STEPHENSON HARWOOD

Energy Law

What are the top 5 points raised by leading UK hydrogen developers?

With everyone talking about hydrogen, Stephenson Harwood lists the top 5 takeaways after discussing hydrogen projects with three market leading UK hydrogen developers.

On 8 December 2020, Cathal Leigh-Doyle from Stephenson Harwood hosted SH's second hydrogen focused webinar on the topic of "Hydrogen Projects – From the developers' perspective" (link to recording **here**). For the 205 registered attendees, listeners were given an unmatchable insight by three market leading UK hydrogen developers' perspectives, namely:

- Mark Griffin from BOC UK & Ireland – Mark discussed one of Europe's largest hydrogen refuelling stations in Kittybrewster, Aberdeen;
- Julia Pyke & Shekhar Sumit from Sizewell C – Julia and Shekhar discussed Sizewell C's hydrogen demonstrator project which aims to produce up to 800kg of low-carbon hydrogen per day using electricity from nuclear power, with the potential to use low-carbon heat from nuclear power as part of this process in the future; and
- Chris Jackson from Protium Green Solutions Ltd – Chris discussed the HESCO contract model, current learnings from projects to date, and early project considerations.

The top 5 points to note are:

Point 1: – integration with the Net Zero agenda

A significant attraction in using hydrogen is that it is a multi-vector energy carrier that can decarbonise a variety of different applications. This is becoming increasingly important as the UK Government embarks on the challenge of converting notoriously carbon-intensive industries to Net Zero, rather than simply decreasing carbon emissions. The panellists provided examples of how their pioneering projects are approaching the inherent challenges of Net Zero.

BOC is proving that a fleet of commercial hydrogen vehicles can be decarbonised effectively, efficiently, and commercially. Kittybrewster hydrogen refuelling station has facilitated over 1 million miles driven by hydrogen-fuelled buses, saving around 100 tonnes of CO_2 in the process. After just 10-12 minutes of hydrogen refuelling from a normal hand pump, a bus can travel 260 miles.

Sizewell C is initiating the production of hydrogen from the low-carbon heat and electricity generated from nuclear power. The initial demonstrator project could refill on average 16 buses, or 160 cars, or 4 trains per day. This will help to "green" the construction of the nuclear power plant, provide a platform to scale up the demonstrator once Sizewell C is operational, and kickstart the local hydrogen economy.

Protium is assisting clients in meeting their own decarbonisation agendas by delivering end-to-end bespoke hydrogen projects in difficult to decarbonise industries such as aviation. Protium is playing an important role in leading the design, funding and deployment of hydrogen projects in the UK and abroad.

All of the developers stressed that in order for the UK's targets to be met, easy and difficult industries to decarbonise must be addressed together at the

same time. We cannot focus on easy to decarbonise industries as this will not suffice for Net Zero.

Point 2 – System design and scaling up

It is critically important to design a system that allows for future scaling up. Currently, the limited use of hydrogen (especially in mobility) means that it is possible to calculate the end consumption. However, as the market expands, this will become more difficult, if not impossible. For this reason, developers cannot underestimate the importance of projects that can be scaled up to meet future hydrogen demands in a cost-effective manner.

For example, in the short term, Sizewell C plans to start producing hydrogen using a demonstration project with a private wire to Sizewell B. However, in the future, the larger-scale developed hydrogen project will link directly with Sizewell C (once the nuclear power plant is operational). This system design enables the project to be future-proofed – it will provide hydrogen during the initial construction period of the nuclear power station and also a wider audience in the future. Ultimately, Sizewell C is ensuring that it is making a no-regret decision now despite the uncertain production needs of the future.

Another example is BOC's Kittybrewster hydrogen refuelling station, which originally launched to refuel 10 single-decker buses. Due to market demand, the station has grown considerably, and now services double-decker buses, road sweepers, vans and cars. This expansion was only possible because the original system design catered for scalability. This enabled BOC to take advantage of commercial opportunities as they arose.

Point 3 – Market collaboration

Collaboration by hydrogen players is essential to ensure hydrogen as an energy and technology continues to develop at the rate required to meet the UK Government's target. In order to have a successful hydrogen producing commercial asset, all developers agreed that irrespective of market competition, collaboration throughout the entire process remains important.

