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THE NEED FOR THE USE OF GREEN ENERGY FOR SUSTAINABLE ECONOMIC DEVELOPMENT

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Abstract
This article explores the meaning and main aspects of sustainable development and green energy, analyzes renewable sources, and discusses the advantages of green energy and some of the challenges facing the sector. At the end of the work, the main conclusions were formed.

Keywords: Green energy, sustainable growth, carbon emissions, solar energy, wind energy, hydropower, geothermal energy, biomass energy, ocean energy, greenhouse gases.

Introduction

A number of legal frameworks for sustainable development have been adopted in Uzbekistan. In particular, by the Resolution of the President of the Republic of Uzbekistan No. PQ-4477 dated October 4, 2019, the “Strategy of the Transition of the Republic of Uzbekistan to a “Green” Economy for 2019-2030” was adopted, which sets out a number of goals for sustainable development. The Sustainable Development Goals for 2030 emphasize ensuring universal access to affordable, reliable, sustainable and modern energy sources for all [1]. Achieving this goal involves developing green energy, energy efficiency, and alternative energy sources, as well as promoting energy efficiency and resource efficiency without carbon emissions in consumption.

If we take into account the lifecycle of energy production, the negative impact of alternative energy on the environment is much lower than that of traditional energy sources, as alternative energy technologies do not consume fuel during operation and do not use depleting natural resources. They are characterized by minimal risk of man-made disasters. The work being carried out in our country on the use of alternative energy sources includes such goals as developing solar, wind, hydro, and bioenergy, increasing energy efficiency, and reducing carbon emissions.

As noted by the country's President Sh. Mirziyoyev, it is planned to increase the share of renewable energy sources to 54% in the next five years, which will reduce greenhouse gas emissions by about 16 million tons. [2].

The use of alternative energy is a necessary and urgent direction in Uzbekistan to ensure energy security, maintain ecological balance, and sustainably develop both industry and the social sphere.

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Materials and Methods

Economic research methods such as the study of research conducted by world scientists and economists on the use of green energy in sustainable development, data collection, analysis of collected data, synthesis, and logical thinking were widely used.

Results of Studies

Sustainable development is a concept of social development in which the needs of humanity today are met without compromising the needs of future generations [3].

Sustainable development is a term that indicates the inextricable link between the social development of a state, people, and nation, as well as the ecological environment. This concept was first proposed in the United Nations International Report on Environment and Development in 1987 [4].

The concept of sustainability is based on six criteria: environment and natural resources, energy exchange, sustainable mobility, economic growth, social cohesion and inclusion, and governance and citizenship [5].

Since the Industrial Revolution, the energy mix of most countries across the world has become dominated by fossil fuels. This has major implications for the global climate, as well as for human health. Three-quarters of global greenhouse gas emissions result from the burning of fossil fuels for energy. Fossil fuels are responsible for large amounts of local air pollution – a health problem that leads to at least 5 million premature deaths each year [6].

When considering the entire life cycle of energy production, renewable energy has a much lower environmental impact than traditional energy sources. Renewable energy technologies do not consume fuel during operation and do not use depleting natural resources. They are characterized by minimal risk of man-made disasters. Renewable energy technologies emit 120 times less greenhouse gases than gas-fired thermal power plants and up to 250 times less than coal-fired ones during their life cycle [7].

Generating renewable energy creates far lower emissions than burning fossil fuels. Transitioning from fossil fuels, which currently account for the lion's share of emissions, to renewable energy is key to addressing the climate crisis. Renewables are now cheaper in most countries, and generate three times more jobs than fossil fuels [8].

Switching to renewable energy is very important for our planet. Burning fossil fuels can hurt the Earth's climate by releasing too much carbon dioxide into the air. Renewable energy reduces these bad gases, which helps fight global warming [9].

Clean energy has far more to recommend it than just being "green". The growing sector creates jobs, makes electric grids more resilient, expands energy access in developing countries, and helps lower energy bills. All of those factors have contributed to a renewable energy renaissance in recent years, with wind and solar setting new records for electricity generation [10].

As the human population increases, our rate of consumption of these fossil fuels also increases. Geologists and others whose job it is to locate and access these pockets of crude oil are finding it increasingly difficult to locate and extract new sources. Whether we have 1 year or 100 years left of oil,

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many argue that what is left should remain in the ground because it is not sustainable - it will run out eventually and so we should prepare for a post-fossil fuel world now [11].

