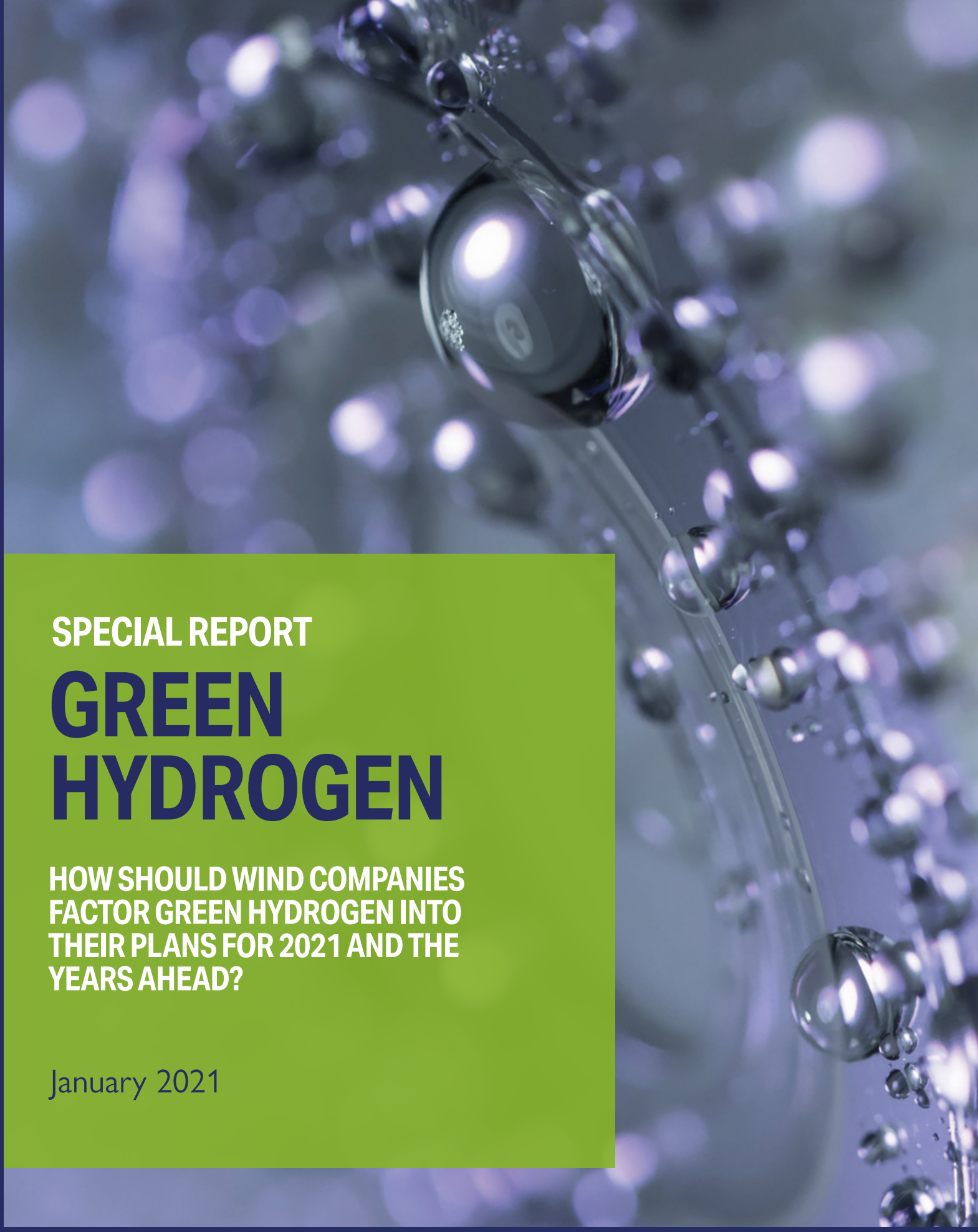

SPECIAL REPORT

GREEN HYDROGEN

HOW SHOULD WIND COMPANIES FACTOR GREEN HYDROGEN INTO THEIR PLANS FOR 2021 AND THE YEARS AHEAD?

January 2021

A WORD ABOUT WIND

POWERED BY TAMARINDO GROUP

Contents

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David Sanders, Managing Director, FTI Consulting

Grzegorz Pawelec, Research, Innovation and Funding Manager, Hydrogen Europe

David Bow, Senior Vice President - Corporate Business Development, Nel Hydrogen

Introduction

Is it time to get excited about green hydrogen? Possibly.

