



Podcast: Hydrogen in energy transition

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Speakers:

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Jeroen van Hoof

Hello, good morning and welcome to another episode of our Global Energy and Resource talks. I'm Jeroen van Hoof from PwC Netherlands. I'm PwC's Global Power and Utilities leader. And today I have with me Marcel Galjee, Energy Director at Nouryon, and Jan Willem Velthuijsen, the Chief Economist of PwC Europe, from PwC Netherlands.

So, welcome, Marcel, welcome Jan Willem.

Marcel Galjee

Thank you.

Jan Willem Velthuijsen

Thank you.

Jeroen van Hoof

Thanks for being here. Today we'll talk about hydrogen and, as a brief introduction, I think we are all on the same page that energy transition everybody agrees is widely understood and shared. And, as part of energy transition, we have set, amongst others, the Paris goals. After setting the Paris goals, it is clear that we will not meet those goals only by inserting more green energy from wind and solar to the energy system. To have the transport sector and the industry oil consumption also transformed, we need other steps to take.

I think hydrogen could be an interesting and compelling example to drive the next step to the Paris goals and I would like to discuss this in more detail with you. Hydrogen is an existing technology. It's already being used in various places in the industry. It's already used for the transportation of buses and residual heating in, for example, Japan. So there's already some examples of the application of hydrogen.

So, Marcel and Jan Willem, let's discuss the potential of hydrogen as a main factor in the energy transition from a global context. And, if I may start with you, Marcel...

Marcel Galjee

Sure.

...

Jeroen van Hoof

Can you share with us what you're seeing in the markets? What hydrogen projects do already exist and how are they performing? What's their reach?

Marcel Galjee

First of all, thank you for the invitation to talk about hydrogen. I'll tell you, if we're looking at hydrogen, we have seen a great progress in moving from fossil electricity to renewable electricity. But by far the harder challenge is to move from fossil feedstock products to renewable products. And especially in this context, this is where hydrogen can play an important role. Hydrogen is the element which connects the world of the electrons, connecting the world of the electricity to the world of the molecules and the products.

But at this moment, hydrogen is produced and already widely used within the industry, but produced in a way which creates a large volume of carbon emissions. And there's another opportunity to produce green hydrogen without any carbon emissions and this is where we need the scale-up. Because that is still within the early phases of development and needs scaling up to make it technically and economically feasible.

And I would say we have announced already a number of projects in multiple countries to start this scaling up from the 10 megawatt installations which we have nowadays, to the gigawatt installations which we foresee in the midterm future. But we need to build these step changes to come from 10 megawatts to these large installations. And then we have announced a 20-megawatt installation in Delfzijl together with Gasunie and we have built a hydrogen tanking station there. And we have announced very recently a project of 100 megawatts together with Tata Steel and the Port of Amsterdam to de-carbonize the steel production, at least a part of it, for the steel production of Tata.

Jeroen van Hoof

Those are really interesting projects. Turning to you, Jan Willem, as an economist, how would you look at the role of hydrogen? What role can hydrogen play in the energy system in a more broad sense?

Jan Willem Velthuisen

Well, Jeroen, hydrogen has some very unique properties from the point of view of an economist. First of all, it's abundant. It's the most abundant element on the planet. That's always an important characteristic for economists. But furthermore, it can be transported and it can be stored, which is also important qualities for an economist, from an economics point of view.

And then, finally, of course, it's carbon-free. And because it's storable and transportable, it can be used as a buffer for other renewable energy production, so if there is an abundance of wind and solar energy but there is no demand at that particular moment, then the power can be turned into hydrogen by electrolysis and it can be stored and held to the moment that there is a demand for the energy.

But furthermore, hydrogen as a component can serve in industry as a feedstock and as a fuel. It can be used to produce many chemical substances in a carbonless-free way. It can

be in production processes carbonless-free. And it can be used in mobility, in transportation, because you can fill your tank with hydrogen and, so for mobility, it's also a carbonless-free set of molecules.

Jeroen van Hoof

So, to summarize, it's about decarbonization of industrial and transportation use, but not only that, it's also solving or at least helping to solve the balancing and storage issue. I think that's indeed very interesting characteristics.

If you would draw it a little bit broader, Marcel, how would you look at the international potential of hydrogen? What about the cross-border potential and, in addition to that, what would you need from regulators as support mechanisms to make this to a success for your company, but also in the broader sense?

Marcel Galjee

I would say the interesting thing about the potential is that it's almost beyond any imagination. It's the key element to connect the industry and the energy sector, enabling the transition to a carbon-emission-free future.