With its expression of interest issued in November 2020, Sizewell C is aiming to do just that by identifying and bringing together businesses with relevant expertise in producing, storing and using hydrogen. By undertaking such an exercise in the planning stages, Sizewell C is trying to reduce project risk and maximise the skills available in ensuring that the most effective system design, technology and end uses are identified and implemented.

BOC provided a great example of successful collaboration at Kittybrewster between local government, private companies and the local residents. It was highlighted that clear and frequent communication with local residents and stakeholders is essential throughout the process of developing, constructing and utilising hydrogen projects.

The developers also agreed that the success of one hydrogen developer is ultimately a success for all hydrogen developers; the more hydrogen is utilised, the better it is for all involved. The role of Government in making documentation public also assists market players as the documentation would otherwise have remained confidential.

Point 4 – Financing and cost models

Government grants and funding schemes play a major role in shaping how quickly hydrogen projects across the UK continue to develop. The UK Government needs to develop its process for issuing and accessing these grants and funding schemes. Uncertainty around issues such as whether the Government will require matched-funding increases the difficulty in relying upon and ultimately using such schemes which are essential for the short term development. At present, in order for a developer to make use of the Renewable Fuel Transport Obligation, the developer needs to rely on their own renewable energy generation capabilities (rather than using the grid). The general conclusion was that this position should not be required in the future as requiring such capabilities dramatically reduces developers' ability to apply for such grants in the first place.

That said, the Kittybrewster project by BOC used UK Government grants and funding. This project is a great example of how grants were available and successfully utilised in creating a commercially viable hydrogen production and consumption model. As of March 2019, the public funding period closed for this specific project and it has continued as a commercial private venture.

The production cost of hydrogen and the price of hydrogen to consumers are also major considerations for project developers and financiers. New technologies, such a creating low-carbon hydrogen from Sizewell C, must be developed further to ensure a short-term route to producing low cost hydrogen is utilised. As demonstrated by other renewables, when the technology increases in efficiency and reduces in cost, it is expected that the

cost of production and consumption will decrease accordingly.

Point 5 – The role of the UK Government

Private financing and financial modelling for hydrogen projects will only become more accessible if the UK Government clearly sets out exactly what it is looking for, how it considers it will meet its objectives, and the measures it will put in place to assist project developers. The 10-point plan released in November 2020 (see our analysis of this announcement **here**) was the first step in the right direction, however it is essential that the eagerly awaited Energy White Paper and Climate Change Committee's carbon budget (which was issued yesterday) go considerably further in informing stakeholders on how the UK Government will meet its target.

UK hydrogen developers cannot over-emphasise how important it is for these upcoming communications from the UK Government to clarify what the future for hydrogen in the UK will look like. Given that hydrogen projects require such a range of expertise and could impact so many sectors, hydrogen can only develop at the speed and capacity needed to meet the Net Zero by 2050 target if the UK Government offers a joined-up approach to its financing, regulation and integration with the wider decarbonisation energy mix.

Conclusion

The best advertising for hydrogen is for UK projects to be approved, constructed and utilised.

Hydrogen developers are eager to collaborate and share learnings where possible to ensure that the speed of development and utilisation continues to increase.

The UK Government however needs to clearly set out how it perceives hydrogen will be used in the UK in meeting its 2050 target. It cannot be underestimated how important this clarification and certainty is for developers to undertake increasingly complex and high value hydrogen projects.

We now await the Energy White Paper which will hopefully paint a much clearer picture of hydrogen in the UK.

Due to the Sixth Carbon Budget only being released on 9 December 2020, we have not provided an analysis here however the executive summary confirms that there is a methodology report and policy report included which will no doubt be welcomed by developers.

Get in touch

Cathal Leigh-Doyle
Senior associate
T: +44 20 7809 2658
E: cathal.leigh-doyle@shlegal.com

Francesca Cadoux-Hudson
+44 20 7809 2846
E: francesca.cadoux-hudson@shlegal.com

Andy Ross
T: +44 20 7801 4166
E: andy.ross@shlegal.com

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