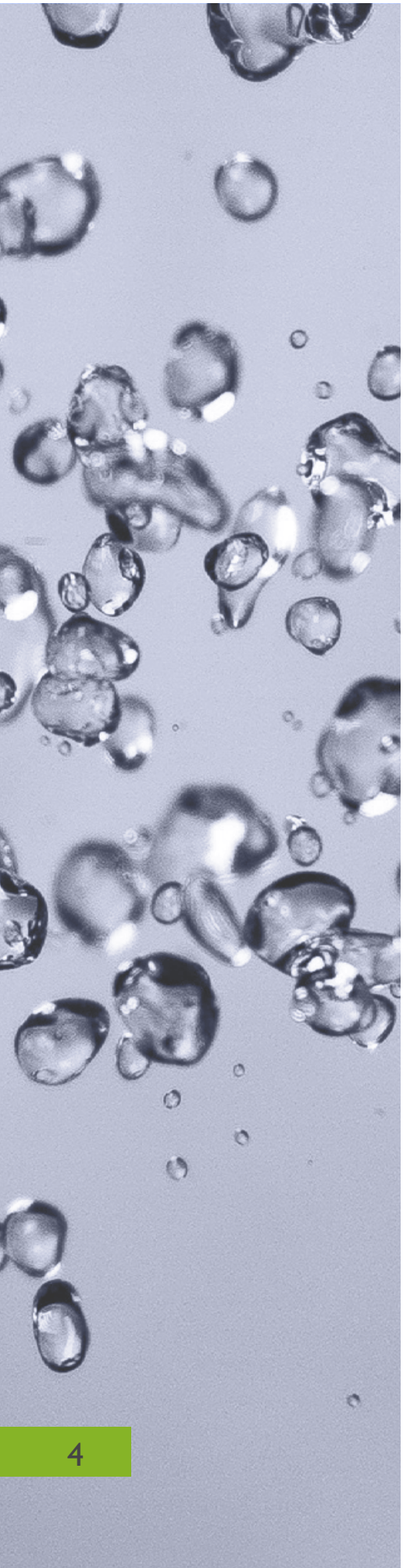
The European Union and several individual countries, both in Europe and further afield, published green hydrogen strategies in the last year and, in doing so, did much to further the cause of the sector.

However, it's important not to get carried away. Policy is only one part of the equation. Equally important is a significant injection of funding to bring down the cost of green hydrogen.

And it's not simply a case of throwing money at the industry: it's vital that the funding is used in a targeted strategic way.

This also presents companies in the wind power industry with a dilemma: do they want to become green hydrogen producers?

These were all areas of discussion at the Wind Investment Boardroom on green hydrogen, run by A Word About Wind



2020: A breakthrough year

Despite the challenges posed by the Covid-19 pandemic around the world in 2020, it was a "breakthrough year" for green hydrogen, according to Grzegorz Pawelec, innovation and funding manager at trade body Hydrogen Europe.

He says that one of the biggest developments that made people sit up and take notice of green hydrogen in 2020 was the publication of the European Union's Hydrogen Strategy. This sets a green hydrogen (or 'clean hydrogen') target of 6GW of electrolyzers installed by 2024, which would be a huge increase on the approximately 250MW that were in place globally at the time of the publication of the strategy in summer 2020.

Pawelec says the strategy serves a number of purposes. In addition to the obvious objective of furthering the case for green hydrogen, the strategy also, at a time of pandemic-induced economic strife, sets a framework for meeting the "need for large-scale investment to kick-start the economy", according to Pawelec. In this context, Covid-19 may have strengthened the case for large-scale Europe-wide investment in green hydrogen.

But while there may be a significant amount of political will behind the green hydrogen cause, Pawelec says that the situation is not as clear cut from a business perspective. He highlights how the pandemic has been a "huge strain for companies and there has been a huge drain on funds".

The EU's Hydrogen Strategy sets a green hydrogen target of 6GW of electrolyzers installed by 2024.

He adds: "Political declarations are one thing, but actions need to follow." Pawelec also acknowledges that, while the EU has an ambitious strategy for hydrogen production, there are "gaps in regulation".

ALIGNING FUNDING WITH POLICY

When taking steps to boost the green hydrogen sector, it is vital that funding is aligned with policy, according to Niels-Arne Baden, senior vice president and head of strategy & public affairs at Danish electrolyser business Green Hydrogen Systems.

