

HYDROGEN-ATOMIC ENERGY IN THE CONTEXT OF THE MODERN CLIMATIC AGENDA AND THE FORECASTED ENERGY TRANSITION

Nowadays, the world community has to be ready to respond to escalating global challenges that require an urgent collective solution. The need to combat greenhouse gas emissions (SDG-13) and the task to restore national economies in the post-crisis period under the permanent fight against the pandemic and its consequences refer to this class of problems of the new millennium.

Amidst the projected energy structure transformation, largely due to an increase in renewable sources generation share, a significant update of global value chains (GVCs) and a considerable price level adjustment are expected in the coming decades (Figure 1). These changes explain higher relevance of the issues that determine the participation of individual countries in the new global system of technological redistribution of the energy market. The emerging framework of relationships will largely determine the efficiency level of national economies and resource distribution fairness between countries in the context of achieving the global SDGs.

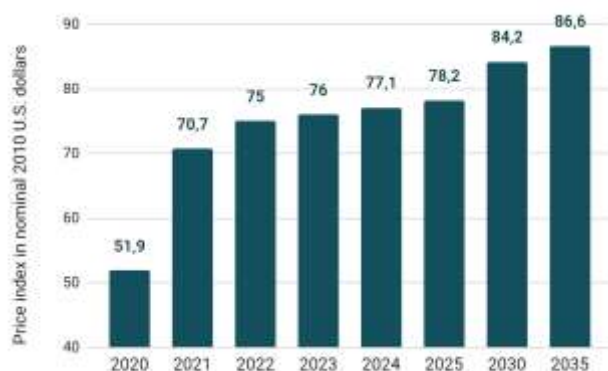


Figure 1 Forecast of price index of energy worldwide until 2035

Source: Sönnichsen N. Global energy commodity price index 2013-2035. - 2021. - URL:

<https://www.statista.com/statistics/252795/weighted-price-index-of-energy/>

Given the situation, the issues of a reliable assessment of the prospects for the nuclear power development are of particular relevance. Zero greenhouse emissions at the generation stage and one of the lowest operating costs levels determine the competitiveness of nuclear power facilities. As an additional benefit of the industry, it is worth noting that nuclear power has currently been the only industrially developed technology able to provide humanity with energy for 10,000 years in advance.

In the context of projected scenarios showing a significant increase in the share of renewable energy sources which reaches up to 30% by 2050, nuclear power claims a stable position as a “clean” primary source for a wide range of synthetic energy sources. Additional prospects for nuclear power are determined by the possibility of its integration into power systems of various sizes. While high-

power NPPs are used in global power systems with consistently high consumption rates, innovative nuclear technologies of small modular reactors are targeted at the segment of remote areas with local consumption, characterized by high mobility, provide desalination of water sources, are an important catalyst for the development of science, education and related industries.

The materials of this report are devoted to the results of a study conducted by the basic department 'Avtopromimport' of the World Economy and International Affairs Faculty, NRU HSE, together with experts from the Rosatom State Atomic Energy Corporation. The materials include forecast scenarios for the global energy balance transformation up to 2050, a levelized cost estimate (LCOE) for various types of energy, taking into account cross-border carbon regulation (CBT). The substantiation of the potential for the development of hydrogen-nuclear energy and its impact on the balanced achievement of the goals of climate regulation while increasing the competitiveness level of national economies are considered separately via examples from both developed and developing countries.