

IMPORTANCE OF RENEWABLE ENERGY SOURCES AND FACTORS OF ITS DEVELOPMENT

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An important problem of the world economy is the global environmental and energy crisis, which is connected with the increase in energy consumption, the decrease of traditional energy resources and the increase in their price.

It is impossible to realize scientific and technical progress without the development of energy and electrification. Humanity needs energy and the need for it is increasing every year. At the same time, the reserves of conventional natural fuels (oil, coal, gas, etc.) are unlimited, nuclear fuel - uranium and thorium reserves, from which plutonium can be obtained in breeder reactors. Therefore, today it is important to find useful energy sources, taking into account not only the cost of fuel and materials, but also the construction, ease of use and durability of the station [1].

Conventional sources include primarily thermal, nuclear, and hydropower.

It is known that the expansion of conventional energy production is causing two major global problems. Firstly, emissions from traditional energy production enterprises are causing a negative change in the global climate, and secondly, natural resources (coal, gas, oil, etc.) used by traditional energy production enterprises are running out. The solution to these problems is the use of renewable energy sources and their development.

Renewable energy sources are sun, wind energy, ground temperature (geothermal), natural movement of water flows, biomass energy naturally regenerated in the environment [2].

Alternative energy is a set of promising methods of obtaining energy, which are not as widespread as traditional ones, but due to the profitability of their use, the risk of environmental damage is low [3].

The urgency of using alternative, including renewable energy sources and energy carriers is also expressed by the global environmental problems that have arisen on our planet in the last decade. Including climate change, depletion of the ozone layer and other reasons.

The world community has been discussing the expansion and development of alternative energy sources for a long time. However, although there are many types of alternative energy sources today, their use is still not popular. Although alternative energy sources are not as widespread as traditional ones, they have been proven to be a promising method of energy production [4].

After all, one of the main trends of the modern world is the active shift of growing energy consumption to the use of alternative energy sources.

The importance of developing "green energy" using inexhaustible reserves of

thermal energy from the sun, wind, rivers, geothermal energy and ever-increasing biomass is repeatedly emphasized. In particular, these include achieving low-cost energy production without environmental damage and preserving natural resources for future generations.

However, green energy is developing only in most of the world's leading countries. Essentially, today, a new paradigm of world energy is being formed, which envisages the decisive contribution of renewable energy sources to the total energy consumption and the gradual replacement of traditional fossil energy resources.

About one-fifth of the primary energy supply consumed by people living on Earth comes from renewable sources such as wind, solar, hydro and geothermal. This sector is expected to continue to grow at an annual rate of 2.6 percent until 2040.

Until recently, the main source of renewable energy was hydroelectric power. Nowadays, wind and solar energy are also developing rapidly. In many countries, scientists, mature specialists, and researchers are conducting research on new photovoltaic cells that can be printed on flexible panels, which will reduce the cost of solar energy [5].

Wind and solar power are highly dependent on weather and daylight hours, so they may not necessarily generate the bulk of electricity during peak demand times. Many countries are now combating this by stockpiling more reliable sources of energy generation. This means that nuclear, gas and even coal-fired power plants are idle or running at low levels, but output is high when there is wind or when the sun drops below the horizon [6].

The term "alternative energy sources" refers to renewable energy sources that produce the absolute majority (85%) of the energy used in the world's energy and can replace traditional energy sources - thermal and nuclear power plants.

Thus, future energy must solve three main tasks in its further development [7]:

- economical use of non-renewable energy resources (saving energy resources);
- efficient use of energy (reduction of losses during production, transformation, transmission and consumption);

- increasing the use of renewable (alternative) energy sources and stimulating the search for new energy sources (development of hydrogen energy research, etc.).

Solving these global challenges aims at three main goals of the new energy policy:

- risk minimization;
- climate protection;
- sustainable development.

Based on this, it can be said that the goal of any state energy policy is the most effective use of natural energy resources and the potential of the energy sector for sustainable economic growth, improving the quality of life of the country's population and strengthening its external economic position.

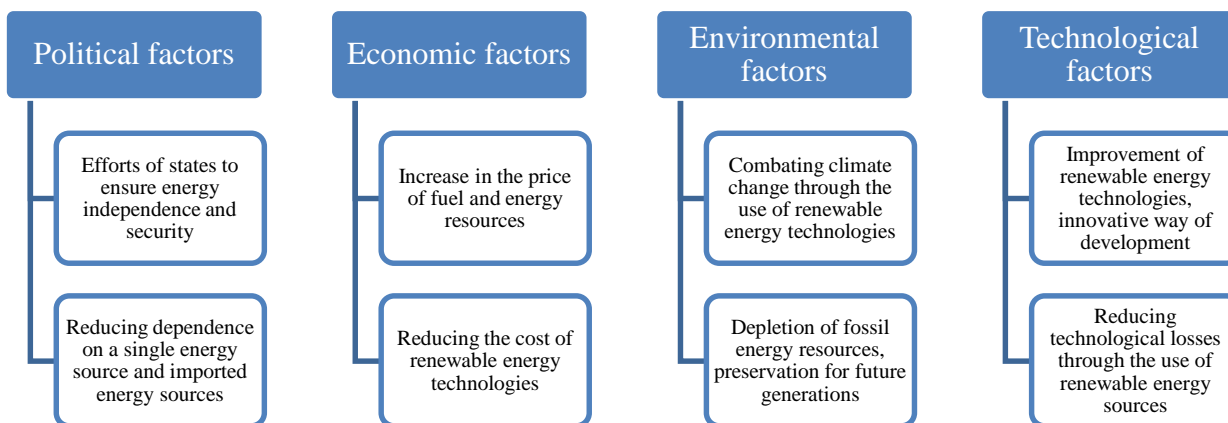


Figure 1. The main factors of the development of the world renewable energy market [8]

From the end of the 70s to the beginning of the 80s of the last century, most countries began to adopt special state-funded programs for the development of energy based on renewable sources [9].

Central Asia is rich in renewable energy sources and has significant potential for increasing energy efficiency and expanding regional cooperation in the field of energy. USAID's "Central Asian Energy" project (implementation period: October 2020 - September 2025, budget: 39 million US dollars) national and regional security is a priority for the five countries of Central Asia - Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan helps to achieve the directions and get economic benefits from the regional electricity trade. The project works closely with national governments and key stakeholders to address three key challenges.

National market liberalization reforms. USAID's "Central Asian Energy" project offers Central Asian countries cooperation directions in updating their national energy strategies and developing optimal market structures, including legal, institutional, regulatory and technical bases. USAID also provides assistance in developing cost-reflective pricing methodologies, business modernization, and cybersecurity.

Clean energy. USAID's "Central Asian Energy" project supports the efforts of the governments of Central Asian countries to develop renewable energy by conducting research on the integration of renewable energy sources into a unified energy system and developing strategies for the future. USAID promotes private sector investment in renewable energy.

Regional electricity market. The project is based on USAID's support for regional energy cooperation, cross-border electricity trade and open access to generation and transmission networks. Also, USAID's "Central Asian Energy" project is working on the development of a regional model of the electricity market, combining technical and market fundamentals.

Through these projects, USAID provides technical assistance to national governments, businesses, and other stakeholders, including international

development agencies and organizations, system operators, local and international investors, and energy companies. USAID promotes national and regional energy market reforms, promotes the widespread adoption of clean technologies to strengthen regional electricity markets, and promote renewable energy sources.

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