Analysis and Results

Ensuring sustainable economic growth and the level of economic development largely depend on energy resources. The world's identified reserves of natural energy resources will allow us to meet energy needs for the next fifty years, provided that the current level of energy consumption is maintained [12].

Economic development, in turn, increases the need for energy and the risk of energy shortages. Therefore, the world community is currently paying special attention to the development of green energy. So what do we mean by “green energy”? Green energy refers to energy produced from renewable, sustainable sources that have minimal impact on the environment. It includes clean forms of energy that produce little or no carbon emissions or pollutants during their production process. The transition to green energy is crucial to mitigating climate change, reducing pollution, and promoting a sustainable energy future.

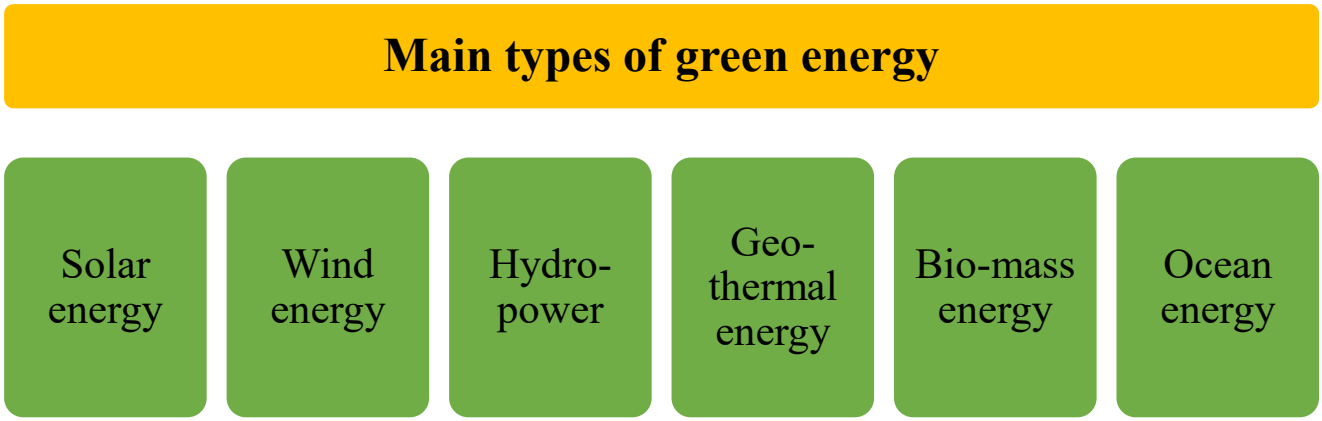

Figure 1. Main types of green energy

Green energy comes from a number of renewable sources, the main ones being:

1. Solar energy. Solar energy is generated by converting sunlight into electricity using technologies such as solar panels or solar thermal systems. It is one of the most common and fastest growing sources of green energy.

2. Wind energy. Wind energy is a form of renewable energy that harnesses the power of the wind to generate electricity. It involves converting the rotating motion of wind turbines into electricity. Improvements to turbines will help them become more efficient, providing clean and reliable power to the grid and households, even in areas with less wind.

3. Hydropower. Hydropower generates electricity by harnessing the energy of flowing water. It is usually generated by dams on rivers or by smaller "run-of-river" systems. Large-scale hydropower is

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criticized for its negative environmental impact (e.g., disrupting ecosystems), but small-scale hydropower is said to be more sustainable.

4. Geothermal energy. Geothermal energy is thermal energy from the earth, derived from the Greek words geo (earth) and therme (heat). Geothermal energy is a renewable energy source because heat is continuously produced underground. Geothermal resources are hot bodies of water that exist or are created by humans at various temperatures and depths underground.

5. Biomass energy. Biomass energy involves the use of organic materials such as wood, agricultural residues, or even algae to produce electricity or biofuels. When managed sustainably, biomass is considered a green energy source because it can be carbon-free.

6. Ocean energy. Ocean energy refers to all forms of renewable energy that can be extracted from the sea. There are three main types of ocean technologies: tidal, tidal and ocean thermal. These technologies are still being developed, but have great potential for green energy production, especially in coastal areas.

