

Hydrogen Fuels Mobility

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Lutz Lienenkämper, then Minister for Construction and Transport of NRW, Germany

1 Welcome / Introduction

Special welcome to:

Professor (Dr. Ing) Detlef Stolten, Conference chair

Professor T. Nejat Vaziroglu, IHAE chair

After almost four days, WHEC World Hydrogen Energy Conference 2010 is drawing to a close. It has been an interesting programme, giving us a comprehensive and up-to-date overview of the latest facts and figures, as well as an outlook for the future.

The message is clear: hydrogen and fuel-cell technology has been making great strides – mind you, this is not always obvious to the layman – and many applications are on the verge of market entry. In some areas, such as the secure energy supply to computer and communications facilities, the breakthrough to the markets has already been achieved.

Given the many structured approaches to turn this promising technology into worldwide commercial success and the commitment shown by the expert community, there is really no doubting the fact that fuel-cell technology, along with hydrogen as the source of energy, is going to make an entry into the transport sector – and very soon, too. I will say more about this later on.

As Transport Minister, I am only too happy to pay attention to these signals, given that they are hinting at promising solutions especially in the area of regional mass transit. Let me assure you that the NRW State Government is prepared and willing to provide substantial backing here.

2 Federal / Nationwide Activities

In the decade ahead, mobility as we know it is set to change, in technical and technological terms, in economic terms and in terms of how it is organised. In order to safeguard our mobility in the long run, we need to develop new and sustainable fuel, propulsion and vehicle concepts.

Electrification of vehicles is what everybody talks about these days. Just recently, on 3 May, the “National Electromobility Platform” held its inaugural meeting, chaired by German Chancellor Angela Merkel and attended by numerous players from the industry and research sectors. The Federal Government is taking an unambiguous stance and will be driving forward the gradual transition from combustion engines to alternative systems such as fuel cells, batteries or hybrids.

However, it is important to not focus on just one technology; in line with the Federal fuels strategy, the vast potential for greater efficiency of traditional petrol engines will be taken into consideration, especially in conjunction with the use of modern fuels.

At the end of the day, it is all about efficiency and sustainability. At the same time, electromobility is a vehicle for the introduction, into the transport sector, of renewable energy sources in the shape of electrical and/or hydrogen power.

During recent years, the Federal Government has launched a range of powerful programs to support and promote the development of new transport technologies. Under the National Hydrogen and Fuel-Cell Technology Innovation Programme (NIP), 700 million Euros are going to be made available by the Federal Government. A lot of that is earmarked to promote fuel-cell driven vehicles. Under the Second Economic Stimulus Package, the same amount of money is going to electromobility battery research. This puts Germany in a very favourable position to compete with other industrialised nations.

The industry, too, has shuffled for position. In September, 2009, some major vehicle OEMs, oil corporations and energy suppliers signed a Memorandum of Understanding, entitled "H2 Mobility", aiming at the development of a hydrogen infrastructure in Germany. By 2020, up to 1000 hydrogen filling stations are going to be built in Germany. Similar initiatives are being launched across Europe.

More or less at the same time, a Letter of Understanding was signed by nine vehicle OEMs aiming at bringing fuel-cell powered cars to the market. The idea is to drive forward fuel-cell development in order to get hundreds of thousands of such vehicles on the road by 2015. Those are inspiring and positive signals that demonstrate commitment and dedication as well as the state of development this technology has achieved.

3 Activities and Plans in North Rhine-Westphalia

It goes without saying that lasting, safe and affordable supply of energy is of great significance to North-Rhine-Westphalia, a centre of industry and energy. Efficiency is the buzzword when it comes to converting and consuming energy.

It is also at the focus of our energy and climate strategy: with our ambitious goals – reduction of CO₂ emissions by 81 million tonnes between 2005 and 2020, or 44 per cent of the nationwide objective – we have taken on the role of catalyst in Germany and Europe. Naturally, my work centres on the transport sector.

The sector accounts for roughly 20 per cent of the carbon dioxide emitted in Germany. Twelve per cent comes from the motor car. This means that any forward-looking energy and climate policies must definitely address the issue of mobility. Mobility is one of the cornerstones of the modern industrialised society. Demands on mobility are rising all the time.

