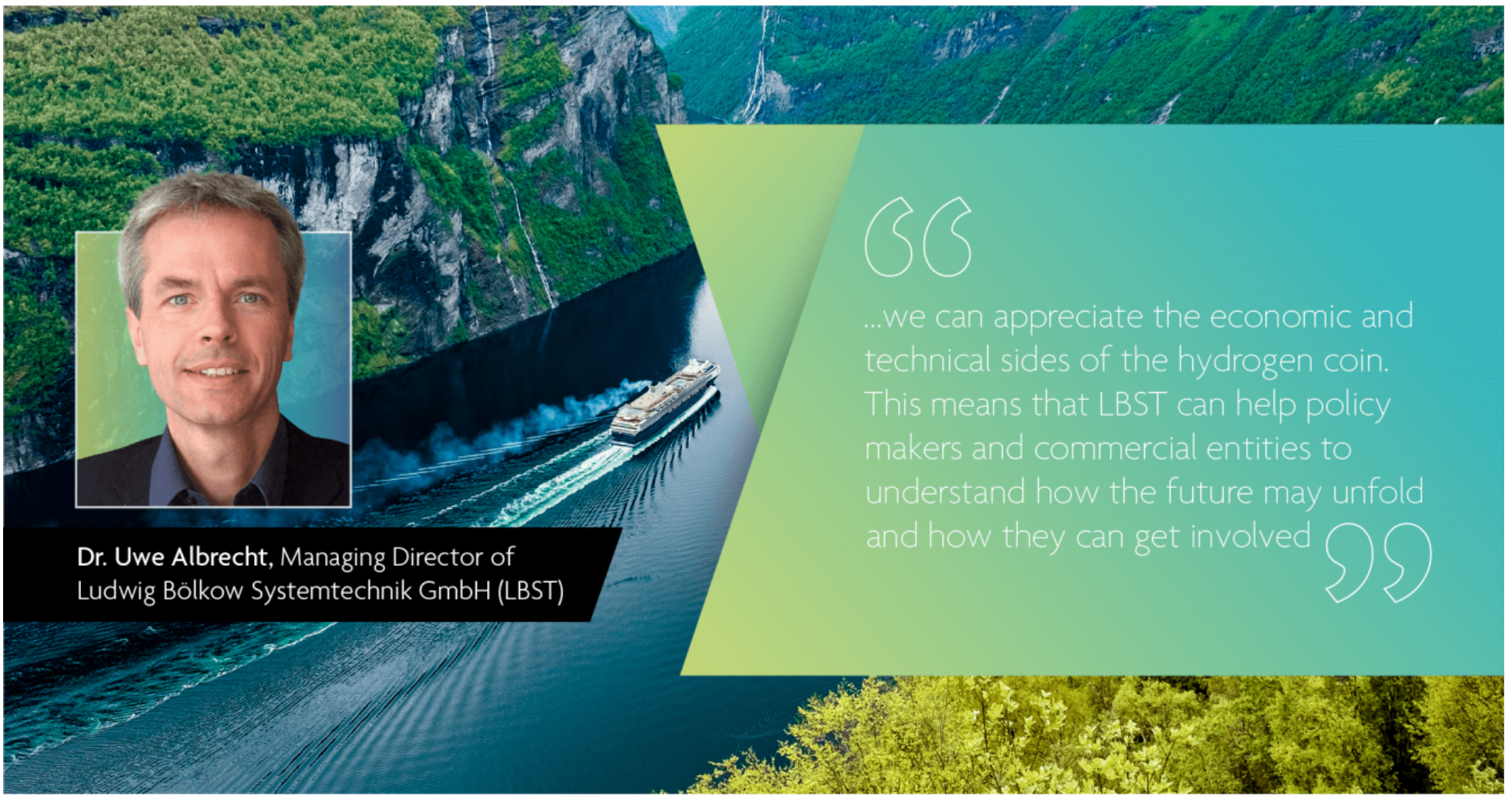

Emerging hydrogen value chains in Germany: An interview with LBST

By Stephen B. Harrison on Apr 29, 2020 | Translate NEWS

In German language, hydrogen is called 'Wasserstoff'. As a literal translation to English, we could say 'material of water', a term that's particularly timely given the large number of water electrolysis projects underway in Germany at present.

Against this backdrop, H2 View met up with Dr. Uwe Albrecht, Managing Director of Ludwig Bölkow Systemtechnik GmbH (LBST), to discuss how the hydrogen economy is developing in Germany and how his organisation is helping to shape the future.

Thanks for your time Dr. Albrecht, what is the core of your consulting work at LBST?

Private and public sector organisations rely on us to advise on a range of topics, including aspects of policy and strategy related to the emerging hydrogen economy. The questions from private companies are often about how to build business models that fit in the emerging hydrogen value chains. And for some, the concerns are that hydrogen may represent a threat to their current revenue streams and they are keen to adjust their strategy to ensure that they maintain relevance and profitability in the future.

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Dr. Uwe Albrecht, Managing Director of Ludwig Bölkow Systemtechnik GmbH (LBST)

And how did you find your way into the hydrogen consulting space?