"If we don't align it will delay growth," he says. "There is a lot of interest, but funding has to be available, funding is needed to drive costs down, we need green hydrogen prices that are at parity with fossil fuels."

One of the targets in the EU's Hydrogen Strategy is 40GW of electrolyzers installed within EU borders and the production of up to ten million tonnes of renewable hydrogen in the EU.

Baden says: "We have less that ten years to achieve this, we need to see initiatives fast to scale the technology."

David Bow, senior vice president-corporate business development at Nel Hydrogen, says there have been very few green hydrogen opportunities in the US other than in California. He adds that funding was vital to move the industry forward but, at the same time, it was important to develop ways in which to recover such funding, for example via carbon taxes.

The cost of electricity is a major stumbling block, according to Bow, who says 70 % of the cost of green hydrogen is the electricity.

"We have less than ten years to achieve this, we need to see initiatives fast to scale the technology."

He continues: "If you can get electricity pricing down in the range of where you'd be at if you were sitting right next to a wind farm, or right next to a solar farm and be able to do it in a more distributive way, we can achieve this fossil parity. We also need to bring in revenue from those that aren't doing anything from a sustainability standpoint."

The funding conundrum

PENALTIES AND INCENTIVES NEEDED

The high cost of the electricity needed to produce green hydrogen means it faces stiff competition from blue and grey hydrogen, which can be produced at a fraction of the price, as was highlighted by participants in the roundtable.

The participants noted that carbon prices were not "penalising enough" to bring the price of green hydrogen down. It was also claimed that there was an "immediate opportunity to link up electrolysers with solar farms and onshore wind platforms".

The roundtable discussion also highlighted that, despite the drive from the EU on green hydrogen – as well as the imminent UK white paper due in the first quarter of 2021 – there needs to be penalties or incentives to support such policies. This can help lower the cost of producing green hydrogen, and roundtable attendees pointed out that the fact that a small proportion of London buses run on hydrogen showed that the wider adoption of this type of energy source was "not far off".

The Covid-19 pandemic has also directed more oil and gas companies to re-think their strategies in relation to hydrogen, says Alan Mortimer, director of innovation, clean energy at Wood Group. This was partly due to the 2020 oil price crash, with prices falling to a 17-year low in March last year, and partly due to growing global demands for a green economic recovery.

Mortimer says 2020 was a positive year for hydrogen partly due to the publication of the EU's Hydrogen Strategy, but also as a result of individual countries – including Germany, Canada and Scotland – launching plans too.

FUNDING MUST BE STRATEGIC

While the green hydrogen industry would certainly benefit from increased funding, it is crucial that the industry is funded in a strategic manner.

"The way funding is allocated is key," says Mortimer. "Another issue is how quickly will the cost [of green hydrogen] come down?"

He continues: "There is confidence that costs will come down, especially for electrolyser equipment, and while this is very positive, we can't be too optimistic yet until we see exactly how governments intend to provide the support that's going to be needed."

Mortimer says that some sectors will embark on their green hydrogen journey before others, due to clean air considerations for example, and he expects that transport will be a "first mover" in this respect.

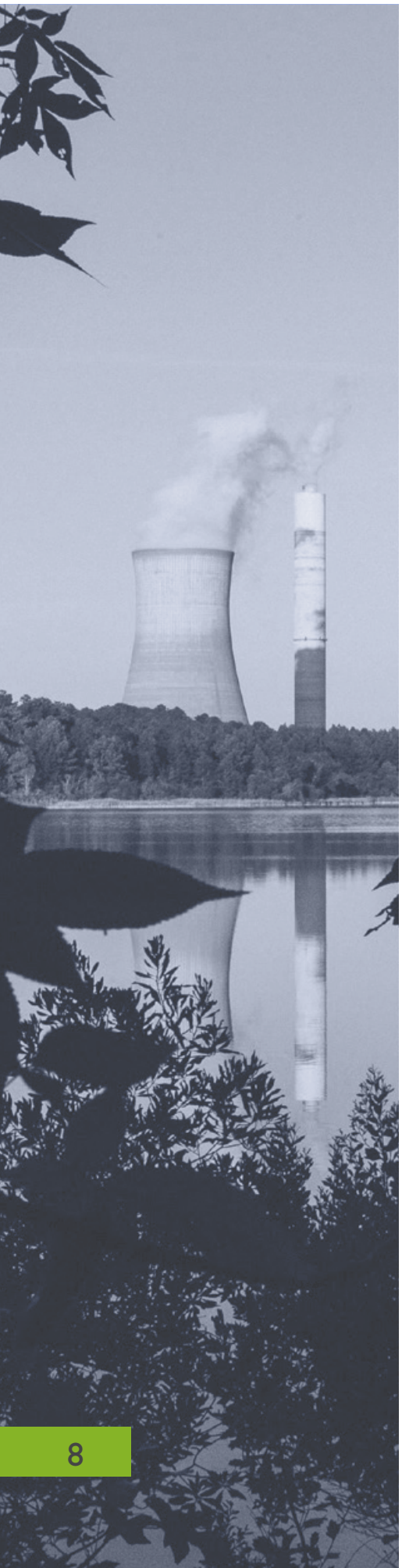
The green hydrogen sector certainly has significant momentum, particularly due to what David Sanders, managing director at FTI Consulting, describes as the "aggressive targets" set out in the EU Hydrogen Strategy.

