



HYDROGEN OUTLOOK IN CENTRAL AND EASTERN EUROPE

EVENT REPORT | FEBRUARY 2021

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H₂

The background of the cover features a photograph of hydrogen infrastructure. In the foreground, there are several white, rectangular hydrogen storage tanks stacked in a row. Each tank has a small yellow triangle on top. Behind the tanks, a large white cylindrical tank is visible with "H₂" printed on it in blue. To the right, a white trailer or container is partially visible with "Hydro" and "zero em" printed on it in blue. The scene is set against a clear blue sky.

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According to EU scenarios, the share of hydrogen in Europe's energy mix is expected to grow from less than 2% today to 13-14% by 2050, as part of efforts to decarbonise transport and heavy industries. Central and Eastern EU countries are now stepping up preparations to be part of the game.

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INTERVIEW

Polish climate minister: 'It is critical that EU legislation on hydrogen is colour-blind'

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By *Frédéric Simon* | EURACTIV.com



Michał Kurtyka during a press conference summing up the COP24 Climate Summit in Katowice, 16 December 2018. [EPA-EFE/ANDRZEJ GRYGIEL]

Poland has welcomed the inclusion of hydrogen infrastructure in the European Commission's recast regulation for cross-border energy networks. "It is critical for our region that this legislation is colour-blind and does not discriminate between different 'types' of hydrogen," says Michał Kurtyka.

Michał Kurtyka is Minister of Climate

and Environment of Poland, which currently holds the Presidency of the Visegrad 4 group of countries comprising the Czech Republic, Hungary, Poland and Slovakia. He answered EURACTIV's questions in writing ahead of a [virtual conference on the outlook for hydrogen in Central and Eastern Europe](#) taking place on Friday (12 February).

The Polish government adopted its 2040 energy policy on 2 February. What is the place of hydrogen in the country's energy policy? Does Poland have objectives in terms of scaling up production capacity and infrastructure deployment? And what are the related cost projections for this?

The recent adoption of the Polish 2040 energy policy is a milestone

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towards future climate neutrality. It sets a clear vision of our strategy for a low- and zero-emission energy transition, which ensures energy security and creates the basis for meeting economic needs resulting from the recovery from the COVID-19 crisis.

The new energy policy recognises the importance of innovation and paves the way for the application of hydrogen as an alternative fuel, energy carrier and energy storage device. The role of hydrogen will increase together with the implementation of offshore wind and nuclear energy into the Polish power system.

The adoption of our energy policy gives a strong impetus for other energy and climate-related strategies. A draft Polish 2030 hydrogen strategy is currently under public consultation. Our proposal covers all aspects of the hydrogen value chain, including production, transmission, storage and use. It presents hydrogen coexisting with other energy carriers to cover growing power demand and respond to the need of a secured and balanced energy system.

The expansion of the hydrogen economy will support the increase in the share of renewable energy sources, give a new role to the gas sector in terms of storage, transmission and distribution of mixtures of natural gas and hydrogen and will be a way for climate neutrality of transport and industry.

The ambition of the Government of Poland is to develop strong national and local competences in the production of key components of the hydrogen technology value chain. In the short term, we aim at supporting research and development followed

by the first applications of innovative production installations.

Our ambition is to have 2GW of electrolyser capacity installed by 2030, which will require investments of over €2 billion.

What are the main challenges and opportunities related to the development of hydrogen in central and east European countries? How do those differ from the rest of the EU?

CEE countries have made a big effort to overcome the historical dependencies, but our energy mix still relies on coal. We plan to diversify our energy mix through nuclear plant and offshore wind farms. It will give us energy security.

Phasing out coal is a very costly process which has to be done with a due account of what our public and our energy system can sustain. Not every EU country has an excess of renewable electricity in the system. Thus, the key issue in hydrogen production should be the level of CO₂ emissions, not the specific technology. In order to achieve emission reductions in a cost effective manner and to prevent creating permanent disproportions between the regions and member states at the beginning hydrogen should be produced from all possible low-emission sources.

The CEE region needs in terms of gas infrastructure are significantly different from those of member states from North Western Europe. In the case of Poland, we have identified gaps in gas transmission and distribution infrastructure which need to be filled in order to enable further transition towards low-carbon energy system. The EU policy needs to take into account these

regional specificities when designing the support instruments for energy transition.

