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### "GREEN" FINANCE AS THE MAIN SOURCE OF SUSTAINABLE DEVELOPMENT IN THE POST-WAR RECONSTRUCTION OF UKRAINE

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The article provides a thorough analysis of the theoretical and practical foundations of the development of green finance, as well as substantiates the prospects for the introduction of effective financial instruments in the field of green economy in order to ensure the post-war recovery of Ukraine's economy. Attention is drawn to the fact that the process of restoring the country's economy after military operations requires a review of traditional development priorities. In particular, it is about the need to find balanced approaches that integrate economic, social and environmental interests, while ensuring the achievement of sustainable development of society. The authors considered the specifics of the use of financial mechanisms within the framework of the concept of "green financing" for the recovery of the economy. The focus is on instruments such as green investments, green bonds, grants, loans, loans and technical assistance. It is argued that the concept of sustainable financial development finds both theoretical and practical confirmation in modern academic discourse. The research uses a number of methodological approaches, including dialectical and historical methods (this research method is based on the study of the emergence, formation, and development of objects in chronological sequence), induction, deduction and systemic approach - to analyze the concept of "green finance" and its role in stimulating the development of the green economy. The purpose of the article: analysis of theoretical and practical aspects of the development of "green finance", identification of the main problems of "green financing" in the post-war reconstruction of Ukraine and development of proposals on ways to overcome them through the introduction of effective financial instruments. Practical significance. Ways of further effective implementation of "green finance" tools in the conditions of the program of sustainable development of Ukraine and the post-war recovery of the country's economy are proposed.

**Keywords:** "green finance", "green economy", financing, sustainable development, reconstruction of the country's economy, "green financing", financial instruments.

#### INTRODUCTION

The modern development of the economy, society and nature protection sphere demonstrates a dual impact on the quality of life and the environment. On the one hand, it contributes to the improvement of the well-being of the population and states, on the other hand, it provokes an increase in the negative anthropogenic impact on ecosystems. In recent decades, the problem of the climate crisis has gained global importance, requiring effective approaches to its solution. In this context, the world economy is gradually being transformed in the direction of a low-carbon development model, and the principles of the "green economy" are becoming an important factor in the international competitiveness of countries.

Ukraine has been in a state of war for three years, which causes significant losses not only to the economy, but also to the environment and the social sphere. Forced during this period, the issue of "green financing" was not a priority, despite Ukraine's obligations under the Paris climate agreement and climate directives of the European Union. Military actions, the occupation of some territories and the liberation of other territories became additional challenges for the state, but at the same time they intensified discussions among scientists, government representatives, local authorities and international experts about the possibilities of post-war reconstruction of the country based on the principles of "green" development.

The COVID-19 pandemic and the war in Ukraine have caused a deep socio-economic crisis, which requires a rethinking of approaches to the recovery of the national economy. In these conditions, the concept of green financing, aimed at supporting investments in projects that combine economic growth with environmental and social sustainability, becomes particularly relevant. This approach is consistent with the principles of sustainable development and forms the basis for the long-term economic security of the state.

Green financing encompasses a set of financial instruments – green bonds, loans, grants, state incentive programs – aimed at implementing projects in the areas of renewable energy, energy efficiency, sustainable transport, waste

management and protection of natural resources. Its key goal is to reduce the carbon footprint, rational use of resources and support innovations that contribute to the decarbonization of the economy.

The purpose of the article is to analyze the theoretical and practical aspects of the development of "green finance", identification of the main problems of "green financing" in the post-war reconstruction of Ukraine and development of proposals on ways to overcome them through the introduction of effective financial instruments.

In our opinion, one of the key problems in this process is the restoration of large budget-generating enterprises, which before the war were significant polluters of the environment. Here, a conflict of interests between environmental regulations and the need to ensure economic stability, in particular the creation of jobs and the filling of local budgets, is possible. Representatives of regional and local authorities often strive for a quick restoration of industrial facilities in their territories, not always taking into account the long-term environmental consequences. At the same time, the international community and experts emphasize the need to integrate environmental standards into all stages of economic recovery (Latynin, M., & Bilovitska, Yu., 2022.).

We are convinced that it is critically important to ensure the recovery of economy compliance with the principles of sustainable development, because the uncontrolled use of finite natural resources can lead to a global environmental disaster. The post-war reconstruction of Ukraine should focus on innovative technologies that reduce the impact on the environment, and promote the development of "green" business, in particular through the creation of incentives for environmentally responsible investment and lending. In the long run, this will allow integration of economic, social and environmental interests, ensuring a sustainable future for the country in the face of global climate challenges.

