

Consolidation will speed up in electrolyser market to 2030

By Stephen B. Harrison, sbh4 consulting

Developing electrolyzers to serve the green hydrogen value chain is a crucial market – but it is a space that has been undergoing notable change.

Today, consolidation is under way in many parts of the market, driven by horizontal and vertical integration within electrolyser production and deployment. But the signs are that this will accelerate over the next five years, to the extent that by 2030 we may find that we are 80% through this consolidation play.

In this context, in the years ahead fresh finance for speculative innovation in electrolyzers is likely to become more scarce and increasingly expensive. The wave of buy-side venture-capital investor interest from the past few years is instead likely to shift to PE consolidation plays and other value-seeking deals.

The next wave of high-value electrolyser-related transactions will pivot to focus on optimising the value of what has been achieved over the past 10 years – and on what is currently in the process of being commercialised.

I should say this much, having described what's happening: this scenario may be exactly what the hydrogen electrolyser sector needs.

There will inevitably be rising costs to

innovation as electrolyser technologies mature and so developments will need to be proven at ever larger scale to demonstrate long-term competitiveness and bankability.

At the same time, the cost of development and growth capital in this space will almost certainly increase due to higher perceived risk, together with a more realistic expectation on returns.

In the background, rising interest rates will also play a role, set against the negative interest rates which prevailed during the hype years of hydrogen as the 2020s got started.

But we can say that fewer, bigger electrolyser value chain players, with strong backing behind them, are essential to the next phase of hydrogen electrolyser development.

A changing market

From here, many of the 100-plus stack builders, electrolyser system OEMs, and systems integrators will begin to merge or else take each other over. This is nothing new for the sector. Plug Power acquired Giner for more than \$60m in 2020, remember. And Sunfire acquired alkaline electrolyser technology from IHT in 2021.

Others may seek out collaboration

opportunities to pool resources and share development budgets, as Industrie DeNora and thyssenkrupp Industrial Solutions have done since 2001. This continued right up to the 2022 IPO of thyssenkrupp nucera.

Inevitably, more and more players will also fall by the wayside in the same way that AquaHydrex filed for bankruptcy and folded its alkaline electrolyser R&D efforts in October 2023. After millions of dollars of investment equity, in the end only a few pennies per share were offered to an insolvency specialist for AquaHydrex's IP and R&D equipment.

In other seismic moves in the sector, Nel acquired Proton Energy Systems in 2017 to form what was, at that time, the world's largest electrolyser producer. The acquisition also meant that both PEM and alkaline electrolyzers were available from one provider.

Recently, however, the tide has turned at Nel. It announced a still-stand in stack production at its recently modernised production facility in Herøya, Norway. The most recent capacity upgrade at that location came onstream in 2024. The site boasts an electrode plating line and highly automated production of its atmospheric pressure alkaline electrolyser stacks.

On the other hand, development of Nel's (yet to be launched) pressurised alkaline product range, with a view to produce it both in Europe and the US, appears to continue unabated.

So could Nel be the first big name to fall victim to a 'buy and break' PE play? Could its PEM, atmospheric alkaline and new pressurised alkaline divisions be broken up? Could some product lines and production assets be wound down and others sold in different directions? Or is Nel perhaps vulnerable enough to be taken over by a competitor? Or could it need to lay itself at the mercy of the insolvency court? A lot of scenarios are possible.

A constructive future?

The next five years certainly won't only be defined by shark attacks by private equity. There will in fact be many constructive ways in which the electrolyser production and innovation space will interact and evolve.

Those international energy and chemicals sector EPCs which have been involved with electrolyser installation projects and built a good reputation with strong market presence may well seek to take over electrolyser EOMs or stack builders.

At the end of the day, this is because what such EPCs really need are stacks to integrate into projects. The balance of plant around the stack is ultimately their bread and butter business and has been for decades.

Paul Wurth, a plant builder focused on the metals industry, was the lead investor in Sunfire's series C fundraising round in 2019. At that time, Sunfire was focused on solid oxide electrolysers and fuel cells.

A more recent example was the investment made by Austrian EPC player Andritz in HydrogenPro during 2023. An advantage to both parties was that Andritz could produce electrolysers in Europe to increase their attractiveness to EU-funded projects.

Well-financed project developers could well seek to protect their favoured electrolyser builder and bring them under their wing to secure the stability of their projects.

For example, the renewables project developer Copenhagen Infrastructure Partners (CIP) partnered with Blue Earth Capital during Sunfire's 2022 Series D capital raise. As part of the investment, CIP secured access to 640 MW of electrolyser production capacity to secure its Power-to-X project pipeline.

Diversified players could win out

Similarly, the cash-rich players with helpful parent companies, which have diversified revenue streams and deep wallets (such as Fortescue Zero, Siemens Energy, and thyssenkrupp nucera) will have the upper hand as M&A deals come onto the table, or where startups see that a white knight offering a rescue package is the only way forward.

An example that leans in this direction is the investment that Longi made in HydrogenPro in 2024. Longi is an established solar panel producer with

a leading product, strong cashflow and profitable business model. It has recently diversified into electrolyser production in China and has been involved in some of the largest electrolytic hydrogen projects.

And Longi's status in the renewable energy space means it can afford to invest in what it believes in for the long term, without the need for these bolt-ons to become profitable overnight.