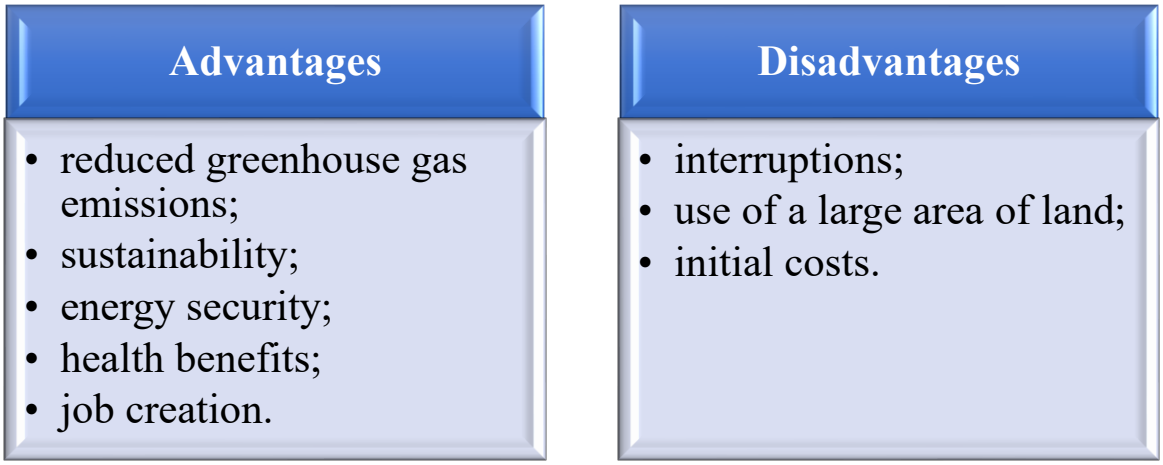

Figure 2. Main advantages and disadvantages of green energy.

The main advantages of green energy are:

- reduced greenhouse gas emissions: green energy reduces reliance on fossil fuels, which emit carbon dioxide and other harmful greenhouse gases;
- sustainability: renewable energy sources are inexhaustible, unlike fossil fuels, which are finite;
- energy security: by diversifying energy sources and using local, renewable resources, green energy can contribute to national and global energy security;
- health benefits: by reducing pollution, green energy can help improve air quality and public health;
- job creation: the renewable energy sector is labor-intensive, creating jobs in production, installation, maintenance, and research.

Along with a number of advantages, green energy also has some challenges inherent to the sector. For example:

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- interruptions: some green energy sources, such as solar and wind, are dependent on weather conditions and do not operate continuously day and night. These interruptions can be addressed by energy storage systems or a balanced mix of different energy sources;
- land use: large solar farms or wind turbine installations require large areas of land, which can sometimes lead to land use conflicts with agriculture or wildlife conservation;
- initial costs: initial investments for renewable energy technologies (especially solar panels or wind turbines) can be high, but these costs decrease over time.

Conclusion and Suggestions

The following conclusions were formulated within the framework of the topic "The need for the use of green energy in sustainable economic development":

1. Sustainable development is a new model of organizing the life of an individual and society. The modern concept of sustainable development calls for environmental protection and the efficient use of natural resources to be addressed together with social and economic problems. The fuel and energy sector directly affects sustainable economic development.
2. "Green energy" is the provision of energy without the consumption of fossil fuels, without emitting greenhouse gases into the atmosphere, and without harming the environment.
3. The main goal of green energy is to meet consumer demand as much as possible from renewable energy sources.
4. Green energy is obtained from a number of renewable sources, namely from the sun, wind, water, waves, geothermal heat, and biomass.
5. The main advantages of green energy are seen in sustainable economic growth, reducing negative environmental impacts, and improving social life.
6. Today, the world is urgently looking to normalize greenhouse gas emissions, invest in green energy systems, phase out coal- and oil-fired power plants, transition to alternative energy consumption, encourage the full use of wind and solar energy sources, and widely use "green" technologies and increase energy efficiency.

Within the framework of the topic, the following can be recommended:
- introduction of a beneficial tariff policy for green energy producers;
- localization of solar panel, inverter and battery production in our country;
- reduction of prices by reducing import dependence;
- development of green energy models suitable for regions.

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