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Article

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WASTE MANAGEMENT IN THE CONCEPT OF GREEN RECONSTRUCTION OF ECONOMY

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Abstract: *The article defined the concept of waste management in the environmental management system. The research analysed the problems of waste management in the environmental management system from point of view by a number of domestic and foreign scientists. As a result, authors outlined the basic components of waste management: strategic planning, prevention of environmental pollution, conservation of resources, minimization of the amount and toxicity of waste generation, choosing the best prevention option, assessment of effects and consequences, decision-making. The research described the system of green reconstruction of economy and formed the basic principles of the green post-war reconstruction that would provide sustainable economic development. The article outlined the concept of post-war green reconstruction which should focus on such areas as: sustainable construction and resource saving; implementation of renewable energy sources; sustainable development of infrastructure; implementation of a waste management system, minimization of residues. The authors grounded five main stages of waste management process under post-war reconstruction of Ukraine: prevention of waste generation, preparation for reuse, processing, other uses, disposal. Sustainable waste management solutions are essential to maintain environmental harmony but, also, they are linked with cost, public response, political constraints, and social norms. Consumers' environmental awareness influence the demand for goods and services and thus reduce the amount of waste. Research argued that local communities should developed own waste prevention strategies and attract environmentally conscious businesses to their territory. State policy should focus consumers for preferring products in packaging/container that is suitable for recycling or reuse (glass), paper bags, eco-bags, used appliances.*

Keywords: *circular economy, green economy, green reconstruction, sustainable development, waste management*

INTRODUCTION

Post-war reconstruction and recovery in Ukraine are projected to cost \$490 billion over the next decade. The government has identified a number of regions and branches where

reconstruction will be comprehensive and based on new principles. The base of this principles is the environmental responsibility. The approach of green reconstruction of economy is the base of sustainable development and will strength the economic convergence of Ukraine with EU. Same time, when we think of environmental development and green investment we think about waste and its disposal in a landfill. Such case actualizes the concept of waste management which combines various actions taken and plans created to manage waste, from composting or recycling existing waste to minimizing the production of waste in the first place. Waste management refers to both public service providers and private companies that handle waste from the time it is discarded to the time it is managed. The concept of waste management is the basic approach in the implementation the model of green economy reconstruction.

Concept of waste management in the environmental management system

Inefficient waste management, from non-existent waste collection systems to inefficient waste disposal, leads to air, water and soil pollution. Open and unsanitary landfills contribute to the contamination of drinking water, cause infections and spread diseases. The problem is quite relevant for developing and low-income countries. The accumulation and dispersion of garbage pollutes ecosystems, and hazardous substances from e-waste or industrial waste harm the health of city dwellers and the environment. This problem actualizes the problem of waste management at the global level and requires the development of integrated solid waste management systems.

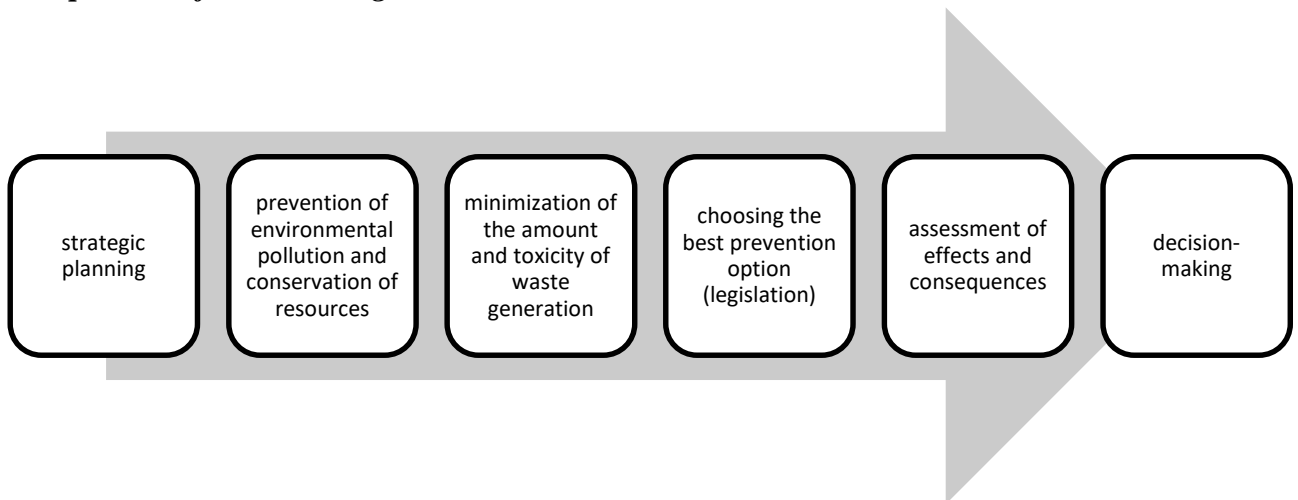
Problems of waste management in the environmental management system were considered by a number of domestic and foreign scientists. In particular, researchers (Khan et al., 2022) studied that solid household waste is a reflection of the culture that generates it and has a negative impact on human health and the environment. The authors concluded that the world is rapidly urbanizing and these changes impose on cities the burden of proper waste management at both social and environmental levels. Scientists (Lopez-Maldonado et al., 2022) investigated that solid waste generation has increased rapidly due to population growth in around the world, urbanization and industrialization. Scientists have found that solid waste management is a serious challenge for society, which creates local problems with global consequences, in particular, poor management can accelerate harmful environmental and socio-economic problems. Researchers (Kharola et al., 2022) identified barriers to organic waste management decisions from the subject's point of view and studied their causal relationships to overcome the problem of organic waste management from a systems perspective. The study identified key issues in organic waste management and noted that incentives and increased attention to waste is an effective approach to solving the problem, and that waste collection fees, environmental behaviour and obligations influence consumer and household decisions.

