

# BALANCING ACT

## The Role of Law between Order and Chaos



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Security of the Rule of Law put to the Test

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Game Changer for Security Tokens?

### GREEN ENERGY

Expert Interview about Hydrogen

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# Hydrogen – hope for the future

**We are witnessing a huge race to find solutions to the current energy price crisis. LGP Senior Expert Counsel Klaus Wölfer spoke to Erich Gornik, one of Europe's leading experts on nanotechnology and semiconductor devices, about hydrogen as an important energy source and why it pays to put scientific findings above political slogans, headlines and short-term hype.**

*Wölfer: To what extent can hydrogen serve increasing demand and, above all, provide climate-neutral energy?*

**Gornik:** The problem with hydrogen at the moment is that electrolysis-generated production is very costly and is only climate-neutral if the electricity is first produced in a climate-neutral way. The second problem is that a lot of distilled water is used, which requires a lot of energy to purify beforehand. This makes distillation and thus also hydrogen production expensive. However, I assume that new processes with new catalysts will become much cheaper. These are currently still in the research stage and it will be several years before they are ready for industrial application. It is probably also possible to produce hydrogen from water with special algae, but these are new processes that will take another five to ten years to develop.

*We have a European hydrogen strategy. Some say that in a way it is already being overtaken by the new anti-inflation law in the US, as America offers huge incentives for the production of hydrogen via massive tax exemptions. Europe attaches very strict and restrictive conditions to subsidies, while in the US research on "green" hydrogen is being carried out eagerly in order to achieve breakthroughs.*

I can only agree with that. America is much more flexible here and apparently also better advised than Europe, because Europe hinders itself enormously with its purist approach. I think the US approach is the right one. We should not pull out of fossil fuels completely, but instead use a certain proportion, because there is nothing better. No fuel will ever be better in terms of energy density. However, it is quite possible to bind

CO<sub>2</sub> and thus to become climate-neutral. The USA will run ahead of Europe if Europe cannot agree on some kind of programme within the next two years.

*Several major European players, such as Germany, often hinder themselves through their negative approach to nuclear energy and through overambitious, unrealistic targets. France, as the second major player, has the advantage of being committed to nuclear energy for a long time and, under President Macron, has also set up strong support for hydrogen research. In terms of research and breakthroughs, can France – I don't want to say substitute – but lead and guide Europe? And should we in Austria take our cue from France?*

I can confirm this. First of all, France has a base level of secure electricity supply due to its large share of nuclear energy. If additional electricity is generated through solar energy, for which France is much better positioned than Germany due to its southern location, you can of course also use part of the electricity generated by nuclear energy to generate hydrogen. Hydrogen is an energy store, so to say, that can then be used in many ways. I believe that France has the right strategy to set an example in Europe.

*There is already cooperation between the Austrian and French industry. In Paris I saw an H2 racing truck from the truck manufacturer Gausin with additions from AVL List – what future do such technology partnerships have?*

# “Hydrogen drives for trucks will soon become reality”

Erich Gornik

I know the List company has built an extremely efficient, if stationary, fuel cell, with very good data in terms of durability and efficiency. This system can be used industrially. I assume that the development of hydrogen drives for trucks, i.e. larger units, will be successfully implemented in the next few years.

***Supply could become a problem, because the fuel station network is considered expensive and is currently still rather broad-meshed ...***

The hydrogen fuel station network is certainly cheaper than the electric charging network, which is much more expensive to build. The hydrogen network can take over parts of the existing network and most petrol stations already have natural gas supplies. It should be possible to transport hydrogen via natural gas pipelines.

***This is an interesting scientific view that contrasts with industry or states going all in on battery-powered vehicles.***

That is incomprehensible to me. Of course, an electric car is of great benefit, especially in the city, because it produces no emissions at all. But the electric car is not that efficient in terms of energy consumption, because it must carry the heavy battery load, thus requiring additional energy. Electromobility is a good thing, but we should not believe that 100% of traffic can be covered by electric vehicles. In my view, this is a misguided development, especially since there will be problems with sourcing raw materials. There are some initial plans for the disposal procedures for batteries. But basically, dis-

posal should already be taken into account in the production of batteries so that they can be easily disposed of or the materials can be reused. It will certainly take another five to ten years until recycling reaches a reasonable capacity.

***If we want to rely on batteries as the pillar of our energy supply right now, we would need gigantic sums and a huge amount of raw materials. If I understand this correctly, this is actually unrealistic?***



LGP Senior Expert Counsel Klaus Wölfer (l) and Professor Erich Gornik (r).

Gornik: We would probably soon reach our limits in terms of the availability of raw materials were we to run everything electrically worldwide. It would certainly not work without the involvement of Russia.

