

Hydrogen is a driver for post-COVID economy

In order for the European economy to recover from the COVID-19 pandemic, the EU has accelerated the decarbonization of the economy, and has assigned the lead role to hydrogen. The market volume is estimated at \$700 billion, and the leading industrial countries are already fighting for a stake. CREON Market Monitor analyzes strategic trends in the emerging hydrogen market.

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Hydrogen has been considered as one of the promising options for the last 15 years in lieu of the European policy to decarbonize the economy aimed at drastic reduction in greenhouse gas emissions by 95% compared to 1990 levels. The COVID-19 pandemic has seriously accelerated this process and has literally pushed the global market towards the development of a hydrogen economy. According to Germany's Minister of Economy and Energy **Peter Altmeier**, the coronavirus gave Europe a chance to rapidly develop climate-friendly technologies. EU energy strategy documents recognize hydrogen as the main driver of economic growth to overcome recession caused by COVID-19. "In this regard, hydrogen has a decisive role," underlined Altmeier.

Hydrogen becomes more competitive

According to Bloomberg's Hydrogen Economy Outlook, 24% of the world's energy demand will be met by hydrogen by 2050, and its price will fall to the level of today's gas prices. The experts noted that in a best-case scenario the hydrogen industry will be able to attract \$11 trillion in investments in the next 30 years, while global sales of hydrogen as an energy carrier will reach \$ 700 billion.

At the same time, the economic performance of the green hydrogen model continues to improve. For example, the cost of alkaline electrolysis has decreased by 40% over the past five years. And according to the latest report of the [Hydrogen Council](#), which already includes three dozen of the world's largest companies, the cost of developing hydrogen technologies will fall by half in the next 10 years. In other words, by 2030 hydrogen will be able to compete not only with renewables, but also with fossil fuels. Moreover, [IHS Markit](#) estimates that even "green" hydrogen generated entirely from renewable energy can become competitive by 2030.

Master tool of decarbonization

The drive towards a new hydrogen economy is adopted by the Germany's strategy for the development of hydrogen energy, presented on June 10. The goal is to create a climate-neutral economy. Hydrogen is at the center of this process. The energy carrier is considered comprehensively within the entire value added chain: from production technologies to creation of required infrastructure, storage, logistics and delivery capacities.

Step by step, it is planned to switch to hydrogen not only in the public transport, but also in metallurgy and petrochemical industries. At the first stage until 2023, the German government will allocate more than €10 billion for the implementation of these plans: 7 billion for "market launch" (creating framework conditions and stimulating domestic demand), 2 billion for international cooperation and another 1 billion for the needs of German industry and mechanical engineering. The objective of these investments is to adopt advanced hydrogen technologies in order to become the world's main technology exporter in the long run.

The EU sets similar goals. A month after Germany, European Commission published two documents, revealing plans to achieve climate neutrality by 2050: a strategy for the integration of the energy system and a hydrogen strategy. The first strategy suggests considering and implementing European energy system as a whole, with the integration of different energy carriers, infrastructure and consumption sectors.

REFERENCE: COLORS OF HYDROGEN

Green hydrogen

Generated from water by electrolysis, for which the electricity is obtained entirely from renewable sources. Regardless of the electrolysis technology, all green hydrogen is generated without CO₂ emissions.

Grey hydrogen

Produced from light hydrocarbons (natural gas) by steam reforming. CO₂ emits into the atmosphere adversely affecting the climate and exacerbating the greenhouse effect. Production of 1 ton of hydrogen releases 10 tons of CO₂ into to air.

Blue hydrogen

Produced from hydrocarbons like grey hydrogen, but in the reforming process CO₂ is captured and isolated from the atmosphere (Carbon Capture and Storage, CCS). In the overall energy balance, blue hydrogen is considered climate-neutral.

Turquoise hydrogen

Produced through methane pyrolysis, which produces carbon instead of CO₂. Turquoise hydrogen is considered climate-neutral if two conditions are met: 100% of the energy for pyrolysis comes from renewable energy sources, and all the carbon released is bound.

