ENVIRONMENTAL SAFETY – RESULT IMPLEMENTATION OF GREEN TECHNOLOGIES

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Abstract

Environmental safety is one of the most important aspects of sustainable development and ensuring the quality of human life. The concept of environmental safety is closely related to the use of green technologies in all sectors of economic activity - industrial production, agriculture, energy, construction and transport. Ensuring environmental safety contributes to the conservation of biodiversity, maintaining clean air, water resources and soils, as well as reducing the level of environmental pollution. This article analyzes the impact of green technological trends on ensuring environmental safety at the regional, national and global levels.

Keywords: government, civil society, reproductive health, environmental sustainability, public policy, partnership, environmental safety

I. Introduction

Over the past fifty years, humanity has been steadily widening the gap between the demand for environmental resources and nature's ability to satisfy it, which leads to an imbalance in the ecological balance, a decrease in the quality of life and the emergence of a global threat to the viability of civilization on Earth. The growth of environmental tension determines the need for the implementation of large-scale measures to protect the environment and ensure the environmental safety of individuals, society and the state. In Western countries, ensuring environmental safety is one of the priorities of state policy. These countries are actively developing and implementing comprehensive measures and strategies aimed at minimizing the negative impact of human activity on the environment, developing and monitoring compliance with environmental standards, encouraging the use of environmentally friendly technologies in industry, agriculture and other areas, as well as actively working to preserve and ecosystem restoration. An integral aspect of state environmental policy is also education and information activities among the population, aimed at developing environmentally responsible behavior and awareness of the importance of preserving nature for future generations. In the Russian Federation, current environmental problems are largely ignored, which is confirmed by the ineffectiveness of current regulations, the use of outdated models of interaction between society and nature, as well as the low credibility of environmental organizations in the country. One of the main problems is air pollution in large industrial cities and regions with a high concentration of industrial enterprises. Emissions of harmful substances into the atmosphere lead to deterioration of air quality, the formation of smog and the spread of respiratory diseases among the population. The irrational use

of agrochemicals, ineffective farming methods and the expansion of industrial zones lead to the pollution of ecosystems, depletion of fertile soil and mass extinction of living organisms.

II. Methods

In recent decades, the environmental situation has become more complex due to uncontrolled deforestation, which is observed in regions such as Karelia, Khabarovsk Territory, Kostroma and Arkhangelsk regions. The environmental consequences of uncontrolled deforestation extend far beyond forest areas, affecting water resources, climate conditions and the quality of life of local people. Deforestation, industrial mining, and illegal hunting and trapping are leading to the extinction of many plant and animal species, which can disrupt ecological balances and threaten the stability of ecosystems.

One of the most serious environmental problems in Russia is the problem of managing industrial and household waste. Significant volumes of waste arise in the metallurgical, chemical, oil and gas industries, as well as agricultural production. Household waste arises as a result of consumer activity of the population and includes a variety of packaging, food products, old furniture, electronics and other items. At the same time, the country experiences insufficient development of infrastructure and technologies for effective waste processing, which leads to the accumulation of waste in unauthorized landfills and landfills.

There are many nuclear industry facilities in Russia, including nuclear power plants, nuclear plants and radioactive waste storage facilities. Accidents and accidents at such facilities can lead to the leakage of radioactive substances and environmental pollution. Another important source of radioactive contamination is nuclear testing, which has been carried out in the past and continues in some cases to this day. These tests can lead to the release of radioactive substances into the atmosphere and contamination of soil and water bodies. Also, alternative energy is not widespread in the country - the main sources of electricity are still oil and gas. Their intensive use leads to the depletion of natural resources and the release of large volumes of greenhouse gases that contribute to global warming. In addition, the production and use of hydrocarbons is often accompanied by spills, contamination of soil and water bodies, and destruction of ecosystems.

The consequences of such an irresponsible attitude towards environmental issues are the gradual depletion of natural resources, high levels of pollution of territories, and deterioration of public health.Meanwhile, supporting rational environmental management and ensuring environmental safety is an integral factor in the country's sustainable development in the long term.

In accordance with Article 1 of the Federal Law of January 10, 2002 No. 7-FZ "On Environmental Protection", environmental safety is the state of protection of the environment and vital human interests from the possible negative impact of economic and other activities, emergency situations of natural and technogenic nature, their consequences. Environmental security is an integral structural component of the national security of the state, along with its military, political, economic, food, information and other types of security. Environmental safety is a necessary factor in ensuring the well-being of modern society and future generations.