Moreover, in the mid- and long-term perspective, a stable increase in share of the green gases (such as hydrogen and biomethane) in gas networks, is expected. In this regard, retrofitting of existing infrastructure to enable blending of renewable and decarbonised gases, such as hydrogen, in the natural gas network should be considered as the most reliable option for greening the gas networks and economies.

Putting differences aside, we have something in common across the EU. Poland has a sizeable hydrogen production – we are the 3rd producer in the EU – but just like everywhere else it is largely based on fossil fuels. We share the challenge of making hydrogen more sustainable.

The development of a European-wide hydrogen market will rely first on market integration at a regional level. What can be the contribution of central and eastern European countries to this effort?

CEE countries can actively promote new opportunities for cooperation on low-carbon hydrogen with neighbouring countries and regions. Such cooperation can contribute to their energy transition, sustainable growth and development.

By 2030 the EU will aim at building an open and competitive EU hydrogen market, with unhindered cross-border trade and efficient allocation of hydrogen supply among sectors.

Currently there is limited infrastructure in place dedicated to transport and trade of hydrogen

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across borders. Development of infrastructure is an important element of the CEE cooperation.

We welcomed the inclusion of hydrogen infrastructure in the Commission's proposal on the TEN-E regulation recast. It is critical for our region that this legislation is colour-blind and does not discriminate between different "types" of hydrogen. While physical properties of hydrogen are irrespective of its production mode, the infrastructure must be in place to support the development of the market.

What are the industrial sectors that are expected to be the main users of hydrogen in Poland and CEE countries? Is it industry, heating, or transport? By contrast, are there any sectors that Poland believes should not be prioritised?

Currently we are working in the Ministry of Climate and Environment on the Polish Hydrogen Strategy which is going to define our goals and measures necessary to introduce the hydrogen economy.

We want hydrogen to support energy transition in three priority areas: energy and heating, transport and industry. We are also addressing hydrogen production and distribution, and the need to create a stable regulatory framework for the future market.

The priority areas refer to the concept of sector coupling, which will help securing the future renewables-based system. While we identified transport as a "quick win" sector and are already introducing legislation and support schemes, we are not

excluding any other sectors at this stage.

We need more time to assess the economic and environmental aspects of hydrogen deployment across sectors. The market uptake will be a good indicator of what should be prioritised.

Today, most hydrogen production is fossil-based and the quantities available are small. How does Poland intend to bridge the gap between fossil, low-carbon and renewable hydrogen? Will supply come mainly from locally-sourced hydrogen or from imports?

If hydrogen is to be an alternative for crude oil and coal, at the beginning it should be produced from all possible sources, the overall CO₂ emission of which is significantly lower than that of oil's and coal's.

When we reach the point where low-carbon hydrogen meets a much larger demand, more and more low-carbon hydrogen from renewable sources can be included. Our ambition is to develop strong national and local competences in the production of key components of hydrogen technology value chain.

The use of hydrogen will help us achieving not only climate neutrality but also maintaining the competitiveness of Polish economy. Developing local competencies will prepare us to become technologically self-sufficient when there is enough renewable power to scale-up electrolysis.

The hydrogen market will be subject to development, supported by successive regulatory work and

adjustment of support schemes for investment, research and development activities. It is necessary to seize the opportunities for the R&D&I in hydrogen created by the EU Green Deal and policies that follow.

The European Commission's hydrogen strategy, published in July last year, aims for 100% renewable hydrogen production from electrolysis. What will be Poland's contribution to this objective?

There is an important scientific and research potential in the field of hydrogen technologies in Poland. We have significant achievements in designing functional materials for the production of fuel cells and hydrogen storage. We also have specialists in all aspects related to the construction of fuel cells. We intend to use these talents to take the lead in this relatively new market which is being created in Europe.

We are also planning to create a comprehensive research program, the ultimate goal of which will be the development of the technology and construction of electrolyzers and fuel cells. This will allow a direct economic effect.