One of the directions of sustainable development in the context of maintaining the balance in the "man - nature" system has become "green finance", ideas about which were formed at the junction of the theory of finance and the real economics and economics of nature management.

## **RESEARCH METHODS**

The topic of "green finance" attracts the attention of both domestic and foreign researchers. The latest scientific works and publications devoted to issues of green finance and mechanisms of green financing in Ukraine demonstrate the gradual growth of interest in this issue among scientists and practitioners (Trushkina & Boyarko, 2024). According source (2024) in the period of 2023-2024, significant changes in approaches to financing were observed in Ukraine, which was manifested in the growth of investments in green technologies and the development of ecological infrastructure. In addition, contemporary publications (Sun, J., et al., 2023). emphasize the importance of government initiatives and regulatory measures in stimulating green finance. The Government of Ukraine has recently implemented a number of incentives and financial instruments aimed at supporting projects that help reduce greenhouse gas emissions and preserve the environment.

One of the first definitions of the term "green finance" was proposed by Salazar J. According to his approach, it is a form of investment and financial activity that contributes to the creation of environmental benefits to ensure sustainable development, as well as an innovative concept that integrates environmental and financial spheres. Based on empirical analysis, the researcher established a close connection between green financing and industry, noting that green financing can effectively contribute to the modernization of the industrial structure. In particular, "green" loans and securities play a key role in the transformation of China's industrial sector (Salazar J, 1998).

In his works Ozili P.K. examines the relationship between digital, green and social finance, proving that their synergy can become a powerful tool for achieving sustainable economic, social and environmental development (Ozili, 2021).

So, in previous studies, the authors emphasize that economic profit is an important aspect of "green" finance, which, in his opinion, represents an approach to managing financial resources that combines economic benefit with environmental protection.

Other scientists, in particular Höhne N., Khosla S., Fekete A. and Gilbert A., define "green finance" as a broad concept covering financial investments aimed at the implementation of sustainable development projects and initiatives. They also include green financial products and policies that encourage the development of a more sustainable economy (Höhne et al., 2012).

Lindenberg N. defines "green finance" as a multi-faceted category that covers several key aspects: financing of public and private investments of environmental direction, measures to prevent, minimize and compensate for damage to the environment and climate, as well as support for the implementation of environmental policy through project financing, aimed at reducing the negative impact on the environment. In addition, this category includes elements of the financial system that specialize in green investments, such as the Green Climate Fund, green bonds and structured green funds, operating within legal, economic and institutional frameworks (Lindenberg, 2014).

Therefore, they emphasize that "green finance" should be considered as a complex, multi-component category that encompasses a significant number of resources needed to restore the natural environment.

According to A. Dubko, "green finance" can be defined as a set of economic relations related to the attraction and use of financial resources for the implementation of environmentally oriented projects and programs, the purpose of which is to reduce the negative impact on the environment and minimize environmental risks (Dubko, 2022).

A different approach is followed by Carlin M.I. and O.A. Ivashko, who considers "green finance" as a system of financial relations, subjects and measures that provide conditions for sustainable development. They emphasize the role of these finances as a key tool for financial and economic regulation of environmental protection at different levels of management (Carlin & Ivashko, 2020).

It is important to ensure diversification of funding for the implementation of environmental projects and develop state target programs that will contribute to the post-war restoration of the environment.

In their works researchers note the growing importance of green finance in the country, considering individual tools for their implementation to solve the problems of increasing the environmental efficiency of production, creating environmentally safe technologies, as well as forming socially responsible behavior among business entities (Redko et.al. 2022; Glukhova & Kravchenko, 2022; Akomea-Frimpong et al. 2022).

The following methods were used in the study: dialectical and historical - to study the evolution of "green" finance, its financial instruments; induction and deduction, a systemic approach - to determine the essence of "green" finance and the main organizational and financial aspects; comparative method - to study the degree of activation of "green" financing in the country, etc.

At the same time, the issues of green financing in Ukraine remain relevant and require further scientific research. The proposed solutions can become an important stage in Ukraine's transition to models of sustainable economic and environmental development in the context of post-war recovery. This approach requires a return to the principles of sustainable development of society, as well as the implementation of measures aimed at the harmonious restoration of the country's economic, social and environmental systems.

## **RESEARCH RESULTS AND DISCUSSION**

Modern society is increasingly oriented towards the concept of sustainable development, which appears as a result of the transformation of national economies in the direction of greening. It also plays an important role in the integration of environmental aspects into the strategies of socio-economic development, raising awareness of the negative impact of certain industries on the environment and society.