He adds that this is particularly the case given the EU's focus on "green over blue" hydrogen. However, Sanders says there are major challenges, including "getting projects beyond the feasibility stage to the pilot stage".

While the economics of green hydrogen are challenging, encouragement can be taken from the fact that this was also the case for the wind industry even as recently as the early 2010s.

> "Subsidies throughout the value chain are going to be critical"

Sanders adds that end-use applications – in transport, heat – are new and in need of subsidies: "Subsidies throughout the value chain are going to be critical," he argues.



Oil & gas companies showing commitment

Oil and gas companies are showing ambition with regard to the development of green hydrogen and have demonstrated clear commitments to carbon targets, says James Pay, partner at Clifford Chance and head of the firm's global renewables group and co-head of the firm's mining and metals group.

However, he adds that "moving from those [green hydrogen] strategies to incentive regimes is going to be critical". Green hydrogen is important in a number of ways and this is what makes it very attractive to governments in a strategic sense, says Pay.

He adds: "It is an energy source in itself, a source of energy storage, and it has the ability to contribute to the decarbonisation of sectors of the economy that have been left largely untouched by the renewables revolution, particularly transportation, domestic heating and heavy use industrials."

Pay says subsidies will be needed to get people to commit capital to green hydrogen projects, and this will be vital to fully capitalise on the potential of green hydrogen. He adds: "There also needs to be seed funding for demonstration projects."

One potential solution is developing clusters of energy projects, which will require joint ventures between energy suppliers and energy users. He adds there are major barriers such as distributing green hydrogen to consumers.

"As we look at a lower subsidy regime for renewables, we've been looking to corporate PPAs as a magic product that will enable us to continue the pace of development of renewable power, but it's not been the case that every jurisdiction in Europe has produced vast quantities of PPAs at scale in order to feed that level of development and long-term production of green hydrogen is one potential source of long-term PPAs in the renewables sector."

Decentralised production is a key element of green hydrogen that is often overlooked, says Baden. "We tend to believe a new energy system will copy the old one where you have huge refineries producing a lot of gasoline distributed by trucks, but hydrogen can be produced very locally," he explains.

However, Baden adds that distributions systems for hydrogen are needed. "A clever tariff system can help support renewable energy in the grid, but storage capacity is a pre-requisite and that's where green hydrogen comes in."

The role of renewables

GETTING THE RIGHT MIX OF ENERGY

It is important that countries find the right mix of energy sources, according to Pawelec. He is realistic that hydrogen alone won't solve energy challenges, just as it isn't viable to produce all energy globally using wind and solar farms.

"It is not viable to think you can deliver all that renewable energy to all those consumers only through the electricity grid and no one is saying we should go the other way and deliver all that electricity only through hydrogen. An optimal mix needs to be found: neither full hydrogen or full electrification, but energy companies realise this," says Pawelec.

With the UK out of the EU, their energy markets are now decoupled, but interconnectedness will continue in the future, one roundtable participant argued. Attendees also stressed that, in order to ensure large quantities of hydrogen are produced, government intervention will be needed to ensure the issue of price is addressed.

Major growth in green hydrogen can support a huge buildout of wind and solar farms in the coming decades, but this will also require government support for those sectors too.

