

THE IMPORTANCE OF RENEWABLE ENERGY SOURCES IN ENSURING ECOLOGICAL SECURITY

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Abstract. This thesis examines the importance of renewable energy sources in ensuring ecological security. The study analyzes the ecological advantages of solar, wind, hydropower, and biomass energy, their role in reducing greenhouse gas emissions, and their contribution to environmental protection. It also reviews international experience in the use of renewable energy sources and the results of reforms being implemented in Uzbekistan. The results of the study show that developing renewable energy sources is an important factor in strengthening ecological security, reducing the negative consequences of climate change, and ensuring sustainable development.

Keywords: ecological security, renewable energy sources, solar energy, wind energy, green economy, sustainable development, climate change, greenhouse gases, carbon emissions, energy efficiency, ecological sustainability, environmental protection.

Today, the intensification of ecological problems on a global scale, climate change, atmospheric air pollution, and the limited nature of natural resources are considered among the most pressing issues facing humanity. As a result of the widespread use of traditional fuel resources such as oil, gas, and coal in energy production, large quantities of greenhouse gases are being released into the atmosphere. This, in turn, has a negative impact on global warming, the disruption of ecological balance, and the health of the population. For this reason, developing

ecologically safe and sustainable methods of energy production is one of the important tasks of the present day.

Renewable energy sources, including solar, wind, hydropower, and biomass energy, acquire particular importance as ecologically clean energy sources. These energy sources are distinguished by their ability to renew naturally, to release few harmful emissions into the environment, and to ensure energy security. Furthermore, the use of renewable energy sources serves to reduce carbon dioxide emissions, use natural resources rationally, and ensure ecologically sustainable development.

In recent years, ensuring ecological security and introducing the principles of the “green economy” have become one of the priority directions of state policy in Uzbekistan. On the basis of decrees and resolutions of the President of the Republic of Uzbekistan aimed at developing renewable energy sources, large investment projects for the construction of solar and wind power plants are being implemented in the country. In particular, the “Uzbekistan – 2030” strategy sets the tasks of significantly increasing the share of renewable energy sources and widely introducing ecologically clean technologies in energy production.

Today, a number of large solar and wind power plants have been put into operation in our country; alongside producing millions of kilowatt-hours of electricity per year, they serve to reduce the volume of carbon dioxide released into the atmosphere. This is an important factor in strengthening ecological security, improving air quality, and mitigating the negative consequences of climate change.

From this point of view, studying the importance of renewable energy sources in ensuring ecological security, assessing their ecological

and economic efficiency, and developing scientifically substantiated proposals for the further development of this field acquire significant scientific and practical relevance today.

World practice shows that renewable energy sources are becoming one of the most important means of ensuring ecological security. According to data from the International Energy Agency (IEA), in 2024 renewable energy sources accounted for 32 percent of global electricity production, reaching a historic record. Solar and wind energy demonstrated the highest growth rates in this regard. In particular, in 2024 the volume of electricity produced from solar energy increased by 480 TWh, and from wind energy by 180 TWh.

According to data from the International Renewable Energy Agency (IRENA), in 2024 renewable energy capacity worldwide increased by 585 GW, bringing total capacity to 4,448 GW. This growth accounted for 92.5 percent of global energy capacity, indicating that the main part of new energy investments is being directed toward renewable sources. Solar and wind energy accounted for 96.6 percent of all new capacity.

The experience of European countries also clearly demonstrates the ecological efficiency of renewable energy. In 2024, the share of renewable energy sources amounted to 62.8 percent in Sweden, 52.1 percent in Finland, and 46.8 percent in Denmark. In these countries, the volume of harmful gases released into the atmosphere has decreased significantly, and the indicators of ecologically sustainable development have improved.

According to forecasts by the International Energy Agency, by 2030 renewable energy sources will account for 46 percent of world electricity production. Solar and wind energy will occupy the main place, providing nearly 30 percent of electricity production. This, in turn, will serve to

reduce the volume of carbon dioxide gases emitted from the energy sector and to strengthen global ecological security.

In conclusion, renewable energy sources are of great importance in ensuring ecological security, reducing negative impacts on the environment, and achieving sustainable development. The use of energy sources such as solar, wind, hydropower, and biomass makes it possible to reduce greenhouse gas emissions, improve atmospheric air quality, and use natural resources rationally. At the same time, they increase the sustainability of energy supply and serve to create an ecologically safe environment for future generations.

Analyses show that in developed countries the share of renewable energy sources in the energy system is increasing year by year. As a result, carbon emissions are decreasing and the indicators of ecological sustainability are improving. This experience confirms that developing renewable energy sources is effective not only ecologically but also economically and socially.

In Uzbekistan too, large-scale reforms to develop solar and wind energy on the basis of “green economy” principles have been carried out in recent years. The commissioning of new power plants serves to increase the share of ecologically clean technologies in energy production, reduce emissions of harmful gases, and strengthen the country’s ecological security.

In the future, increasing the volume of investments in renewable energy sources, introducing modern energy-saving technologies, supporting scientific research, and raising the ecological culture of the population will create a foundation for the further development of this field. As a result, the opportunities for ensuring ecological security,

reducing the negative consequences of climate change, and achieving sustainable economic development will expand.

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