In our opinion, first of all, the peculiarity of the model of sustainable development is that its implementation is accompanied by the transformation of the financial system, which contributes to the emergence of new mechanisms for attracting financial resources. This makes the implementation of the model of sustainable development relevant even in the period of post-crisis recovery of the economy, as well as necessary in the context of modern trends in the development of the world economy. Moreover, a significant part of modern innovations aimed at increasing the competitiveness of the national economy is aimed at optimizing the use of natural resources and achieving a harmonious interaction between society, nature and the economy.

The concept of "green finance" has become the subject of active discussion in the context of increasing negative consequences of climate change. Whether it is sustainable development finance, environmental investment, climate finance or other similar mechanisms, all these terms are components of environmental finance. Their significance is especially emphasized by the introduction of financial products aimed at preserving the environment and stimulating economic growth (Kazlauskiene et al. 2017).

At the current stage, green finance plays a key role in the implementation of the concept of sustainable development, acting as tools widely used by countries and enterprises to increase competitiveness in international and regional markets (Mo et al., 2023). In addition, the active use of green finance and the attraction of appropriate investment resources ensure the improvement of the efficiency of activities in the long term. This contributes to achieving better or even leading positions in various sectors of the world and national economies.

In the context of ensuring sustainable economic growth, "green" financing should be aimed at stimulating the growth of incomes and employment while simultaneously reducing the level of environmental pollution, as well as increasing the efficiency of the use of energy and resource potentials.

The post-war recovery period of Ukraine will be characterized by difficult economic conditions, lack of financial resources and significant challenges in the social sphere (Shevchenko, 2024). However, the restoration of the national economy, in our opinion, should be based on the principles of sustainable development, with an emphasis on the implementation of projects that will contribute to the achievement of its goals. In this context, it is important to focus efforts on the development of sustainable financing, creating conditions for the interest of economic entities in the implementation of innovative projects aimed at the long-term sustainable development of the national economy.

Despite the importance of this concept, its implementation in the post-war period will be largely limited by a shortage of financial resources. This issue will become extremely relevant, because a significant part of the finances will be directed to the provision of social needs, defense, support of war-affected families, as well as rehabilitation and adaptation of military and civilian citizens with limited physical capabilities. The state should play a key role in ensuring the mental and physical health of the military and their integration into peaceful life. However, these measures do not guarantee the formation of stable conditions for sustainable economic development. For this, it is necessary to carry out radical economic reforms.

The introduction of financial mechanisms aimed at the implementation of the model of sustainable development in Ukraine should be carried out with the help of both traditional and specific financial instruments (Table 1).

The analysis of financial instruments (tabl. 1) that contribute to the development of the "green economy" allows us to formulate the following conclusions:

1. Diversity of green financial instruments: In Ukraine, access to such instruments remains limited, which is due to the insufficient level of development of the green financial market.

**Table 1.** Financial instruments contributing to the development of the "green economy" and the post-war recovery of Ukraine's economy