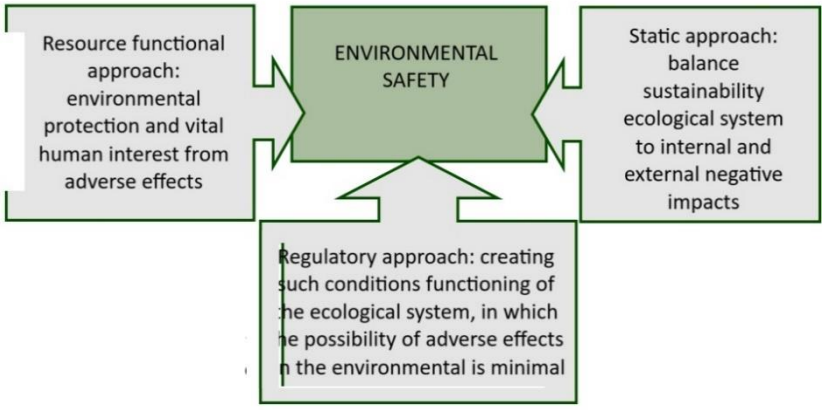

Fig. 1. Approaches to characterizing the concept of environmental safety

The concept of environmental safety can be understood from three different perspectives (Fig. 1).

The formation of a system for ensuring environmental safety in Russia is a complex and multilateral process, including the development of legislation, the creation of an institutional framework, the development of technologies and the adoption of measures to protect the environment. This system is based on the desire to minimize the negative impact of human activity on nature and ensure sustainable development of the country. A key measure to ensure environmental safety at the regional, national and global levels is the widespread introduction of green technologies, which are aimed at reducing the negative impact on the environment and increasing the efficiency of resource use.

Green technologies can be implemented in all sectors of the national economy - in industry, agriculture, energy, construction, household waste processing, and the social sphere. For example, one of the least environmentally friendly industries is steel production, which consumes huge amounts of coking coal and natural gas. A green alternative to these resources is hydrogen, which is produced by hydrolysis and is used as a reducing agent for iron ore. In reaction with iron ore, hydrogen is converted into water, which significantly reduces emissions of carbon dioxide and ferrous metal dust contaminated with toxic inclusions. The developer of this technology was the Swedish startup H2 Green Steel, and the largest vertically integrated steel corporation Severstal plans to actively develop and implement it in Russia.

An example of the use of green technologies in agriculture is the Japanese concept of vertical farming, which is based on growing plants in vertically arranged systems, often inside buildings or containers, using artificial LED lighting, hydroponics and aeroponics technologies. Vertical farms can produce agricultural products year-round and are not affected by seasonal changes and weather conditions. A controlled environment within the farm minimizes the risk of disease and pests, reducing the need to use pesticides and herbicides. Vertical farms can be located close enough to consumers, which can reduce transportation times and reduce carbon dioxide emissions when transporting products.

The most active implementation of green technologies is observed in the energy sector. Green energy is an energy sector that focuses on producing energy from renewable sources such as solar, wind, hydropower, biomass and geothermal energy, as well as improving energy efficiency and reducing greenhouse gas emissions. Green energy is fundamental to reducing dependence on traditional energy sources, i.e. oil, coal and natural gas, which negatively impact the environment and contribute to climate change. In promoting green energy, the development of innovative technologies, including the creation of more efficient solar panels, wind turbines, biofuels, batteries and other tools for generating and storing electricity, is key.

Green technologies in construction are aimed at creating energy-efficient, environmentally friendly and sustainable buildings and infrastructure. Thus, the development of structures with passive solar orientation and the use of materials with a high thermal insulation coefficient helps reduce energy costs for heating and air conditioning. Installing LED lighting and motion sensors allows you to reduce energy consumption for lighting and extend the life of the lamps. Installing rainwater harvesting systems and wastewater recycling systems can reduce freshwater consumption and reduce pressure on local water resources. The installation of green roofs and vertical gardens on the facades of buildings improves the microclimate, reduces heat losses and increases the aesthetic quality of buildings. A diagram of a “green home” using modern technologies is shown in Fig. 2.

Green technologies in the field of transport are focused on ensuring environmental safety by reducing greenhouse gas emissions, improving energy efficiency and reducing negative impacts on the environment. Thus, the introduction of electric and hybrid cars makes it possible to reduce the consumption of traditional fuel and reduce CO2 emissions. Electric trains, trams and buses, as well as high-speed magnetic levitation trains, allow the transport of large numbers of passengers with minimal emissions. The proliferation of bicycles, scooters, hoverboards and other personal mobility devices helps reduce vehicle traffic and pollutant emissions. A promising direction for the development of green transport is the production of cars powered by hydrogen fuel, which can be produced by electrolysis or using a biomass reactor. Vehicles powered by hydrogen fuel have a travel range comparable to cars

running on traditional gasoline or diesel, while the only product of hydrogen combustion is water, which does not have any harmful impurities.

