

HYDROGEN POWERED ELECTRICITY IN UKRAINE. ADVANTAGES AND DISADVANTAGES

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Abstract

The article examines the prospects for the use of hydrogen energy in the Ukrainian industry. The present state and the best ways to develop the use of hydrogen in industry are assessed.

Keywords: Hydrogen, power, industry, electric power, efficiency.

Introduction

The global problem of modern energy industries is the deterioration of the environment caused by the huge emissions of toxic products of combustion and greenhouse gases (mainly carbon dioxide). The exacerbation of this problem in the face of growing demand for fuel and energy encourages the world community to find new energy technologies that would provide an acceptable level of pollution and, at the same time, did not aggravate economic growth. According to experts, a key place in solving this problem will be hydrogen energy - the production and use of hydrogen in various industries[4,5].

Research results

In Ukraine, research in the field of hydrogen technologies is still in its at the beginning. The advantage of hydrogen energy for Ukraine could be the possibility of significantly reducing the country's energy dependence by converting its existing own energy resources (coal, peat, shale, biomass, industrial waste, etc.) into hydrogen with its further use to meet the country's energy needs[2].

Hydrogen can be used in fuel cells for the production of electric and thermal energy in power plants for both decentralized and centralized energy supply. Wide possibilities for the conversion of coal into a combustible gas containing hydrogen has underground gasification of coal. It makes sense to develop hybrid power as a combined system: fuel cells, gas turbines, steam turbines.

In Ukraine, there is also the possibility of obtaining hydrogen as a by-product in the chemical, coke and refinery industries, use for the production of hydrogen, or various organic compounds. One of such production facilities exists on the territory of the enterprise "Ekoantilid" (Kamianske, Dnipropetrovsk region), whose capacities allow the production of hydrogen[1].

It is necessary to develop biotechnology for the production of hydrogen, to use the potential of electricity (especially nuclear power) in the night time of consumption for the production of hydrogen[3]. It will also increase the competitiveness of domestic products in the domestic and foreign markets through the use of their own cheaper energy resources. The ecological effect of the use of by-products is achieved by the fact that the resulting energy replaces the energy that must be produced from fossil fuels.

With the successful development of hydrogen energy, Ukraine could fully utilize its rich energy resource base, diversify energy sources, and improve the ecological situation in the country. It is also a way of introducing world-class high technologies and building up the industry sector, the possibility of entering markets with environmentally friendly technologies and equipment. To do this, it is necessary to support the existing scientific developments in the country, which are held in a number of institutes of the National Academy of Sciences by organizing and financing relevant research. To concentrate efforts on the development of hydrogen technologies, it would be advisable to establish cooperation between research institutions under the auspices of the National Academy of Sciences of Ukraine and to develop a corresponding Program involving both public and private investments for its implementation. The presence in Ukraine of significant deposits of

zirconium ores, rare earth elements and industry for their processing, could provide fuel cell production using state-of-the-art domestic technologies. It would also be advisable to provide, at an early stage, preferential taxation and other legislative support for the production of fuel cells and other components of hydrogen systems. This would allow Ukraine in the future to find its place in the distribution and use of hydrogen technologies on an international scale, to create new jobs for highly skilled professionals, both in the field of strategic research and development, and in high-tech industries[2].

Conclusion

For Ukraine in the near future we can talk about the use of hydrogen technologies in autonomous systems of energy consumption and transport, first of all, in combination with gasification of coal or biomass, as well as solar and wind power.. With the successful development of hydrogen energy, Ukraine could fully utilize its rich energy resource base, diversify energy sources, and improve the ecological situation in the country. It is also a way of introducing world-class high technologies and building up the industry sector, the possibility of entering markets with environmentally friendly technologies and equipment.

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