Effective management of waste, which will be used as a resource in the future and play an important role in achieving environmental sustainability and the transition to a circular economy (Tanveer, Khan & Umar, 2022). The authors identified the following categories: e-waste, transition to a closed-loop economy, plastic waste, bio-based waste disposal, life cycle assessment and environmental impact, as well as construction and demolition waste disposal. Scientists have developed conclusions for politicians, specialists and practitioners regarding waste management and technological innovations towards a circular transition. Waste

management theory is a conceptual description of waste management that defines concepts related to waste and proposes a methodology for waste management. The theory of waste management is based on the hypothesis that sustainable waste management largely depends on the definition of the category "waste". The concept of "waste" is related to a person and his life activities. Populations, households and economies depend on constant flows of air, water, food, raw materials and fossil fuels. Waste is constantly generated or released into the air, dumped on/into the ground. The concept of "technical inefficiency" is closest in meaning to the traditional use of resources and generation of waste. "Technical inefficiency" means that managers of an organization fail to minimize costs or maximize output because they are not using the best available technology (Zvarych & Rivilis, 2023).

The European Council Waste Directive defines waste management as: collection, transport and disposal of waste, including supervision of disposal sites and aftercare. That is, from the definition, it follows that waste management is only the process of manipulating unnecessary materials, and waste management is an activity on these materials. As a result, this definition does not cover all waste management activities and is therefore not sufficient. The term "management" refers to the manipulation of activities, and gives the hope that waste management will encompass more than the elimination of waste. The basis of sustainable waste management is the minimization and reduction of waste (Pongracz, 2002). As a result, it is worth noting that the waste management process also involves (see Fig. 1): strategic planning; prevention of environmental pollution and conservation of resources; minimization of the amount and toxicity of waste generation; choosing the best prevention option, taking into account the legislation; assessment of effects and consequences; decision-making.

Figure 1
Components of waste management



Source: Authors.

The "5R" waste management system covers a set of principles aimed at reducing the impact of waste on the environment. (1) Refuse unnecessary items such as single-use plastic or excess packaging. (2) Reduce the use of resources and increasing conscious consumption. (3) Reuse items or using durable goods that have a longer service life. (4) Repurpose, i.e. giving items a new purpose or using items with a long service life. (5) Recycle of used materials into

new products, reducing the need for raw materials and reducing the overall impact on the environment. In general, these principles are aimed at responsible waste management and encouraging individuals and enterprises to be more attentive to their consumption and disposal habits (Reznikova et al., 2019). The best alternative to waste disposal is to prevent its generation. This is why waste prevention is the goal of all waste management strategies. A variety of technologies can be used at the production, use, or post-use stages of a product's life cycle to eliminate waste and, in turn, reduce or prevent environmental pollution. Some representative strategies include environmentally conscious production methods, including the use of: less hazardous or harmful materials in production; modern systems for monitoring the storage of hazardous materials; innovative methods of chemical neutralization and fresh water saving technologies.

