Good morning everyone. I’m happy to be here today and address this great audience of believers. I’m also a believer; don’t get me wrong, although not immediately from the onset.

It’s now just over 5 years that I have joined Hydrogenics. I had been professionally active in the mature part of the chemical industry up until then, and the fact that I could become part of a cleantech venture motivated me a lot. I had, so to say, an opportunity to move from the dark side of chemistry to the clean side and make good for all the sins I had committed before. I had again the positive prospect that I would be able to face my grandchildren and say: “It wasn’t me, on the contrary, I helped cleaning it up.” Anyway I knew little about the history of the hydrogen sector and even less about the reigning controversies.

The first thing I learned very quickly was that the industry and its stakeholders, back in early 2011, were very depressed. My freshmen’s motivation and ‘rock the cradle’ attitude and tone were welcomed with cynicism. One of my collaborators, a fifteen year old veteran of the nascent industry, was more than willing to patiently explain me why my enthusiasm was unjustified, why I should understand the facts first and then probably run before I would lose it too. Or even better start running immediately and save the time and effort to understand the facts. Anyhow it was quickly apparent to me that the industry had fallen victim of the hype cycle of innovation. After the turn of the century and the dot.com bubble, the stock market turned their attention to the embryonic hydrogen industry. Especially after the very public support from President George W. Bush, hell broke loose and IPO after IPO followed. The nascent hydrogen industry was caught by speed and hyped by the media. Even well-informed insiders could not resist simply ignoring this sudden interest and rode the peak of the inflated expectations. What followed was as in every other typical hype cycle of innovation. Swiftly after the hype peaked, bad press followed, white papers and books on the myth of the hydrogen economy were published and sure enough the industry tumbled in a trough of disillusionment. This stage in the cycle of hype was further extended due to the financial crisis. Anyhow I understood I could not cure people’s depression, frustration and cynicism by throwing an overdose of poppy-dog enthusiasm at them. Unlike the stock market I had to show patience and start to walk along the winding slope of enlightenment: in other words, develop the next generation of products, applications, methodologies and best practices, lobby to lawmakers for recognition, supporting rules and regulations.

What I do remember from reading the material on the myths of hydrogen is that they were often grounded in a conservative view of the world and mankind’s capacity to shape its destiny and evolve over time. They lacked often vision and a belief in innovation. Some of the material listed up to twenty myths of hydrogen. The top tier myths I can summarize here:

- The technology is too expensive
- There are not enough rare and/or noble materials to come around
• It would render existing assets obsolete
• Disbelief in global warming
• Inefficient
• The storage problem is insurmountable
• We will deplete the ozone layer
• There is not enough clean water

For most of these myths, if not all, I could see a way out if you take a long-term perspective on things. The lamest myth is definitively the one referring to the cost of the technology. I always like to respond to that with a question. What’s the cheapest form of labor? Any idea? Well it’s slavery. Slavery is the lowest cost of labor, but we have decided not to allow it any longer. It’s prohibited despite the facts that it’s more expensive, because it is against our values.

One myth which continued nagging me was the storage problem. This challenge is directly linked with such a fundamental physical phenomenon, called entropy, such that the odds, and the gods, might be against us I was thinking.

Anyhow, parking that though one for later, I was figuring out how to tackle my new professional challenge when I remembered a conversation I had several years hence with a successful start-up venture capital investor. Impressed by his track record I asked him what they did differently to be so successful. He told me, surprisingly openly, that their success thrives on repeatedly and critically trying to answer the following question with regard to their individual investment stakes: “What do you really have to believe in for this to become true?” Making sure you understand crystal clear what it is you need to believe in for each investment to become a business and ... stepping out of the investment immediately one’s you see, what you needed to believe, is no longer true or possible.

Strengthened by this advice I applied the same methodology to our renewable hydrogen venture and asked myself: “what do you really have to believe in for this to become true?” I listed all the possible answers and ranked them in order of importance. At the top I read: “Global warming is a globally accepted threat to mankind. The only renewable energy sources available in sufficient capacity in the next critical decades we can tap into to displace fossils are solar and wind. Their intermittency and electronic nature creates an issue for them to be the silver bullet solution, and creates a need for a chemical energy carrier such as hydrogen.”

Voilà, with that in mind life has been good the past five years. I have seen proof stacking up that what I needed to believe in is actually confirmed. After Kyoto and Copenhagen, we have now Paris with the COP21 agreement. Investment in wind and solar power keeps rising and spreading globally. Before you know the intermittency leads to prolonged curtailment of these new assets and a grid-scale storage solution will be needed. Further, more and more big cities are planning to ban gasoline and diesel cars and busses in the next decade.

Given all this evidence I now started wondering: “what’s the next thing I need to believe in for this becoming a reality? What’s next on the ranking list?”

Well, looking at what made other sectors successful, such as semiconductors, mobile communication, solar, etc... I believe that the time is ripe for the sector to get engaged in a process to define, and continuously update, a commercialization roadmap for its technology, which defines
early markets, sets priorities and triggers action. With this broadly supported roadmap the sector needs to seek policy support to develop rules and regulations, technology push and market pull measures, in order to increase volumes and develop the supply chains.

Unlike with the earlier “I have to believe ...” this time, I and the sector, can’t sit back and see how things develop and unravel. This critical next “I have to believe ...” we have to smith ourselves and make a reality. No one is going to do it for us, and we will only be successful if we are united in action. In this context the rebranded Hydrogen Europe association will be instrumental and hopefully sets a benchmark for other regions in the world.

So with this you all know now where my focus and my organization’s focus will be the next years.

That being said I still have not wrestled to piece my entropy concern. You remember I parked that. Why should I believe we will be able to tame or cage entropy? Entropy is, as you know, a phenomenon in nature that is omnipresent. Entropy can simply be referred to as the level of disorder in a system. Nature prefers states where the level of disorder is heightened. Entropy is at the basis of the hydrogen storage challenge.

Now we all recognize global warming is directly linked to the demographic explosion of mankind. Human population is growing exponentially, while space and resources are fixed and set. This is happening because we believe collectively in the values that every human life is sacred and birth control, while advisable, should remain an individual right and decision. Our values are what we believe in and how we behave. But, they have also consequences. In order to avoid that entropy drives mankind to look for a lower state of energy, in other words slaughter each other until each community has again enough space and resources so killing can seize, we have to create order. We often refer to this as complexity, where in fact this is an attempt to create order, a continuous attempt to win it from entropy. And the world is getting more complex by the day and it’s not stopping. Clearly mankind is particularly skillful in creating order. You could call us entropy-busters. That’s basically all we do, all the time, busting entropy. Hence, my gut feel tells me we will get to grips with the hydrogen entropy challenge too and develop technology to solve the storage challenge.

With that philosophical thought I would like to conclude. Thanks for your attention and enjoy the rest of the day.