Financial instrument	Subcategory	Characteristic	Disadvantages of tools
Share capital (Morris et al. 2007)	Ordinary shares	Risky capital	High risks for investors
	Preferred shares	Priority rights, possible cumulative dividends	
	Green crowdfunding	A voluntary association of people who collectively raise funds or other resources, usually via the Internet, to support the initiatives or activities of other individuals or organizations. In addition to donors and recipients, the system-creating role is played by the crowd platform, which organizes and mediates the financing of crowdfunding projects and the organization of campaigns	Small sums of money; the difficulty of obtaining significant funds
Debt Obligation (Noh, 2018)	Green mortgage loans	Banks offer retail customers reduced interest rates when purchasing new energy-efficient homes or investing in retrofits and energy efficiency measures.	High interest rates; complicated process of obtaining
	Loans for energy modernization of buildings	Banks offer customers a lower rate that motivates households to install the latest energy-saving technologies and systems that use renewable energy sources. For this, various banks cooperate with manufacturers and suppliers of such technologies, as well as environmental public organizations	
	Green loans for commercial construction	Preference in lending is given to companies that build housing with lower levels of energy consumption, waste generation, and pollution compared to traditional construction approaches.	
	Green car loans	Low-interest loans encourage customers to purchase cars with high fuel efficiency and environmental friendliness	
	Green bonds	Debt collateral, the purpose of which is to finance "green" projects	High risks for investors
	Green bank credit cards	Credit card holders agree to donate to environmental non-governmental organizations about 0.5% of each purchase, transfer, etc.	
	Leasing of green equipment	Provision of equipment with a low level of CO <sub>2</sub> emissions, as well as leasing of ecological equipment for production enterprises	Higher payments
	Structured funds	Micro Financing. Providing loans to finance low-cost energy equipment, small projects in renewable energy technologies. Projects developed by small providers and serving communities with low income and limited financial opportunities	High risks for investors
Assets (Morris et al. 2007)	Green investment funds	Investment funds raise capital and direct it to support environmentally friendly projects and companies.	
	Carbon funds	The Carbon Fund raises funds from investors to purchase credits to reduce CO <sub>2</sub> emissions from existing projects or to finance new initiatives that create a stream of such credits.	
Stock indices (Noh, 2018)	Ecological stock indices	Indices tracking the financial activity of companies that adhere to environmental standards	
Investment grants (Dubko, 2022)	Risk capital	Attracting funds for the formation of economically profitable projects, ensuring long-term financing and reducing overall costs	High risks for investors
Taxation (Markevich, 2019)	Green fiscal funds	Since 1995, Dutch banks have been taking advantage of a special initiative: citizens who invest in green funds or place money in green banks receive tax breaks — an exemption from capital gains tax and a reduction in income tax. As a result, investors agree to lower interest rates on their deposits, which allows banks to offer green loans at reduced rates.	Reduction of tax revenues to the budget
Guarantee (Noh, 2018)	Exchange rate risk	The commercial lender provides a loan to the importing company at reduced interest rates, and the export-import bank compensates for the difference between the market rate and the preferential rate.	Limited funds
	Political risk	Limited protection against sovereign default and force majeure risks	
Insurance (Dobrovolska, 2018))	Green insurance	Green insurance covers two main areas: 1) insurance products that set premiums based on environmental performance, and 2) insurance that takes into account the use of clean technologies and emissions. For example, insuring energy-efficient homes at more favorable rates.	High risks for investors
	Carbon insurance	The purpose of carbon insurance is to reduce the risks associated with emissions reduction transactions, the valuation of low-carbon projects, and the management of price fluctuations for carbon credits	
Technical assistance (Markevich, 2019)	Additions to financial instruments	Transfer of property, funds, equipment, intellectual property objects, provision of information, services, training, internship	High risks for investors

Systematized by the authors for Morris et al. 2007; Dubko, 2022; Markevich, 2019; Noh, 2018; Dobrovolska, 2018

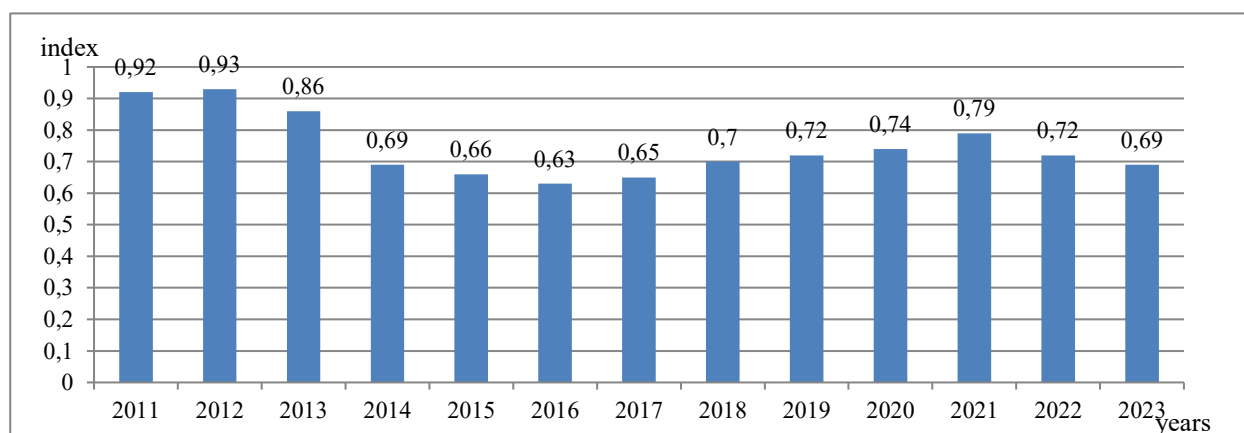
2. Effectiveness of the use of green financial instruments: Improving the effectiveness of the use of these instruments in Ukraine is possible thanks to the improvement of mechanisms for monitoring and evaluating their effectiveness.

3. State of development of green markets: Green markets in Ukraine are at the stage of formation, but show significant potential for further growth and integration into global economic processes.