System of green reconstruction of economy

Due to of Russian aggression, Ukraine faces a many of strategic challenges. Among them is the reconstruction of critical infrastructure, providing the country's energy security, accelerated implementation of the EU legislation, climate change mitigation and adaptation to it. The war still rages on, but the country's reconstruction is already being planned. The reconstruction will comprise a lot of steps and should include planning process. There are some basic principles of the green post-war reconstruction that would provide sustainable economic development (Ecoaction, 2023):

- sustainable and systemic solutions;
- transparency; community and public participation in decision-making;
- using the best available technologies and practices;
- sustainable development of cities and regions;
- energy sector decarbonization and decentralization;
- development of sustainable and decentralized agri-food systems;
- ensuring preservation of Ukraine's ecosystems and natural resources.

Strengthening the position of the "green economy" (Mikhno, 2021) around the world determines the high scientific intensity of developments and the high level of technology of "green production", which ensure an accelerated transition to the new sixth technological order. This is what determines the background of the world economy and the competitiveness of national producers. Green reconstruction should take place taking into account a well-thought-out, differentiated and step-by-step approach to the socio-economic, production-technological and natural-geographical specifics of the business of Ukraine.

It is worth considering green reconstruction through the main structural and reproductive content of the economy in relation to the interrelated processes of production, exchange, distribution and consumption of products (goods, services), characterized by minimal resource intensity (especially non-renewable resources) and minimal negative impact on nature, in particular the volume of waste and (or) emissions in the process of production and consumption. Such a systematic approach allows us to perceive the post-war green reconstruction as a system that will have internal and external (regulatory) influences that will form direct, regular and irreversible changes in the sustainable ecological development of Ukraine (Reznikova, 2019).

Post-war green reconstruction concept

The concept of post-war green reconstruction should focus on such areas as: sustainable construction and resource saving; implementation of renewable energy sources; sustainable development of infrastructure (transport); improvement of water resources management; implementation of a waste management system, minimization of residues; rational management of land resources and control of urbanization; conservation of existing species and control of their populations (Müller, 2022). The main prerequisites forming a green economy as a necessary business model are: resources and their pricing; growth in the number of consumers among the middle class; Big data; change in legislation and globalization of management; transition from “agreement” to “relationship”. The concept of post-war green reconstruction of Ukraine should be focused on prioritizing investment and access to sustainable natural systems, infrastructure, knowledge and education necessary for population prosperity. The concept could offer opportunities for ecologically decent livelihoods, entrepreneurship and jobs (Kozak, 2022). The concept of the post-war green reconstruction of Ukraine will be based on the principle of justice, that is, the scientific development will be inclusive and non-discriminatory. The concept should outline a long-term economic vision for wealth creation and sustainability and outline measures to address the current multidimensional poverty and injustice. This approach to the development of the concept of recovery of Ukraine is innovative in the management of natural systems, because it is based on such properties as circularity, local inclusiveness and natural biodiversity (Zvarych et al., 2023).

The energy transition process for the EU will not be cancelled by either the energy crisis or Russian aggression, they may slow it down somewhat, but there are chances of its dynamic acceleration. That is, the reduction of carbon emissions into the atmosphere and the growth of carbon productivity of the economy through the involvement of the best practices of decarbonization will give a powerful impetus to the development of the energy industry, in particular, the direction of renewable and alternative energy sources. Along with this, it is important to solve the problem of waste management in Ukraine through the recycling implementation mechanism and methodical recommendations on ways to adapt existing practices of the circular economy at the stage of restoring the stability of the system in crisis conditions (war, pandemic), which will positively affect the development of the energy and agricultural industries (Bergmann & Romanyshyn, 2022).

A climate-neutral and ecologically clean economy will ensure green growth and sustainable development of agriculture through an increase in the water productivity of the economy, a reduction in waste generation, and a reduction in air and water pollution. Economic development in this way will mean ecologically clean reconstruction and reconstruction, which is achieved in an ecological way, and Ukraine will be part of the global climate-neutral economy. Building a base for green investments and green innovations, government assistance to green sectors in priority areas, creation of green jobs will have a positive impact on the economy. Green post-war reconstruction requires the use of green tools to achieve the set goals, effective mechanisms for integrating environmental issues into the decision-making process, and clear environmental conditions for the implementation of sectoral projects. The main function of the reconstruction and green reconstruction of Ukraine should be the greening of this process, the prevention of long-term negative consequences of ecological sustainable development of Ukraine, and the implementation of priority green projects in this area. In such

way, Ukraine's green reconstruction should be a sustainable reconstruction realized by the best available technologies and practices.

