



Resato International: From hydraulics to hydrogen mobility

By Stephen B. Harrison | 15 May 2020

Hydrogen mobility is growing rapidly, especially in countries like Germany and South Korea which have committed to invest in a hydrogen fuelling station infrastructure. As with any growth market, there is space for new entrants.

The question is: which kinds of industries are well placed to migrate into hydrogen mobility?

Industrial gas players are coming from the direction of hydrogen production and gases distribution, energy majors already have a stake in the roadside filling station infrastructure, and automotive OEMs also have an interest.

Hydrogen filling stations compress hydrogen to 350 bar for heavy-duty vehicles and 700 bar for cars to ensure a high energy density in the fuel tank inside the hydrogen-powered car, bus, truck or train. So, it is no surprise that companies which have expertise in high pressure technology can also stretch their competence into the manufacture of hydrogen filling stations.

Consider that the hydraulic system on an excavator will operate at around 350 bar. And the hydraulic system in an autofrettage machine will produce 20,000 bar: that makes the 700 bar pressure in a hydrogen filling station seem rather tame.

Resato International, based in Assen in the Netherlands, is an example of one such company that has an established position in ultra-high pressure technologies. Its traditional markets are waterjet cutting machines for a wide range of materials including steel or ceramics and high pressure test systems.

With this pedigree, the company is well placed to move into the adjacent space of high pressure hydrogen fuelling stations. **gasworld** spoke exclusively to Aileen Meyer – Area Sales

Manager Hydrogen – to find out more about Resato’s products and her role in fulfilling its business development plans.



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Aileen Meyer, Area Sales Manager
Hydrogen at Resato International BV

Source: Resato International / gasworld

Aileen, I believe you are based in Germany. How do you fit into Resato’s European ambitions?

Yes, I’m located in north west Germany and the main Resato offices and factory are just across the border from here in the Netherlands. My role is to bring our products into the German market, where the construction of public and private hydrogen fuelling stations is rapidly advancing.

So, how did you arrive in the world of hydrogen mobility?

Well it all happened faster than I could keep up with – a bit like the broader story around the rapid development of the hydrogen economy just now. One day I was studying languages and international business, then I began a hydrogen market study as the final part of my university programme and before I knew it, I was working with Resato.

After a few months as a trainee, I jumped in at the deep end to take responsibility for Resato’s

hydrogen filling station sales in the German market.



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What kind of technical expertise is relevant for hydrogen mobility?

Taking Resato as an example, we are building on our foundation in high pressure. In fact, the hydrogen gas compressor that we use is a hydraulic driven piston compressor. I must admit that when I first joined the team, 700 bar was just a number to me. I had no idea of the complexity that is involved in compressing the gas to that pressure or how challenging it is to create seals that can contain the hydrogen effectively. However, the technical team have really done a great job helping me climb the learning curve.

But with regard to pressure, consider this – our experience goes up to 14,000 bar. Let’s try and put that into the context of hydrogen fuelling. Imagine standing on the ground looking up at the 700m tall Burj Khalifa tower in Dubai: it would seem like a long way up. But, from a Jumbo Jet flying at 14,000m the view looking down to the top of the skyscraper 13,300m below makes it disappear into a small dot on the landscape.

In this context, ‘high pressure’ is quite relative and we know that we have the right safety

mindset and technical expertise to handle the pressure.

Thanks for that visual analogy. What else can you leverage into hydrogen fuelling systems from Resato's pool of experience?

Our waterjet cutting machines operate 24/7. That means that we have mastered reliable design and production and we have plenty of experience of their maintenance and servicing requirements. We like to get in to service the machines before anything goes wrong and we have learned what the optimal replacement cycles are for the seals and other essential parts. Clearly hydrogen filling stations are not waterjet cutting machines, but they also need to operate over extended periods with tip-top reliability and safety.

As another example, we are developing digital solutions for remote monitoring and diagnostics of our waterjet cutting machines. The software and services here will replicate well in the hydrogen fuelling stations. Also, we conduct high pressure testing using gases up to 3,000 bar. So, many of our technologies, business processes and mindsets are transferrable from one case to the other.



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You've made progress in the Netherlands, so what about Germany – have you made inroads there?

I am pleased to say that we have. Our first FOS will start up this summer and a public station will follow in 2021. That may seem like a long time away but there is approximately a one-year lead time to produce the bigger public filling stations due to the complex supply chain for the components, their highly technical nature and the amount of testing that is required to ensure their safe operation. However, the filling station production lead time is generally not an issue for the operator of these public systems because the local permitting process can also be quite complex and time consuming. For the smaller fleet owner systems, we can turn them around much faster and our goal is to reduce the lead time on the larger systems also.

The idea of a fleet owner station is intriguing. Is that an easy entry point for operators to get into hydrogen mobility?

Yes, we believe so. There are many applications where small fleets of hydrogen-powered cars operate from a fixed location such as taxi fleets or company carpools. When the vehicle fleet operates in close proximity to the FOS they can be sure that a top up of hydrogen is always at hand. Costing only around 15% of the larger public stations, we believe that many fleet operators will find the conversion to hydrogen a viable option.

As the hydrogen mobility topic develops, there could also be good potential for hydrogen filling stations in other applications, for example, fork-lift trucks that operate inside warehouses are ideal to be converted to zero emission fuel cell vehicles because nobody wants toxic exhaust gas fumes polluting the enclosed workplace and causing a health hazard.

You raise a good point about vehicle emissions and safety. What about environmental concerns? Can your fuelling stations run on green hydrogen?

Absolutely they can. The system is quite flexible in that way. It can be fed with hydrogen from high pressure gas cylinders, or bottles as some people say, which are readily available from many industrial gas suppliers or it can be coupled to an electrolyser.

Whether the hydrogen in the gas cylinder is green or not, and whether the electrolyser runs on green power or not is really a decision for the operator. Our system will work equally well in all cases.