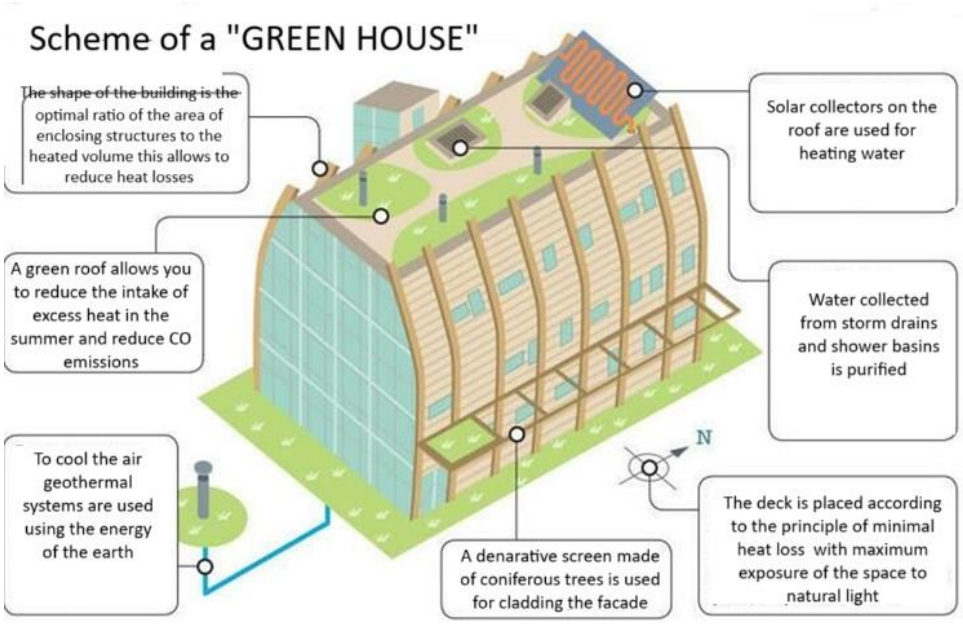

Fig. 2. Diagram of a house using green technologies

Green technologies can also focus on reducing the amount of waste sent to landfills and recycling it into new products. This category includes separate waste collection, composting of organic waste, production of fuel from waste and its use as an energy source. Thus, modern biogas plants process organic waste, wastewater and agricultural waste into biogas, which is used to produce electricity and heat. Pyrolysis technology allows you to convert organic waste into solid carbon matter (coal), liquefied hydrocarbons and gases. The process of composting, which is the biological decomposition of organic waste, is used to produce compost used in agriculture and landscaping. Mechanical recycling, pyrolysis, hydrolysis and chemical recovery technologies allow used plastic products to be recycled into new products. Specialized recycling techniques recover valuable metals and materials from waste electronic devices and ensure safe handling of toxic components.

The considered green concepts and technologies have a direct impact on environmental safety at the level of individual territories and regions. For example, renewable energy sources, energy-efficient systems, and recycling and waste management technologies help reduce air emissions, water and soil pollution, which improves the environment and human health. Sustainable agricultural and forestry practices help preserve natural landscapes and biodiversity. The development and implementation of green technologies helps reduce greenhouse gas emissions, which helps mitigate the impact of climate change on the environment and humanity.

Conclusion

Effective implementation of green technologies seems impossible without a comprehensive transformation of the consciousness of the population and the introduction of environmental culture. To increase people's awareness of environmental issues and the principles of sustainable development, green educational programs can be developed and implemented aimed at informing the general public about the problems of climate change, energy efficiency, sustainable use of natural resources and reducing the impact of human activities on ecosystems. These programs can cover different age groups and educational levels, ranging from pre-school education to vocational training and adult education.

An important characteristic of green educational programs is their practical orientation and the active involvement of participants. These may include interactive activities, hands-on assignments, volunteering, excursions and project work that help students and participants understand the importance of caring for the environment and develop conservation skills. Green educational programs promote environmental thinking and values, which leads to more responsible behavior towards the environment and promotes harmonious coexistence between humans and nature. Thus, green technologies and the ecological way of thinking of people play a key role in ensuring environmental safety, contributing to the preservation of the environment and the sustainable development of the planet.

Based on the results of the study, it can be concluded that the key threats to environmental safety at present are an increase in the amount of garbage, deforestation, water and air pollution, ineffective disposal of nuclear waste, depletion of mineral resources, reduction of biodiversity and global warming. Humanity can counter these global challenges only through a comprehensive transition to the use of green technologies that ensure environmental safety and harmonious coexistence of man and the environment.

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