In the area of mobility, North Rhine-Westphalia has for quite a while been maintaining intense and good cooperation with the Federal Government, especially the Ministry of Transport. And we are keen to continue to play a major role in improving and implementing the necessary National Development Programmes.

This is against the backdrop that the North Rhine-Westphalia government under its holistic approach to energy and fuels, is carrying out a range of mobility programmes identical to the Federal schemes. More specifically, these are the three key principles of our strategy:

1. Energy security

Protecting the supply of energy by becoming less dependent on oil (more diverse energy mix, putting fuel supply on a broader basis, use of domestic energy sources, use of “domestic” secondary sources such as electricity, man-made fuels or hydrogen)

2. Sustainability

Protecting climate and environment by increasing the use of renewable energy in the transport sector and by making propulsion technologies as efficient as possible.

3. Economic viability

Though cuts in fuel consumption, low-cost fuels, sustainable fuel supply and by keeping the cost of purchase down.

With an eye on achieving energy efficiency, the NRW Government, mirroring efforts by the Federal Government and the EU, has come up with a twin-track “holistic” fuels and propulsion strategy:

- A) clean fuels combined with efficient propulsion systems, based on optimised combustion engines (e.g. XTL fuels, second and third-generation bio fuels, CNG or biogas);
- B) step-by-step electrification of drive train, incorporating the full spectrum of technical options (i.e. hybrid technology including plug-in and diesel-hybrid solutions), battery-powered cars as well as fuel-cell and hydrogen technology

According to the State Government, electromobility must be defined as “driving with an electric motor”. Our energy and climate policy pays special attention to electric mobility that is “visible”, in other words, not limited to private motor cars. Instead, we would like to see light commercial vehicles, city buses or local government fleets utilise their full potential of increasing energy efficiency and achieving climate protection.

Electric propulsion systems therefore provide an outstanding perspective for the realisation of climate change targets in the transport sector. How good this will eventually turn out to be depends both on future increases in the efficiency of electric vehicles and on the efficiency of fuel production techniques.

The policy cornerstones described above have led to the NRW Electromobility Master Plan, which is designed to:

- Describe the importance of electric mobility and the opportunity it provides;
- Identify the need for action;
- Draw up implementation strategies that contain concrete steps to achieve the above objectives.

The issue of electromobility has also huge implications for North Rhine-Westphalia as a centre of the car industry. The transition from conventional engines to electric drive trains is set to trigger enormous changes in the motor sector and especially amongst automotive suppliers. It is therefore our aim to prepare for these changes and use the resulting economic opportunity for North Rhine-Westphalia.

Several industries have the chance to benefit from the changes, amongst them the mechanical engineering sector, the electrical and chemical industries as well as the energy suppliers.

4 Fuel Cells and Hydrogen Technology for North Rhine-Westphalia

Let me specifically address a very important component of electromobility – hydrogen or, more precisely, hydrogen-fed fuel cells. The North Rhine-Westphalia Government considers hydrogen to be a major element of the changeover to renewable energy sources.

The fuel-cell and hydrogen technology has all the hallmarks of a key technology with great economic potential. It is therefore one of the focal areas of the State Government's promotion and development efforts in the energy sector. I have said earlier that the results of this conference are encouraging us to continue to work on this issue, to step up our efforts, even. On Monday, my cabinet colleague, Economic Affairs Minister Christa Thoben, said that we had made a start by joining the Clean Energy Partnership (CEP).

Within CEP, North Rhine-Westphalia is going to give intense support to the introduction of hydrogen as a fuel for regional public transport. To this end, the NRW Government has devised a medium-term commercialisation strategy for hydrogen and fuel cell technologies.

This is essentially about broadening the skills base of local vehicle manufacturers and utilising the state's favourable infrastructure. Let us first take a look at the infrastructure:

In North Rhine-Westphalia, Air Liquid operates a 230-kilometre hydrogen pipeline between the Ruhr and Leverkusen, just north to Cologne. This pipeline, already serving as a basis for hydrogen and fuel cell projects, is bound to move even more to the focus of strategic considerations. It runs parallel to a number of major transport routes in North Rhine-Westphalia, and is an outstanding means for getting hydrogen to the consumer.