4. The role of state support in the development of green financing: State support for green financial initiatives in Ukraine requires significant strengthening to ensure sustainable economic development based on ecological principles.

On the way to the implementation of the "green" economy, most countries, including Ukraine, face numerous challenges. Among the main obstacles, the following can be distinguished: an insufficiently developed system of environmental management, a low level of awareness of the benefits of "green" growth and a lack of knowledge about its positive aspect, stereotypical perception of "green" investments as non-profitable, limited use of strategic environmental assessment as a tool for greening political plans and programs, shortage of financial resources, weak coordination between departments and sectors, lack of examples of best practices and ecologically oriented technologies adapted to national conditions, insufficient support and low level of public participation, as well as limited institutional and personnel capacity in the field of "green" economy at different levels of management and in all sectors (Reshetnyk et.al. 2019).

Figure 1 shows the dynamics of changes in the index of sustainable development of Ukraine, which reflects changes in the development of economic, social and environmental systems of society.



Source: compiled in Sustainable Development Modeling 2023

**Figure 1.** The value of the sustainable development index of Ukraine for 2011-2023.

As you can see, at the end of 2023, the value of the sustainable development index was 0.69. The graphic representation of the dynamics of this indicator clearly demonstrates the impact of the war and its consequences on the level of sustainable development of the country. In the future, there is a tendency to decrease the value of the index: if in 2013 this indicator was equal to 0.85, then in 2014 it decreased to 0.69, this trend is due to military operations in the east of the countr. It value of the index recorded in 2013 has not yet been restored, which indicates the slow pace of implementation of the sustainable development model in Ukraine. A sharp decline in 2014-2015 is particularly noticeable, after which the index gradually increased during 2016-2021. The overall dynamics of the sustainable development index reflect key trends in the development of the national economy, the stability of the political situation, and the functioning of the social system.

It is worth noting that there is a close relationship between green finance and agriculture. This connection is becoming increasingly important amid growing concerns about climate change and food security. Let us analyze the volumes of green finance and the instruments for its attraction in Table 2.

**Table 2.** Volumes of green financing in Ukraine in 2020-2023.

Year	The total volume of green investments, billion dollars.	Share of state investments, %	The most common tools	Areas of investmen
2020	1,6	20	Green loans	Energy, renewable energy sources
2021	3,0	15	Green loans, green bonds	Energy, water supply and wastewater treatment
2022	3,5	10	Green loans, green bonds	Energy, renewable energy sources and energy efficiency
2023	2,9	8	Green loans, green bonds	Energy, renewable energy sources and energy efficiency

Source: compiled for Sustainable Development Modeling 2023

Summarizing the results of the research, it can be noted that there has been a significant increase in the volume of green financing - by 81% during the period under study, which indicates an increased role of environmentally oriented investments in the structure of the national economy. At the same time, the share of public investments in this area has

decreased by 2.5 times, which may indicate an increase in the activity of the private sector and international financial institutions in financing sustainable development projects. This trend confirms the transition to a more diversified model of green financing, based on a partnership between the state, business and international donors.

## CONCLUSIONS

The conducted research allows us to conclude that in order to increase the intensity and efficiency of green financing, it is necessary to focus on the following key areas: the development and implementation of state programs to support green financing, raising the awareness of citizens and enterprises about the benefits of green investments, as well as the involvement of international financial institutions to support environmental projects in the regions.

Green finance is a key tool for ensuring sustainable development of regions of Ukraine, especially in wartime and post-war reconstruction. The military conflict caused significant destruction of infrastructure, industrial enterprises and housing stock, which creates an urgent need for reconstruction and modernization. In this context, green finance can not only contribute to the restoration of the economy, but also do so taking into account the principles of environmental sustainability, which is especially important for preserving natural resources and reducing the harmful impact on the environment.

The introduction of green financial instruments stimulates the development of energy-efficient technologies, renewable energy sources, environmentally friendly production and modernization of infrastructure with minimal environmental impact. This, in turn, contributes to economic growth by creating new jobs, increasing the investment attractiveness of regions and increasing the well-being of the population. The social aspect of green finance is also important - improving the environmental situation improves the quality of life of citizens, reduces health risks, and provides more sustainable and safe living conditions.

Only under the conditions of creating favorable financial, legal and social conditions, green financing can become a powerful driver of sustainable development of the Ukrainian economy. It will not only accelerate the process of post-war recovery, but also lay the foundation for environmentally balanced, socially just and economically efficient development of the country in the long term. Thus, green financial support is not just an investment tool, but a strategic mechanism for transforming the Ukrainian economy in response to the challenges of the present and the future.

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