Smart actors make strides?

Strategic investors with a history of smart involvement in this space also have the opportunity to use and commercialise electrolysers. Some may choose to double down on some of their favourite investments and bring them in-house. For example, Mitsubishi Heavy Industries joined Longi and Andritz in Hydrogen Pro's recent investment round.

In a similar combination of investors, Chart Industries, Larsen and Toubro and McPhy have an interesting three-way agreement. McPhy brings the electrolyser technology, Larsen and Toubro is a leading Indian EPC house with access to extensive manufacturing facilities, while ►

“Well-financed project developers could well seek to protect their favoured electrolyser builder and bring them under their wing to secure the stability of their projects”



► Chart seeks to future-proof its business model with access to clean tech that will support decarbonisation across multiple sectors. So will McPhy ultimately end up in the hands of one of these larger actors?

Posco, a major South Korean steelmaker is a major investor in Hysata, one of Australia's leading electrolyser startups. Hysata, of all the innovators out there, has undoubtedly the greatest claim to be a mould-breaking pioneer with its bubble-free alkaline electrolyser technology.

Its unparalleled high efficiency results in stunningly low operating costs and its innovative design eliminates the need for many balance-of-plant items, reducing on-site installation complexity and equipment manufacturing costs.

In a similar vein, membrane-less electrolyzers are also breaking with conventional thinking. But are they safe? Most safety systems dealing with flammable materials rely on avoiding two of the three points on the fire triangle: an ignition source, a flammable gas, and an oxidiser.

When hydrogen and oxygen are produced together as a gas mixture we have combined two elements of the fire triangle: in this context, there is no way to guarantee that an explosion will not take place. Electrostatic discharge

inside the pipework may take place, even if good earthing practices have been implemented.

Breaking the mould is not about taking unnecessary risk to achieve a step change in performance. Safety must be prioritised as the innovations are screened.

Will these membrane-free electrolyzers and their innovators be sustainable? Or could this be the first category of electrolyzers to fall by the wayside? It is hard to say, but much at stake for some.

What next?

There are other innovation plays I've not covered here for a lack of space. Many look compelling but none are guaranteed. If investor funding or parent company patience runs out before the big orders are signed, these product lines may be cut or the innovations sold.

Outside of such mould-breakers, when comparing electrolyser efficiency, stack life, minimum turn-down, permissible number of 'offs', and other key parameters, it is becoming increasingly difficult to identify points of difference between the 'standard' players. This is especially true when looking at pressurised PEM and pressurised alkaline stacks and systems.

For those electrolyser builders that survive, innovative critical components will be in high demand. They are the differentiators that lead to the stack builder having a unique selling point.

To ensure stack builders and OEMs continue to stand out in the long-term, when they believe they have found something unique they may wish to acquire the associated critical component manufacturer. Or they may seek to bring emerging component-level technologies in-house through other means.

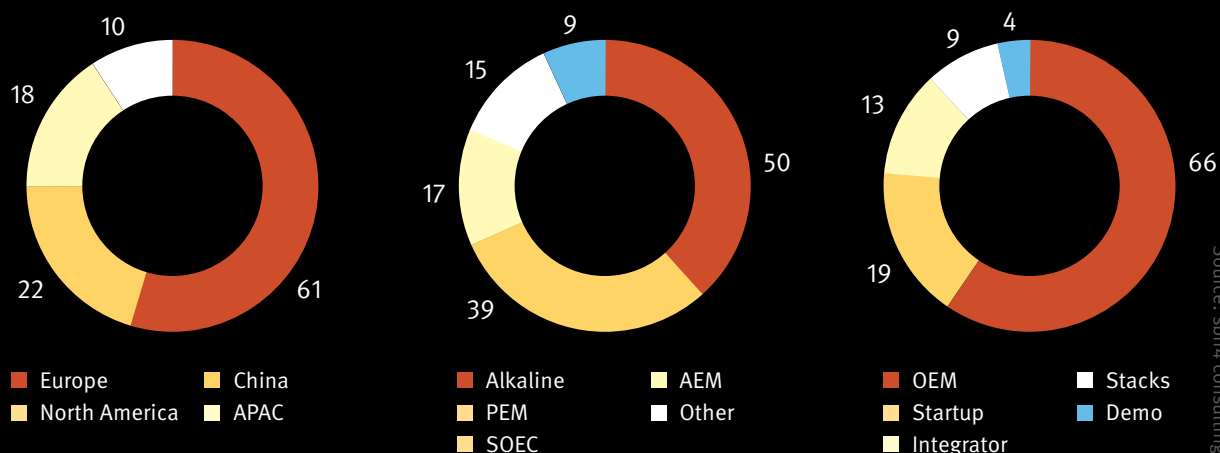
For now, though, let's say that capitalising on the next wave of hydrogen opportunities will look more like a value play than a growth play. The highly speculative funding era is over.

So looking for special situations where some key components of value can be salvaged from the wreckage may well be a relevant buy-side strategy to follow.

It might appear there is less risk investing in this area than there was three years ago. Valuations are more realistic, for sure. When the deals do come, valuations may largely be influenced by competitive bidding.

It is still a complicated picture, in short. Many of the winners and losers remain to be decided. But the next five years will be different to the last. A new era is upon us. **GW**

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