***We are currently very dependent on Russia, China or the Democratic Republic of Congo for many of our green technologies, which does not fit in at all with the current desire for energy independence.***

Right, we should actually see the treasures that the earth has provided us with as belonging to all of humanity and that individual countries only own them because they happen to have the right to exploit them. The gas or the oil is not Russian or Chinese per se, because these raw materials belong to the whole of humanity and therefore one should not pursue moral politics with these energy resources. This is a completely flawed approach and harms Europe in particular.

***There is also the idea of producing green energy elsewhere: in the United Arab Emirates, in Saudi Arabia or most recently in Canada, hydrogen could be produced locally from “green” electricity, which is then transported to European industrialised countries to be used in an environmentally friendly and efficient way. What relief can be expected from these initiatives for Europe in the short and medium term?***

None at all in the short term, because these are primarily projects that are supposed to show how efficiently you can do it. That means it takes several years. And then there's the fact that the long transport routes are expensive and you're basically walking into a price trap, because this form of green hydrogen will always be expensive and thus lead to a very big competitive disadvantage for Europe. Germany would basically be in a very good position if the country had not shut down its nuclear power plants and instead planned to convert the superfluous electricity, of which there has been an enormous amount from wind power in the Baltic Sea in recent years, into hydrogen. Then Germany would have no energy problems at all and would not have to buy hydro-

gen from Australia and Canada. Germany should develop its own industrial methods to produce hydrogen from wind on a large scale and switch the nuclear power plants on again. Anything else will lead to a very severe handicap for German industry. The standard of living in Germany will drop, because the question is whether German industry will even be competitive in a few years.

***What possibilities are there for the use and generation of green energy in Southeast Europe? I'm thinking, for example, of North Macedonia, where the sun shines very strongly.***

**“Gas and oil are not per se Russian or Chinese.”**

**Erich Gornik**

Yes, you should generate electricity primarily with solar cells in these regions. In southern Italy or southern Spain, the efficiency of a solar panel is at least twice as high as here. That means that electricity costs exactly half as much there. That is a competitive disadvantage for us. Because we have money, we build huge numbers of solar panels. Within Europe, it should be possible to generate electricity in another country where it can be generated more efficiently. If we have to buy twice the number of panels, we are consuming a lot of raw materials. The production of solar cells generates a lot of CO<sub>2</sub>, but strangely nobody talks about that. Solar cells are mainly made of silicon, which

needs to be at high purity levels and requires a very energy-intensive process. We should also think about saving materials if we want a real energy transition.

***That is also the question with hydrogen transport. There is serious talk about bringing it from Australia and Canada to Europe. Isn't that also very costly in terms of the raw materials required?***

It's also unethical to transport liquefied gas to Europe from such a great distance. That pollutes the oceans and the air. Of course, if one were to stipulate that the ships must be hydrogen-powered, the climate effect would be small, but then quite a lot of the hydrogen to be transported would be consumed.

***When it comes to the use of hydrogen, there is always talk of so-called “Hydrogen Valleys”, where the production and use of hydrogen is concentrated. Probably most expediently in the vicinity of heavy industry, where relieving the environment by running on hydrogen would bring a lot of benefits.***

Yes, that makes a lot of sense, because it's always good if the transport routes are short. You can basically produce hydrogen wherever there is wind and sun, maybe also with geothermal energy. Transporting hydrogen over long distances carries the issue that practically no material is completely leak proof and hydrogen diffuses out of all materials. Therefore, it is better to concentrate everything locally.

***In Northern Burgenland, hydrogen is to be produced on a larger scale around the wind farms due to their often surplus energy production. There is also talk of feeding hydrogen into the gas grids. Does that have a future? Should we focus further on this?***

I believe that wherever you have superfluous electricity, you should rely on hydrogen. Electricity is the most valuable energy we have. Before we just dump it without having used it, we should produce hydrogen with



it. I hope that hydrogen production will become a little more efficient. But instead of just dumping unused electricity, using it for hydrogen production is the best method. And the hydrogen economy will certainly cover 35 to 40% of the total primary energy demand in about 15 to 20 years.

***Up to 40 % of total energy demand? In about 20 years? Regardless of how it is generated?***

For the clean energy transition, you need hydrogen above all else and you should also use grey hydrogen as far as it is necessary. It will be phased out anyway once the subsidies for green hydrogen are significantly higher. It is good to use existing production methods, even if they are not yet completely climate neutral. The Americans are very pragmatic and apparently much smarter than the Europeans.

***In what way does European science organise and articulate itself vis-à-vis politics?***

There are many conferences on hydrogen and European science sees how valuable it is and what you can do with it. However, I believe that European politics has long since abandoned really listening to science. Unfortunately, you get this impression when you follow Europe's actions in climate policy.