Above all, however, the key to success in developing the hydrogen economy is working together as governments, industries and partnerships to improve the technology, push the costs down and create a policy and regulatory environment that will encourage innovation and attract investments.

STAKEHOLDER OPINION

DISCLAIMER: All opinions in this column reflect the views of the author(s), not of EURACTIV Media network.

Hydrogen – the case for Central and Eastern Europe

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By Bartek Czyczerski | Business & Science Poland



Bartek Czyczerski, Managing Director of
Business & Science Poland

Best businesses thrive when faced with challenges and the EU Green Deal offers an abundance of them in the foreseeable future. However, the potential to turn a challenge into an opportunity will rely on joint and coordinated efforts of public and private actors. It is our shared objective to make a successful transition to a decarbonised economy and to the responsible future. We all agree that the question is not if but how to do it and success will depend

on providing businesses and societies with a clear and walkable path to get there.

Bartek Czyczerski is the Managing Director of Business & Science Poland.

Hydrogen has the potential to become the fuel of the XXI century. Hydrogen is the simplest, lightest, and most abundant element in the universe with many applicable uses. Its main advantage is the possibility of

its low- and zero-emission production methods coupled with the ability to transform it into other carriers or types of energy – including electricity or heat. Thus, hydrogen can play an important role in the process of achieving climate neutrality. Its application may range from heavy transport – where electrification is very difficult – through the industrial use to the energy storage.

And here comes the rub: it is crucial

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to realise that today only less than 0,1% of global production of H₂ originates from a zero-carbon process. Therefore, between the current situation and the vision of a 100% renewable hydrogen economy, there is a long and costly way to go.

To give you one example: to put on the road 500 buses fueled with green hydrogen accompanied by the electrolyzers of 50 MW of the necessary production capacity and 30 refuelling stations requires the investments of ca. 450 mn EUR over a few years span. This amount does not cover the cost of electricity necessary to produce green hydrogen to fuel them. The current estimates suggest that the yearly cost difference between a traditional and hydrogen fuel required to run those buses will amount to ca. 19-23 mn EUR in favour of a traditional one.

We subscribe to the long-term priority to develop the renewable hydrogen market but for the moment the production of such hydrogen is neither sufficient in terms of quantities nor cost-effective. We must not forget that at the end of the value chain there is an EU consumer who will be confronted with the higher costs of new technologies and without a customer willing to foot the bill there is no market.

Clearly, the investments needs are significant and there is an urgency for the support in this regard. However, any business decision must consider not only the investment cost but also long-term profitability which depends on the sufficient demand.

Therefore, apart from the financing, it is essential to address other tasks: the development of the hydrogen market based on the various low-emission technologies, at least until the renewable hydrogen market matures; the instruments stimulating the demand; finding the way to cover the cost difference between the traditional and zero-carbon technologies; and finding a way to incentivize and support the innovation.

There are several ways to boost the development of the hydrogen economy. The list is open, and some initial ideas include:

- increasing the share for renewable energy from hydrogen for renewable energy sources (RES) under the RED II Directive;
- financial support for innovative projects aimed at obtaining clean hydrogen in existing installations – e.g., a hydrogen purification to the quality that can be used in automotive fuel cells – or in small-scale, local power plants where there is a need to compensate for higher production costs of zero-carbon hydrogen;
- further, decreasing distribution fees for renewable energy for hydrogen production;
- last, but not least – the support mechanisms for products manufactured with the use of “renewable hydrogen”.

We reason from a particular perspective of the Central and Eastern Europe region which has made a successful transition to a market and a greener economy. Since 1990, the EU has managed to reduce its total CO₂ emissions by 23%, largely thanks to the reductions in the Central European countries. Yet, despite these efforts, the current regional energy mix is a result of the past and overcoming this heritage will take extra time and effort. It will also affect the way and pace of developing the hydrogen economy. Poland today is the nr 3 producer of hydrogen in the EU. Similarly, to the rest of the EU, it is still predominantly based on fossil fuels. However, we are familiar with this business and can contribute to make the hydrogen the backbone of the sustainable energy transition of the XXI century. It may be a small step for some, but it will be a giant leap for the CEE region towards the climate-neutral economy.

