RAFFINERIE HEIDE

Executive Perspectives

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The Path for Green Hydrogen: Hope or Hype?

The bourgeoning global conversation

Across the energy landscape hydrogen is generating a buzz, with major players praising its decarbonisation potential. This discussion has driven a policy response across Europe, with Spain, France and the Netherlands introducing guidelines and subsidies in the last two years to support the development of clean hydrogen projects.

With such international attention on hydrogen right now, the resource is gradually being viewed as a super-saviour in the energy transition. And this view is not unfounded. Firstly, hydrogen can be produced cleanly through the utilisation of excess renewable energy via the process of electrolysis. This ‘green’ hydrogen can replace hydrogen produced by carbon-intensive means, demonstrating its emission reduction capability.

There are also decarbonising applications specific to the production of ‘green’ hydrogen. For instance, at Raffinerie Heide the vision is for the production of ‘green’ hydrogen at scale, to fuel our own refining processes instead of natural gas.

Similarly, there is also the potential for ‘green’ hydrogen to further decarbonise heat. Since over a decade, our operations have served a broader district heating network, however, production of ‘green’ hydrogen on site would enable an expansion of this by using the off-heat of the electrolysis unit, not only helping to heat the local swimming pool, but also supporting one of Europe’s largest tomato-growing greenhouses We also envisage piping this heat into the local gas grid, which can be used across multiple applications currently reliant on natural gas.

Hydrogen can also be combined with other chemicals to produce cleaner refined products, such as synthetic aviation fuels and this is an option we are currently exploring. On a life-cycle basis, we believe the CO2 abatement potential of synthetic aviation fuel is ~70% compared to the fossil fuel equivalent.

Challenges and solutions

Issues around cost have led some to argue that the development of ‘green’ hydrogen for the production of cleaner synthetic aviation fuel should not be relied upon for carbon emissions reductions. Equally, questions have been raised over hydrogen storage, given the constraints of weight, volume, efficiency, safety, and cost.

These challenges are by no means insurmountable. Firstly, replacing the carbon-intensive process of ‘grey’ hydrogen production with a zero carbon electrolysis process to produce ‘green’ hydrogen, we can learn more about ‘green’ hydrogen as a decarbonising force and develop cost digressions to inform future decision making. After this, we can start to identify and enter new businesses that could benefit from incorporating ‘green’ hydrogen into their energy mix.

Scaling up will also reduce costs, but the right support will be needed to make this happen. While investment in innovation involves risk, this is better than taking a 'wait-and-see' approach, which would delay progression to decarbonisation.

Concluding thoughts:

The positive future that hydrogen paints – the ‘hope’ so widely spoken of – can only become a reality if the right investment and regulatory frameworks are introduced to support and accelerate its development. The evidence of the efficacy of supportive policy is not hard to come by.

Japan introduced its hydrogen strategy in 2017, a few years earlier than some of its international counterparts, and the result is that it has grown into the arguably the most advanced hydrogen economy in the world today. Japan holds the highest number of hydrogen refuelling stations in the world, and is aiming to reach 1 GW of power capacity based on hydrogen by 2030.

My hope is that as other nations look to create their own hydrogen development strategies, including in Germany, we will begin to see hydrogen’s potential in practice.

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About Raffinerie Heide

Raffinerie Heide GmbH is part of the Klesch Group and is one of the largest employers in Dithmarschen, Schleswig-Holstein, with around 560 employees and 40 trainees. The company has an annual processing capacity of 4.5 million tonnes of crude oil, equal to the oil demands of the entire state of Schleswig-Holstein. The refinery with a medium-sized ethos, which was founded in 2010, produces traditional petroleum products such as petrol, diesel and aviation fuel. It also produces light heating oil and base materials for the chemicals industry. Raffinerie Heide, which is one of the most complex refineries in Europe, is among the best in the continent in terms of utilisation and availability thanks to its strict standards of care in relation to maintenance.