Take 5 with... Laurent Carme, CEO of McPhy Energy SA

By Stephen B. Harrison on Mar 05, 2020 | Translate NEWS

Hydrogen energy is at a turning point, with various start-up companies of the past decade transitioning from R&D driven organisations to embrace industrialisation. Scale-up and concrete realisation of hydrogen's future role is the order of the day.

One such company managing this transformation and preparing for a profitable future, with a purpose, is McPhy Energy. In an exclusive interview to explore the company's past, present and future, as well as its product differentiation, H2 View spoke with CEO Laurent Carme.

Thanks for taking 5 with H2 View...First and foremost, could you tell us about the history of McPhy?

Our former CEO founded the company in 2008. The original idea was solid state storage of hydrogen in metal hydrides, branded McStore. We were a pure R&D outfit at that time. As markets evolved and technologies developed, we had to take the brave decision to transfer our focus from the original concept to work more closely with hydrogen electrolysers and fuelling stations. Thanks to this diversification, we now offer customers an integrated offer of hydrogen production and distribution equipment.

Hydrogen as a source of clean energy is the common thread that has defined our journey.

Let's talk about the products that you have chosen to focus on – what are they?

Two ranges will dominate. Hydrogen fuelling stations, and large-scale power to hydrogen energy schemes. We work mostly with alkaline electrolyte systems, which are our core expertise. Alkaline electrolyte equipment avoids the need for water purification and has a proven track record over many decades. This provides a high degree of confidence in the reliability and extended lifetime of such equipment. So, for very large capital investments customers sometimes regard it as a low risk option.

On the other hand, we can see potential for proton exchange membrane (PEM) systems: a technology for which McPhy has integration capabilities and good experience.

Beyond the track record point, how do PEM and alkaline electrolyte electrolyser technologies compare?

That's a great question. The reality is that hydrogen energy is still a comparatively new area and there have not been many instances where a true like-for-like comparison has been possible on a commercial scale.

However, one of our latest Power-to-Gas projects, Jupiter 1,000, will enable this. It has an installed capacity of 1MW split equally across an alkaline electrolyte system and a PEM electrolyser. Ask me this question again a year from now, and I will be able to give you a very precise answer!

How are McPhy hydrogen electrolysers differentiated?

One aspect is pressure. Our electrolysers operate at high pressure. We are not talking about 350 bar or 700 bar that hydrogen fuelling systems are designed for: in the electrolyser, high-pressure means 30 bar.

How does high-pressure in the electrolyser stack make a difference?

It's all about electrical current density and process intensity. Compared to an atmospheric pressure system, the high-pressure electrolyser technology can deliver a lot more hydrogen from a much smaller footprint. In fact, an atmospheric pressure system needs 3-5 times more space than ours. At McPhy, we work well under pressure!

How did you come to join the team?

I have been working in renewables for most of my career. I spent many years working on wind farms. The buzz that I experience in the hydrogen sector today reminds me of how the wind sector was 10 or 15 years ago. At that time, it required vision and some calculated risk taking to ensure that wind power emerged to be the competitive and economical means of power production that it is today. Hydrogen production needs to follow the same journey.