Waste management in the concept of green reconstruction

Implementing green reconstruction requires a combination of programme design and policy. To ensure that decentralised decision-making is guided towards green reconstruction, existing obstacles to green investment such as highly regulated wholesale market prices in the electricity sector need to be eliminated. Affordable financing is vital for green reconstruction. The costs of capital were already high in Ukraine before the war. Without affordable financing, the higher capital costs of green investments cannot be outweighed by lower operational costs. Efficient administration of green reconstruction projects is necessary. Replacing old, dirty and inefficient assets which are damaged or destroyed by the war with newer and clean technologies will generally require more sophisticated planning and construction processes that can otherwise lead to a lower speed of implementation. Private investors will be very cautious in a post-war situation, with security concerns likely not fully resolved. But they could complement and enhance the financing provided by countries and international financial institutions and improve productivity through joint ventures or more competition on previously monopolistic markets (Stubbe & Saha, 2022).

The waste management process under post-war reconstruction of Ukraine should include five main stages: (1) prevention of waste generation; (2) preparation for reuse; (3) processing; (4) other uses (eg, renewable energy); (5) disposal. Waste prevention is simple and desirable way to manage waste, and it is the first step in the waste management process (Lumenlearning, 2020). Business should act in accordance with the EU Directives on the prevention of waste generation and resort to the following methods of prevention: reducing the amount of waste; reducing the harmful impact of waste on the environment and human health; reduction of the content of harmful substances in materials and products. In Ukraine, the National Waste Management Strategy until 2030 has been adopted (Melen-Zabramna, 2018).

This reconstruction should provide for the creation of a network of centers for the implementation of clean production/technologies to minimize the volume of waste generation; adoption of legal acts on the introduction of eco-design of consumer goods, which is more suitable for reuse or disposal, by processing or reducing the use of primary raw materials. Ukraine should introduce economic mechanisms to stimulate the reduction of the amount of generated waste, such as: a tax/ban on the production of plastic bags, disposable plastic containers and tableware; preferences for manufacturers of environmentally friendly packaging for consumer goods; financial support of innovative developments in the field of product packaging design. However, citizens and businesses must be environmentally conscious and must take measures themselves to save resources, reuse things, and reduce consumption. Thus, local communities should actively work on developing their own waste prevention strategies and attract environmentally conscious businesses to their territory. Consumers' environmental awareness can influence the demand for goods and services and thus reduce the amount of waste. So, consumers may prefer products in packaging/container that is suitable for recycling or reuse (glass), paper bags, eco-bags, used appliances. That is why all subjects of economic relations should prevent the generation of waste, first of all, each subject needs to start dealing with its waste at the first stage, which will make the country cleaner and the nation healthier.

DISCUSSIONS/CONCLUSIONS

Integration of environmental and climate policy should take place in all sectors, which requires taking into account the provisions of environmental and climate policy in strategic and programmatic documents in all spheres and levels of public life. The priorities of the European Green Deal (EGD) should become the key tasks of Ukraine's post-war recovery. Such key tasks include: decarbonization and modernization of the economy, preservation of biodiversity, clean industrial production and the transition to sustainable agriculture. Green reconstruction should contribute to the sustainable development of Ukraine. That is why the recovery of the economy requires that the goals of sustainable development be aligned with the investment policy. And the financing vectors should be directed primarily to the development of production chains with high added value, displacing the resource-export economy.

Ukraine's green economy should be: low-carbon, energy-efficient, nature-oriented, efficient and clean production, balanced consumption. The green economy should be based on the following principles: shared responsibility, innovation, cooperation, solidarity, flexibility and interdependence. Development should empower the national economy and provide better choices through targeted and appropriate fiscal policies. Economic development should be sustainable and ecological and oriented towards climate goals, environmental protection policy and social protection policy. The reconstruction programme must be designed to favour long-term efficiency over initial investment costs to encourage investment in green technologies. International donors and IFIs will need to play a vital role and their concerns must be taken seriously in designing the institutional framework of reconstruction. To avoid stalling or impeding the green reconstruction, effective and fast project management and implementation processes are needed. The availability of investment insurance, covering relevant risk categories such as military risk, will be a necessary precondition to attract any investment.

Green reconstruction economy model should focus on approach that, waste should be recycled through effective treatment methods to recover materials and minimize the hazardous impact on environment. Sustainable waste management solutions are essential to maintain environmental harmony but, also, they are linked with cost, public response, political constraints, and social norms. Sharing knowledge and implementing advanced technological know-how to manage waste and post-consumption processing is mandatory for implementation the model of green reconstruction of economy and investment into future generations.

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