***Will it ultimately take a real energy collapse in the coming winter to bring about a rethink here?***

Well, that would be sad, but it probably takes dramatic circumstances for people to wake up. European politics has started to completely abandon the wishes and needs of its people. This is a very worrying devel-

opment that could lead to an extreme destabilisation of our political system. I hope it will not continue like this. ■

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LGP Senior Expert Counsel

**Dr. KLAUS WÖLFER**

Doctor of Law and active at the Austrian Foreign Ministry for a long time. He was Head of the Austrian Cultural Institute in Rome and Head of the Arts Section in the Federal Chancellery, as well as Ambassador for Austria in Indonesia and Turkey.

**Dr. ERICH GORNIK**

Professor emeritus for solid-state electronics and nanotechnology at the Vienna University of Technology. Studied technical physics. Scientific expertise in the fields of semiconductor components and infrared laser technology. Wittgenstein Prize winner of the Austrian Federal Government. More than 500 publications in peer-reviewed journals.

# Towards a green hydrogen society

**Our focus on hydrogen and France is complemented by a current policy paper on green hydrogen. In his guest editorial, French politician Michel Delpon, France's "Monsieur Hydrogène", discusses the great potential of this emission-free energy source for business, industry and agriculture.**

**F**or the last five years, I have dedicated my term as a Member of Parliament to the development of renewable hydrogen in France and Europe. Today, hydrogen has made its mark on the worldwide energy landscape by occupying an important place in politics. Because it is such an important building block of the international climate ambitions of COP 26, every country should be fully briefed on hydrogen energy. However, the environmental and social dimension required to drive the development of this zero-emission energy source is too often lacking. The "CLUB VISION HYDROGENE", which I founded in March 2022, is a new repository for ideas and at the same time a positive catalyst for action. Its mission is to train stakeholders, identify and promote initiatives, find solutions, share best practices and experiences and, above all, communicate in order to contribute to the dissemination of this form of green energy. The aim here is to provide access to abundant, environmentally friendly energy to as many people as possible, including those who are less well off.

Energy is economically and financially heavily based on volatile pricing. We therefore need to move to an ecological transition based 100% on renewable energy. For the time being, energy may be more expensive, but eventually it will level out: once hydrogen costs as much as fossil fuel, about 2 euros per kilogram, we will be a hydrogen society. All countries will then operate on an even playing field, regardless of the region, including the African nations, which will finally also be included thanks to intensive solar radiation. Hydrogen production will be driven by the mass production of electrolyzers, tanks, fuel cells and new use cases. This means between 150,000 and 200,000 jobs for France by 2030, in 25 sectors of activity and around 100 different professions. This will boost upstream production in the entire renewable energy sector: photovoltaics, wind power, methane, hydropower and geothermal, as well

as both natural and by-produced hydrogen, not to mention CO<sub>2</sub> capture, which is making great progress.

On the downstream side (use side), in addition to mobility, i.e. car, truck, sea and air transport, there will be a gigantic market for industry, especially for steel, concrete, nitrogen fertiliser and construction with hydrogen-powered boilers. Bankers have also begun to understand this paradigm shift and will act accordingly: they are abandoning fossil fuels and increasingly focusing on green finance by selecting investors who do not pollute. The national challenge, as with all interlocking technologies, is to maintain our sovereignty over the entire industrial value chain. In the future, every European country must therefore succeed in striving for this economic sovereignty by promoting clean re-industrialisation, industrial relocation, and



shorter transport routes. In 2020, France authorised a 10-billion-euro budget to support the hydrogen sector through the COVID-19 crisis.

Before the Ukraine war and the economic and financial sanctions against Russia, European climate policy was strengthened through the “Fit for 55” package which ambitiously promotes the development of hydrogen technology. At the time, however, no one anticipated the major geopolitical tensions that are now having a huge impact on our economy due to our dependence on imported fossil fuels. The consequences are hugely increased production costs for grey hydrogen made from Russian gas, which in turn makes green hydrogen more competitive.

That is why I am lobbying the government to pass a decree allowing the direct con-

nection of electrolyzers, which will fix production costs and fully decouple hydrogen production from fossil fuel market fluctuations. In addition, the next draft law on the ecological transition will address the scaling of renewable energies from 2023 onwards by facilitating permits for the siting of carbon-neutral plants throughout the country. Another of France’s trump cards is the “France 2030” programme, whose goals have been set by the President of the Republic and in which hydrogen plays an important role. Thus, France is the country best positioned to achieve carbon neutrality by 2050. It is essential that European countries, which sometimes have different interests, find a unified roadmap to meet the goals of the Paris agreement.

In any case, the drought and fires of the past summer are a serious warning for the future of our planet! ■



**MICHEL DELPON**

is President of the “Club Vision Hydrogène” in Paris, founded in spring, and a former French MP (2017-2022). At the end of August, Michel Delpon was appointed “Ambassadeur France 2030” for hydrogen by President Emmanuel Macron.