But there's also another potential I would like to highlight and that's the potential of creating jobs and to create new economic models. If I take the parallel to offshore wind, there, 10 years ago, we decided to support and build and scale up the offshore wind sector, creating new value chains, creating a new industry, and creating new job opportunities. And this is also the opportunity we now see within the hydrogen sector.

So, if we show leadership, we can build up these new value chains and be the enabler of the biobase and the circular economy, because that is the role hydrogen can play.

And if I then look at the role of the government and the regulators, I think we are really looking at a joint responsibility and a joint opportunity. We jointly need to look at creating this leadership position, build it up, creating the value chains towards a carbon-emission-free world in 2030 and, in the end, towards 2050.

And I see a number of countries already moving into that direction. I see great examples coming from France, from the U.K., from Sweden, but also Japan and even some U.S. states are looking into this role of hydrogen into their economy.

Jeroen van Hoof

So would you say it's fair to state that between 2020 and 2030, we really need to invest in this partnership to make sure that, post-2030, hydrogen can be indeed an economically viable and scalable alternative to address all the topics that Jan Willem raised before?

Marcel Galjee

Yeah, definitely. And also here this is a joint effort. So this is where as an industry we need to work on innovation to make it technically more feasible. We need to work at it economically. But that's the same from a governmental perspective. And, if we do this in a joint way, we can create this new economy and create this leadership position.

Jeroen van Hoof

We've done it before, like you said, for wind, for solar, to bring the costs down. We had some support mechanism in place. As a chief economist, how would you look at that, Jan Willem? What are the barriers we should address before we come to that stage?

Jan Willem Velthuisen

Well, there's two economic problems at the moment. The first is that the economics don't add up yet of the different ways of producing and using hydrogen. And one has to do with the scale. Electrolysis is still an expensive technology, carbon storage is still an expensive technology, so we need cost reductions there and for that you need scaling up.

The second problem is the chicken-and-egg problem of the infrastructure that you need for transportation and storage before you can develop the markets. Markets are not mature and deep yet. So do you first have the markets maturing and deepening and then you can fund your infrastructure, or do you need the infrastructure first, then you can develop those markets?

For that to happen, to get that flywheel in motion, what you need is government, it's an important role of the government. Marcel pointed out this partnership. The role of the government would include setting clear decarbonization targets and sticking to those, so that markets can mature and develop and investments that we can earn back.

We need support in research and development and demonstration projects, and the information on that should be accessible for the developing markets, for the market players. We should be clever in intelligence with regulation that is in place. Regulation may not always be very helpful for the development of these markets, so we need to be intelligent and clever and flexible there.

And, finally, we need a good mix and an intelligent mix of incentives like fiscal stimulants and taxation and subsidies. We know by now what works and what doesn't work and what the effects are of these instruments. So we can make a clever mix of those.

Jeroen van Hoof

But is that even more complex, maybe, than what we did with the scaling of offshore wind and solar, if I listen to you?

Jan Willem Velthuisen

It is in a sense more complex, because the applications are more broad. I think the applications are both in industry and in mobility so also the regulation that is in place, in and around industry and mobility, is far more complex than just the renewable regulation regarding power production. Because the applications are multiple, I think the interactions with regulation will turn out to be more complex. So we need even to be more intelligently and more cleverly.

Jeroen van Hoof

Should we look at industry as a starter there? Because if we address industry first, would that enable the scaling up to, for example, the transport sector and others? Does that make sense to you, Marcel? Would you look at it differently?

Marcel Galjee

No, that makes a lot of sense, because if you look at the role of the industry, there we need really large volumes of hydrogen. So the scaling up can be done through the industry. And I would say that the mobility and residential sector can benefit from it.

And I also would like to add on what Jan Willem is saying is that the transition within the industry is definitely far more complex, but if we want to reach the carbon goals which we have set towards a zero carbon society in 2050, then we need to get this going. And this is where we definitely need this complexity and we need to solve these problems and we need to get started now.

Jeroen van Hoof

Thank you, gentlemen, for these interesting insights. It's clear that hydrogen can play a compelling role in the energy transition and meeting our climate goals and decarbonizing the energy system.

But on top of that, I think hydrogen really provides us the opportunity to create new economic models, create value and a lot of jobs. This is indiscernible worthwhile to pursue.

In this context, together with the World Energy Council**, we'll continue to work with you on publishing another report on the application and possibilities of hydrogen and what's needed to get this transformation going.

Thank you for joining me today.

Marcel Galjee

Thank you.

Jan Willem Velthuijsen

Thank you.

Jeroen van Hoof

Thanks.

** Jeroen van Hoof is the WEC National Member Chair for the Netherland