Add to this the availability of large quantities of industrial hydrogen which experts reckon to be a key source of hydrogen for the duration of the transitional period up until 2030. Quantity, quality availability and affordability of hydrogen from industrial – technical and chemical – were at the focus of a study conducted by the Wuppertal Institute in collaboration with the Jülich Research Centre on a variety of technical and chemical processes. In North Rhine-Westphalia, some 260.000 passenger cars or almost 6000 buses could be operated with industrial hydrogen, without needing to produce an extra molecule. This is an opportunity we are not going to miss.

The best infrastructure is worth nothing without vehicles to use it. We all know that a couple of hundred fuel-cell vehicles are in use worldwide so far, and all manufacturers are gradually expanding their test fleets. Earlier, I mentioned the Letter of Understanding concerning the market entry of fuel-cell vehicles, you know, where hundreds of thousands of fuel cell cars were going to be in service by 2015.

On a parallel track, we in North Rhine-Westphalia put the focus on regional public transport, most notably on buses. We are currently working with partners from the public transport sector on a scheme to drive forward the use of fuel-cell hybrid buses. We firmly believe that FC buses are an interesting option when it comes to helping the technology achieve breakthrough. There are several aspects to support this theory, such as the visibility of the

vehicles, high public awareness, commercial viability and infrastructural advantages through fleet operations.

As yet, however, vehicles are not available in sufficient numbers and, what is more, there is no real competition. We are eager to change this and open up to the market, using local technologies. In fact, we began to do this at an early stage. As early as 2006, the Transport Ministry carried out initial field trials with so-called midibuses in the city of Düsseldorf. Those are still in operation, and the scheme was extended in 2009 to cover the Ruhr. Additional vehicles are today running in Gladbeck, Bottrop and Herten.

In the meantime, the manufacturers of the midibuses, Gladbeck based Hydrogenetics Corporation, have translated the lessons learnt into a new vehicle concept. This was rolled out last week and is now being operated here at the conference in what we call a "Ride and Drive Event".

We have launched another project in a joint German-Dutch venture. The objective is a scientific and technical assessment of the routine use in mass transit of no fewer than four bendy buses powered by a novel triple-hybrid system. The buses are going to be used on public transport routes in Germany and the Netherlands where they will be shown to a wider public. The buses are full of innovation. The concept vehicle is parked up outside. It is well worth your while having a look.

As we want to continue on the road we have embarked on, we are working on follow-up schemes to increase the number of vehicles. At the same time, we are initiating more development programmes in collaboration with additional partners, in order to encourage manufacturers.

With a view to improving the uptake of electric mobility, the State Government supports the establishment of charging points along public roads. In the summer of 2009, my department authorised local councils to designate signposted special roadside loading zones for electric vehicles.

The same measures could also be applied to fuel-cell driven cars. Moreover, electric vehicles, be they battery or fuel-cell powered, definitely profit from the new low emission zones.

5 Concluding Remarks

In the debate on electric vehicles and hydrogen or fuel-cell motors, we are facing a number of new issues. Pilot trials, new infrastructure (e.g. "extension cords", hydrogen fuelling stations, smart grids, virtual power plants, storage), smart metering and driver behaviour call for closer co-operation of regional stakeholders, with a view to safeguarding the chances for success of innovating products and services, and to crack the market.

This multidisciplinary co-operation is very much in line with North Rhine-Westphalia's so called "cluster" policy which aims to make the state's business sector more competitive.

Success of the cluster policy hinges on action programmes and projects across various clusters. We refer to it as cross innovation. Electric mobility is a good case in point. Tomorrow's mobility challenges can only be dealt with if a multitude of partners join together

– one only needs to look at the current co-operation of car manufacturers and energy suppliers in the area of vehicle electrification.

The future belongs to a variety of technical solutions to particular mobility issues. Electromobility needs to be viewed with technological neutrality. Whilst battery-powered cars and fuel-cell vehicles each have their advantages and drawbacks, depending on application and use, they complement each other beautifully. Industry has therefore opted for both tracks. As there will be no “this or that” both technologies should be developed under the heading “electromobility”.

I am sure this meeting has contributed towards highlighting the current developments with regard to the new propulsion systems. The opportunity is certainly there to be thrilled by this innovative technology during the “Ride & Drive Events”.

I am confident that the 2012 follow up in Toronto will be another milestone, building on the success of this conference. Thank you very much!