The wind and solar capacity that is going to be needed if European countries are to hit net zero by 2050 could be as high as 15 times what we have today according to some forecasts, says Sanders: "We're going to need lots more renewables to decarbonise the economy."

Sanders also says that, in the long term, hydrogen will be needed to simply store excess power from wind and solar farms, as intermittent renewables make up a much higher percentage of the generation mix.

Another challenge is whether we could use hydrogen to decarbonise those applications that are hard to decarbonise, such as steel, shipping and aviation. Sanders adds that a lot of building heating, and some land transport, could be done by electrification: "Hydrogen is critical for some applications and getting the funding to make those work will be absolutely critical," he says.

DECENTRALISED PRODUCTION IS KEY

There are also moves to expand green hydrogen globally. For example, Bow highlights that parts of the Middle East have the goal of being net exporters of green hydrogen.

But this might arouse local objections to the amount of wind and solar needed. Bow adds that needing 15 times the level of wind and solar we have today might impact views from tall buildings, that is probably a world we are going to "have to accept".

Bow continues: "The funding, or carrot, aspect is critical, but it has to be linked with the stick of carbon-taxing, for example."

He adds that the "low-hanging fruit" is industrial applications, but he adds that "getting electricity pricing right is going to be critical".

Mortimer points out that some countries are not well-blessed with renewable power and they will be looking to import green hydrogen. He explains: "This begs the question of how cost-effectively and efficiently can we move green hydrogen around the planet?"

With regard to the issue of how companies in the wind sector should adapt their strategies to prepare for the growth of green hydrogen, Mortimer says: "We are working with development companies now about considering hydrogen as an end product. Do they want to be hydrogen producers? Hydrogen gives the potential for growing their wind business."

How wind companies can adapt

WIND COMPANIES MUST INCREASE OUTPUT

Onshore wind businesses that want to get involved in green hydrogen need to be in the solar market because the economics of combined wind and solar hydrogen projects are better, says Sanders.

He adds that key questions to be considered include how much hydrogen can wind farms produce and for which end applications? "If low volumes of hydrogen are produced, it could be easier to supply applications with sites requiring less hydrogen such as hydrogen refuelling stations for mobility," he says.

Meanwhile, participants remarked that, while there are moves to link up green hydrogen with offshore wind, it is expected that the first sectors to start producing green hydrogen will be onshore wind and solar. This is because of the smaller distances between electrolysers producing hydrogen and consumers using it.

If wind power companies are to get involved in producing green hydrogen, they need to produce "more wind power more cheaply", according to Pay.

"Utilities may become more involved in green hydrogen business – and then there are the wind producers, who will just be suppliers of electrons into the green hydrogen sector and becomes an important customer for them – storage is the bridge between the two," he says. Pay highlights industrial hubs and data centres as initial targets for green hydrogen, along with transport.

A key driver of the wind industry's involvement in the production of green hydrogen would be getting the "value chain to produce green methanol and green ammonia in places where we produce onshore wind and solar", says Baden, who adds that this strengthens the business case.

"Wind developers want to own the entire value chain," he says.

Conclusion

There is a great deal to be optimistic about in the green hydrogen sector and wind companies should adapt their strategies accordingly.

Bow argues that wind companies have started responding to the emerging potential of green hydrogen: "Wind companies are looking at converting from selling electrons to selling molecules, in this case hydrogen," he says.

Bow adds that they are also considering, not PPAs, but rather HPAs [Hydrogen Purchase Agreements] with a view to "carrying them on their balance sheets".

The transport sector is a huge opportunity for green hydrogen, according to Pawelec, who adds that industrial uses are also "low-hanging fruit".

Meanwhile, he highlights the situation in Spain where oversupply of renewable energy generation could be paired with green hydrogen to avoid power going to waste. Pairing an electrolyser with onshore wind would help to improve the business case of green hydrogen.

All in all, our roundtable participants are confident there are many reasons to be optimistic about the future of the green hydrogen sector. Policymakers are clearly on board, but that's only half the battle. Government intervention is needed to ensure the costs associated with green hydrogen are lowered.

The transport sector is a huge opportunity for green hydrogen

But there are pathways for green hydrogen to achieve early successes when linked with wind farms. The transportation sector is likely to be the first to experience the transformative effects of this emerging energy source, which has massive potential if managed in a strategically effective manner.

It is now decision time for wind companies, who may now find their interests are best served by becoming green hydrogen producers too.

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