The second "hydrogen" strategy is more specific. According to the document, in the next 30 years, the European hydrogen sector is expected to bring investments of 470 billion euros. By 2024 production capacity should increase to 6 GW for the production of 1 million tons of green hydrogen per year, and by 2030 capacities should reach 40 GW and 10 million tons respectively. Once these objectives are achieved, the metallurgical and chemical industries in Europe can be transferred to hydrogen energy.

The main condition is that all hydrogen for industrial applications should be generated exclusively from electricity obtained from renewable energy sources. Nevertheless, the European Commission like Germany allows the use of natural gas for the production of hydrogen so far, provided that the CO₂ released by electrolysis process is captured and not released into the atmosphere (blue hydrogen).

European ecologists and environmental organizations have approved ambitious plans for hydrogen transition, primarily in the transport sector. "The EU should adopt laws that oblige ship-owners and airlines use low-emission fuels such as hydrogen, ammonia or synthetic kerosene," said **William Tods**, Executive Director of Transport & Environment, a European NGO.

Russia's potential in hydrogen energy

The capacity of the hydrogen market is reflected in the [Energy Strategy of Russia](#), also published on June 10. In the document, hydrogen is treated as having high export potential, up to 0.2 million tons per year by 2024, and growing tenfold by 2035 to 2 million tons (similar to a European scenario). According to the plans of the Ministry of Energy that is also developing a hydrogen concept, Russia could potentially produce 3.5 million tons of hydrogen per year. This is equivalent to about 15% of the global hydrogen market, which may reach 23.8 billion Euro by 2035 (data from the NTI Center for Competences "New and Portable Energy Sources").

In order to launch a full-scale domestic hydrogen market, Russia still lacks incentives, says **Yuri Melnikov**, Senior Analyst at the Energy Centre of Skolkovo School of Management. Russia's goals to reduce greenhouse gases are less ambitious than those of the EU, even after the ratification of the Paris agreements. Russia is going to reduce CO₂ emissions by only one third compared to 1990. In other words, the carbon neutrality EU is aiming at, does not play a significant role for Russia, as carbon regulation in the country is just beginning to emerge. "CO₂ emissions cost nothing to Russian enterprises, and the carbon

footprint in products is almost irrelevant to suppliers. In this situation, hydrogen will have to compete with other types of fuel solely on price, primarily with natural gas, while gas prices are regulated at a low level", states the expert in [his article](#) in Nezavisimaya Gazeta.

Nevertheless, Russia has great potential for the development of a new policy, the expert believes. It is not decarbonization that stands on the agenda of Russian energy policy (as in the case of the Europeans), but the struggle for urban ecology does. The federal project "Clean Air" provides for a 22% reduction in the amount of harmful emissions by 2024; its budget is estimated at 500 billion rubles. In addition, renewable energy sources have begun to emerge in recent years: "The industry shows good prospects, even a parity in cost with fossil-fueled, nuclear or hydroelectric generation can be reached in future. Russia has enormous growth opportunities in renewables and world's largest wind energy potential", Melnikov writes.

Furthermore, Russia received two strong external incentives to develop its own decarbonization program. First, the EU plans to introduce a cross-border carbon tax on all imported goods, including on products with "carbon footprint" in the entire production and commodity chain. According to [KPMG analysis](#), under the base case scenario the new climate tax could cost 33.3 billion euros to Russian exporters in 2025–2030.

Secondly, the EU (the world's second-largest economy) made it clear that the course towards an economy without harmful emissions is an approved and already implemented roadmap. "The EU should be climate neutral by 2050", said EU Energy Commissioner Kadri Simson at the presentation of EU's energy system integration strategy. "This means that by then we should have phased out fossil fuels. As for the gas sector, we will use decarbonized gases. And all our partners who supply us with fossil energy should bear this in mind", stressed Simson. For a country supplying Europe with about 200 billion cubic meters of gas a year, this is a serious challenge.

The next CREON Market Monitor will be dedicated to the prospects for the Russian hydrogen energy industry and the development of infrastructure within the country. The leading industry experts will discuss the prospects for hydrogen at the Hydrogen 2020 Conference in Moscow on November 2. [Registration](#).