'Low hanging fruit': Eastern EU states eye existing gas network for hydrogen

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By Kira Taylor | EURACTIV.com



Michał Kurtyka at COP24 summit in Poland in December 2018
[WALDEMAR DESKA / EPA-EFE]

Existing gas networks should be repurposed to transport hydrogen and help boost demand, said Michał Kurtyka, Polish Minister of Climate and Environment [at an online event about hydrogen in Central and Eastern Europe on Friday \(12 February\)](#).

"We need to adapt the networks. We need to make sure that the already existing gas infrastructure will be adapted to also transport decarbonised gases, including hydrogen," he said.

Hydrogen provides a way for coal-

reliant Central and Eastern European countries to shift their industry away from fossil fuel. Analysis from the European Commission shows that every €1 billion of investment into renewable hydrogen leads to around 10,000 jobs along the supply chain, said Kadri Simson, the EU's energy commissioner who spoke at the conference.

Poland is already the third largest producer of hydrogen in Europe and the fifth largest in the world. It has just adopted its energy plan for 2040 and wants one third of its electricity

capacity to be green by 2030.

Poland has also launched a hydrogen strategy while Bulgaria has announced it will develop a national roadmap for hydrogen. Slovakia has established a centre for hydrogen technologies and Croatia is preparing a national programme for hydrogen market development.

"Already, we are seeing hydrogen buses in Riga, and there are promising projects on the horizon for hydrogen applications in the maritime sector and even in aviation. So it's clear the

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opportunities are there for Central and Eastern Europe,” Simson said.

But the Commission needs to do their homework on regulatory aspects, said Milan Sedláček, head of EU affairs and strategy at Eustream, the gas transmission system operator in Slovakia.

“Please do not be too rigid from the very beginning. These blending and low carbon gases are a low hanging fruit and it has to be for the benefit of everybody,” he added.

Although it is important to develop production for decarbonised hydrogen, the most important thing is to increase the volume and drive down costs, said Adam Guibourgé-Czetwertyński, Poland’s Undersecretary of State at the Ministry of Climate and Environment.

Speakers at the online event called on policymakers in Europe to set aside the debate about the sources of hydrogen production – whether from natural gas or renewable electricity – and focus instead on scaling up production. That means moving away from referring to hydrogen by its colour – grey, blue or green depending on its source – and focusing more on CO₂ emissions.

“We shouldn’t be looking at this colours definition, but we should be looking at the CO₂ content, which is necessary for the production return,” said Kurtyka, adding that the EU should adopt a technology neutral approach which also embraces low-carbon hydrogen produced from nuclear electricity.

FUTURE OF HYDROGEN IN CENTRAL AND EASTERN EUROPE

According to Sedláček, there is no doubt about the role that hydrogen will play in decarbonising the EU and the existing gas infrastructure will play an important part in this. However, he warned there is little money available for repurposing the grid.

Gas pipelines already exist across the EU, including Soviet-era networks in many Central and Eastern European countries. In Slovakia, there is currently a project looking at whether these could be repurposed to carry hydrogen.

But Sedláček highlighted issues with public acceptance of hydrogen, saying poverty, pricing and politics may prevent its uptake, particularly where dirtier energy is cheaper.

“It demonstrates the problems with access to energy in post-communist countries and low income households especially. Those low income households, of course, have a tendency to switch to cheap and dirty energy carriers, which immediately run the countries, together with coal usage, into problems with air pollution,” Sedláček said.

In Hungary, hydrogen’s role is seen as two-fold – as storage and as a fuel mixed with natural gas. Projects there include research and development and transport and, crucially, blended hydrogen.

In Poland, the equivalent of €250-

300 million has been made available for zero emission transport, with the country aiming to have 500 hydrogen buses on the road by 2025. This would help cut down air pollution in one of Europe’s most polluted countries.

Poland also aims to open its first 50 MW cogeneration plant by 2030. This is a combination of natural gas and hydrogen, which lowers the amount of carbon emissions and is seen as a step away from coal and towards greener energy.

The Commission is hoping to boost hydrogen production in Europe, with the [hydrogen strategy introduced in July last year](#) and proposed revisions to transnational networks put forward in December, including on hydrogen pipelines and electrolyzers.

Hydrogen

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