Personally, with experience in venture capital and industry, I have had the chance to evaluate a wide range of sustainable energy business models and technologies at an early stage in their trajectory. At LBST, we have been active in analysing hydrogen as an energy vector for over 30 years, having been a key contributor to 'Solarwasserstoff Bayern' which was the first German Power-to-Gas project back in 1989.

At present, there are some major hydrogen projects underway in Germany but considering its potential, the use of hydrogen as an energy vector it is still in its infancy. So, with my background and with the long experience of the team, we can appreciate the economic and technical sides of the hydrogen coin. This means that LBST can help policy makers and commercial entities to understand how the future may unfold and how they can get involved to unlock hydrogen's potential to support our decarbonisation goals.

Regarding policy, in what areas do you see potential for regulatory developments?

At present, in Germany, there is a high level of regulation applied to the power generation and electricity grid operators. For example, grid operators may not produce power. Also, the gas network and the electricity grid are not regulated in an integrated way. We expect that there will need to be more flexibility in the future because hydrogen production by Power-to-Gas coupled with

delivering the hydrogen through elements of the gas grid to consumers in all energy sectors, possibly also including large turbines or fuel cells to convert it back to electrical power, means that gas distribution grids can complement the electricity grid.

This integration is especially attractive in Germany, where we generate large quantities of power in the north, but struggle to distribute that to markets in the south. The gas grid can help us out here, and a new approach to the relevant regulations will enable that integration.

Can you elaborate on a power to hydrogen project that LBST has been involved in recently?

Yes, 'Element Eins' is a relevant example here; we were involved in writing the feasibility study. At the heart of the project is a 100 MW electrolyser that generates green hydrogen from renewable power which is produced by wind turbines off the coast of Niedersachsen in northern Germany.

There are several projects in the planning stage at this scale and, in my view, 100 MW represents the next natural scale-up step. These pilots are not yet delivering commercial returns, but they will help to prove that the technology is scalable, and they collectively send a clear signal to regulators that policy development must soon catch up with the physical reality.

In the industrial gases sector, hydrogen pipelines are common in the refining and chemicals sectors. Are there projects in Germany taking place in these areas?

Perhaps we can look at the Hypos initiative here. For the past three years stakeholders have been investing in R&D and building infrastructure in Eastern Germany to enable the use of green hydrogen in mobility, energy, refining and chemicals applications. In this concentrated geographic location, the hydrogen economy can be proven at scale and the full value chain from green hydrogen production through storage and to use can be stress-tested.

It has really built up a lot of momentum and approximately 100 companies and organisations are now involved. Some of the major global industrial gas producers are on the list of partners, as are some of our leading Germany universities and several hydrogen electrolyser producers.

Specifically, which industrial sector applications do you see adopting green hydrogen in the short term?

My observation is that the refining sector is taking the lead here. For them it is a rather simple substitution of hydrogen produced from fossil fuels on steam methane reformers (SMR) to the use of green hydrogen from electrolysers. Perhaps the Get H2 Nukleus project in north west Germany is a clear forerunner here. A 100 MW electrolyser will generate green hydrogen which will be connected by pipeline to two BP refineries in Lingen and Gelsenkirchen.

In the chemicals sector, the same is sometimes possible and Evonik is also tapping into the Lingen hydrogen pipeline.

And, are other carbon intensive industries following in this direction?

Steelmaking is certainly taking big steps here. A fundamental step in the production of steel is the reduction of iron oxide ore to iron. This is generally performed using coke which is produced from coal through pyrolysis. The coke reacts with the ore to yield the desired iron and carbon dioxide.

As an alternative, hydrogen can be used in a process referred to as 'direct reduction' or DR. In this case, the hydrogen reacts with the ore to produce iron and water vapour. The ArcelorMittal plant in Hamburg is conducting tests to establish the viability of this process right now.

In terms of the implications for industrial gases consumption, thousands of tonnes per day of oxygen is used for basic oxygen steelmaking around the world. This new direct reduction process could see hydrogen becoming an equally important gas for DR in that industry as we seek to decarbonise.

How can hydrogen play a role beyond gas pipelines and our energy grid?

Mobility is likely to be a major application for hydrogen. Definitely in heavy-duty commercial vehicles and trains, and very likely in long-range and high-end passenger cars. Beyond that, shipping is also showing potential. The heavier end of the mobility sector is especially suited to using hydrogen because of the power-to-weight advantage that it offers over batteries.

The Alstom Corodia iLint hydrogen powered regional train is a great case study here. In fact, two of the trains now operate to connect various cities in Lower Saxony. The Alstom team at Salzgitter developed the train and our shareholder TÜV SÜD acted as testing and inspection body for Alstom during the development and approval process.

LBST was a key contributor to a study on infrastructure and regulatory approvals for the German government, paving the way for the eventual implementation.

About those heavy transportation applications, who are likely to be early adopters of hydrogen for maritime mobility?

The cruise sector leads with their interest to adopt hydrogen as a propulsion system. Partly because nobody wants to get coated with dirty soot particles from the exhaust gases from the cruiser's funnel when sunbathing by the onboard pool. Furthermore, the type of people who book Arctic and Antarctic cruises tend to show an interest in sustainable energy usage onboard the ship.

There are also discussions taking place in Norway that some fjords will only be open to non-polluting ships in the future. So, to offer access to these jewels of nature, cruise operators will need to convert to a clean fuel such as hydrogen.