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"GREEN" ENERGY: A LOOK INTO THE FUTURE

***Abstract.** The transition to "green" energy, the introduction of "green" technologies is a growing vector of the global economy. Kazakhstan, despite the presence of huge natural resources, including hydrocarbons, intends to actively develop renewable energy sources. The development of "green" energy is considered promising, which is connected to a large extent with the technological process and, above all, with the development of an alternative economy.*

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«ЗЕЛЕНАЯ» ЭНЕРГЕТИКА: ВЗГЛЯД В БУДУЩЕЕ

***Аннотация.** Переход к «зеленой» энергетике, внедрение «зеленых» технологий - это растущий вектор глобальной экономики. Казахстан, несмотря на наличие в недрах огромных природных богатств, включая углеводороды, намерен активно развивать возобновляемые источники энергии. Развитие «зеленой» энергетике, представляется перспективной, что связано в значительной мере с технологическим процессом и, прежде всего с развитием альтернативной экономики.*

Today, the world is modernizing energy and moving to a new technological model, which includes updating the technological base, increasing production efficiency, as well as ensuring an improvement in the quality of life and living environment. The key direction of energy modernization is the formation of "green" energy.

In a broad sense, "green" energy is solutions in the field of energy and energy supply that reduce greenhouse gas emissions. Through this prism, "green" energy includes increasing the efficiency of the use of fossil fuels for energy generation, the transfer of energy sources to less carbon-intensive

fuels, the introduction of new, energy-saving technologies, as well as the development of renewable energy sources.

Today, the degree of penetration of the "green" sector of the world economy is small, but it is characterized by high rates of development. This is primarily due to the preservation of the priority of ensuring the energy security of the importing countries of fossil fuels, which are the leaders of the world economy. The average growth rate according to HSBC is 11% per year.

Meanwhile, the picture of the development of "green" energy seems promising, which is largely due to technological progress and, above all, to the development of alternative energy. In 2020, the global market for "green" (low-carbon) energy has grown 3 times - up to 2.2 trillion US dollars per year. At the same time, the renewable energy market will grow by an average of 8.6% per year and will reach \$1 trillion by 2025.

Almost all EU countries have developed new "green" measures in the field of energy, the development of public transport and infrastructure, the construction of eco-cities, as well as the development of car recycling systems [1].

Today, in Europe and the United States, the growth rates of investments in green energy, as one of the promising sectors of the green economy, are ahead of other industries. High rates are maintained due to the rapid growth of capital investments in developed countries, among which only those aimed at the development of renewable energy in just seven years increased from \$ 52 billion in 2004 to 260 billion in 2011.

As a result, the support of "green" technologies, including renewable energy, has become an important tool for many countries to stimulate the economy. In the USA, a "green bank" is being created with an authorized capital of \$ 1 billion, which will specialize in lending to projects for the development of environmentally friendly energy sources. South Korea, which has chosen the concept of "green" growth as a national strategy, focuses on "green" industry, energy and investment, "green" modes of transport, alternative sources of fresh water, waste recycling technologies, the development of parks, the arrangement of rivers within the city.

Today, renewable energy is a growing market with an annual turnover of more than 50 billion euros, with a powerful multiplier effect in the field of education, science and production.

In the future, the improvement of renewable wind, solar thermal and hydropower will help replace environmentally unsafe and low-efficiency production. In 2012, the total amount of electricity generated by solar energy in terms of productivity can be compared with the capacity of 12 nuclear power plants. According to the forecasts of the European Renewable Energy

Council (EREC), in 2030 renewable sources will provide 35% of the world's energy consumption [2].

By 2050, the United States envisions an 80% reduction in harmful emissions; solar installations will produce 65% of the energy consumed by the country and 35% of heat. In Mexico, it is planned to build energy-efficient buildings, it is planned to reduce carbon emissions by half by 2050, and a program is being introduced to assist households to replace old household appliances with new models with higher energy efficiency.

In Kazakhstan, the "green" vector also acts as a trend in energy policy. Under the Kyoto Protocol, Kazakhstan has committed to reducing greenhouse gas emissions by 15% by 2020. This requires a carefully thought-out and effective transition from a raw material to a new, "green" economy. In particular, we need other innovative technologies that are based on energy efficiency, high diversification of production and employment and at the same time pollute the natural environment less. Today, a strategy has already been adopted aimed at reducing the energy intensity of GDP by 25% in 2020, and a new Law on Energy Conservation has been launched. Along with this, Kazakhstan initiated the Green Bridge Partnership program aimed at strengthening cooperation in the field of green economy between developing and developed countries. It is no coincidence that 4 years later, the World Exhibition EXPO-2017 was held in Astana under the motto "Energy of the Future".

Within the framework of the exhibition, the EXPO Village Green Quarter was built in Astana, the cost of which, according to preliminary estimates, amounted to \$ 370 million. The Green Quarter represented the personification of the latest energy saving technologies and a modern approach to environmental responsibility. On the territory of the "Green Quarter", the area of which was 20 hectares, administrative and business centers, residential areas, parks and cultural facilities are located. The latest developments in the field of energy efficiency have been implemented in all buildings [3].

Every year, 2% of GDP is invested in "green" modernization. Basically, the commissioning of renewable energy facilities is focused on 2013-2014 and, according to the program's targets, by the end of 2014, the volume of electricity generated by renewable energy sources should reach 1 billion kilowatt-hours.

Five small hydroelectric power plants and a solar power plant have already been commissioned in the Almaty region. A small hydroelectric power plant with a capacity of 1.5 megawatts and two wind farms have been built in Zhambyl region. A biogas plant has been launched in Kostanay

region. Last year, a unique project "Solar Roof" was implemented on the basis of Gumilev ENU, which simultaneously serves as a training center.

The Ministry of Education and Science, together with Parasat Holding, is implementing the program "Scientific and technological support for the development of the energy sector of the economy of the Republic of Kazakhstan (renewable energy sources, energy conservation) for 2011-2014". In particular, pilot-industrial solar-wind, solar-water and solar-heat pump installations, lighting devices based on ultra-bright LEDs, etc. have been created [4].

NAC "Kazatomprom" organizes the production of photovoltaic plates and photovoltaic modules based on Kazakh silicon KAZ PV with an annual capacity of 50 megawatts. These are unparalleled solar panels made of Kazakh metallurgical silicon using a unique technology of plasma purification and directional refining.

In the plans for the next decade, 20% of all energy produced in Kazakhstan should be produced from alternative sources. To intensify work in this direction, an Agency for the Development of Clean Energy is currently being created, as well as a Fund to support alternative energy projects.

For the further effective development of "green" energy, it is necessary to take into account the speed and scale of expanding human access to energy with minimal negative consequences for the environment. To ensure the sustainable economic development of the state today, it is important to maintain an optimal balance of traditional, renewable and alternative energy without compromising the stability of the economy as a whole.

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