around 20 million to 30 million euros per year per 100 MW of electrolyzer capacity, underscoring the need for adequate guarantees and insurance to mitigate the risk of pipeline capacity.

Finally, the nascent renewable hydrogen market would benefit from clear implementation of demand-side obligations that push economic operators to incorporate renewable hydrogen, as outlined in the EU's Renewable Energy Directive. This would enable a level playing field between EU production and imports and help establish an EU-wide tradable certificate scheme that rewards over-achievement and facilitates compliance.

³ [Analysing future demand, supply, and transport of Hydrogen. European Hydrogen Backbone \(EHB\). June, 2021.](#)



Conclusion

Building infrastructure for large-scale green hydrogen use will take many years, and if net-zero targets are to be achieved, it is critical to start planning well in advance, and in parallel to growing demand for the gas in new sectors. This will require all parties in the value chain – from policymakers, TSOs, developers and off-takers – to come together to address this missing piece in the supply-demand puzzle.

Without the required attention of policy makers to the pivotal role of midstream infrastructure we believe that the ramp-up of the hydrogen economy will be massively delayed. Midstream infrastructure is essential to realize cost-efficient solutions and reduce the implied risks of both manufacturing and downstream investments.

CONTACTS



Michael Timm

Senior Director

mtimm@alvarezandmarsal.com

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