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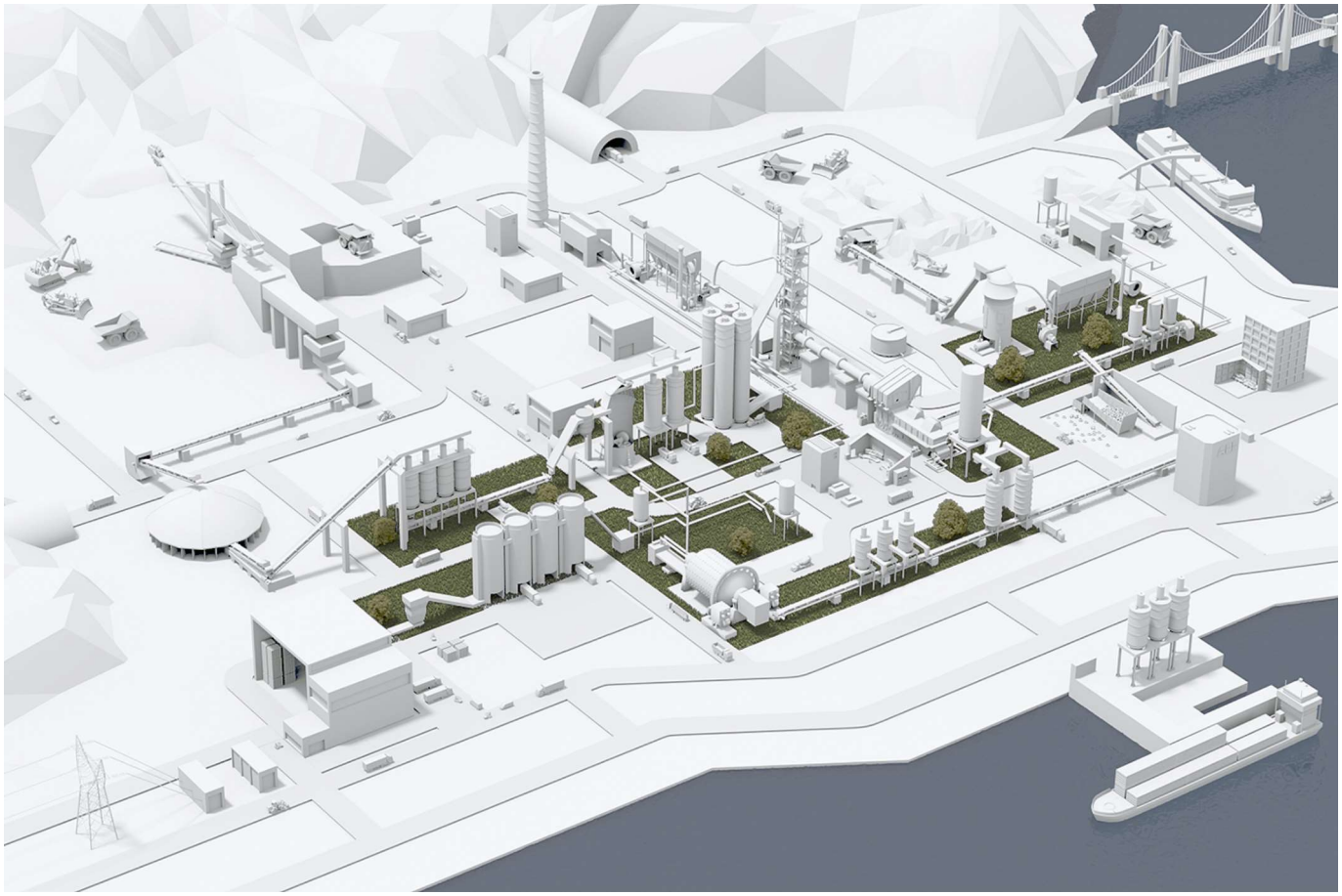
Let's talk about scale...what is the biggest project McPhy has been involved in?

Well, that's good timing! We have just announced our participation in an EU-backed consortium to build a 20 MW electrolyser at the heart of a chemical park in Delfzijl, the Netherlands. The funding will be from the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) and Waddenfonds. In addition to McPhy, the consortium involves five other partners (Nouryon, Gasunie, De Nora, Bio MCN and Hinicio) with a diverse range of expertise.

We feel proud that our products have come through the rigorous evaluation process which placed a major emphasis on safety.

How much hydrogen will that produce?

With that scale of electrolyser, the capacity is 3,000 tonnes per year. The electricity is from renewable sources, so this will be one of the largest zero-carbon hydrogen projects ever undertaken. Nouryon and Gasunie will jointly operate the plant and BioMCN will use the hydrogen to produce renewable methanol. There are discussions about increasing the capacity to 60 MW, so this project will really be a beacon for the future.



©ABB | Rendered concept of the cement production plant of the future.

What potential do you see for hydrogen?

Well, the Delfzijl example above takes us into chemical synthesis. Hydrogen is also used extensively on refineries to produce clean fuels. In the fossil fuel sector, it will also see increasing penetration to replace natural gas in our pipeline grids. Hydrogen is also increasingly being used for direction reduction in steelmaking. These types of applications are already on the radar.

Beyond that, we believe that hydrogen will be also used to enable the decarbonisation of cement and ammonia production.

And finally, what will be required to ensure that hydrogen penetrates these applications?

Zero-carbon hydrogen has environmental credentials, and this will be enough to stimulate change in some cases. But to drive large-scale transformation, the use of hydrogen must be economically attractive compared to alternatives such as natural gas. This is one of the core motivations behind our strategic initiative to industrialise our operations to support the cost-effective production of clean hydrogen from renewable power sources.