"Green" finance as a modern tool for social and environmental security

O V Cheberyako, Z S Varnalii, O A Borysenko and N S Miedviedkova
Taras Shevchenko National University of Kyiv, 64/13, Volodymyrska Str., 01033 Kyiv, Ukraine
E-mail: cheberyako@ukr.net

Abstract. The article is devoted to the study of the essence of "green" finance and is intended to give an idea of the existing "green" financial instruments and problems of their application in Ukraine, to outline ways to improve the use of "green" financial instruments to ensure social and environmental security. The study calls for a review and improvement of practices in the use of "green" financial instruments, taking into account the international experience. The research paper is structured as follows: firstly, theoretical approaches to the essence of "green" finance are disclosed; secondly, the impact of "green" finance on social and environmental security is considered; thirdly, "green" finance is examined financial instruments to enhance national security in both the environmental and social spheres. The results of the study allowed to provide directions for the development of "green" finance in the context of social and environmental security in Ukraine, in particular, to strengthen the use of public-private partnerships, climate risk insurance and investment in education to create a skilled labor force in "green" finance.

1. Introduction
Nowadays, environmental problems and environmental protection become the extremely important issues. Anthropogenic global environmental stress can undermine the socio-environmental stability, impede the economic development and cause conflicts. The issue of climate change is a defining political and economic subject and will remain so for many years, whereas the UN has declared the "red code of humanity" due to the global warming. Worldwide, governments, investors, corporations and citizens are beginning to take action in response to the climate crisis, focusing on a decarbonization strategy to counter global warming and stop it at 1.5 Celsius. The transition to a "decarbonized" economy will require an appropriate level of new capital investment, especially in the form of green finance to support the reduction of greenhouse gas emissions and help corporations to adapt to the impacts of climate change.

UNEP defines a "green economy" as a low-carbon economy that significantly reduces environmental risks while using resources efficiently and in the interest of society as a whole, improving human well-being and ensuring social equity. UNEP estimates that achieving the Sustainable Development Goals requires significant funding - $ 5-7 trillion per year [1].

The uneven over-utilization of global environmental resources has signaled the need for States to enter into multilateral agreements to adopt the Sustainable Development Concept, which was first proclaimed in 1987 in the report of the World Commission on Environment and Development, and...
green finance has become a new trend in world finance. "Green" finance is a new financial model that integrates environmental protection with economic income and is a logical complement to the Sustainable Development Concept, which, according to the UN, is supported by 170 countries. The projects of "green finance" are: renewable energy and energy efficiency, pollution prevention and control, biodiversity conservation, initiatives of circular economy, sustainable use of natural resources and land.

Estimates of funding requirements vary, but are significant. According to the German think tank DIW Econ, Ukraine’s total needs for building a "green" economy amount to at least 200 billion euros. [2]. According to the International Power Energy Agency, total investment of $53 trillion is needed by 2035 in the energy sector alone. G20 estimates that global investment of $90 trillion is needed over the next 15 years to achieve global sustainable development and climate change goals. This situation highlights the need for a research "green" investments that improve human well-being and ensure social justice, as well as significantly reduce risks to the environment.

2. Material and methods

Considering that the links between environment and security are powerful and important, the objective of the article is to deepen the theoretical aspects of "green" finance as a modern tool for socio-environmental security and the feasibility of practical recommendations to enhance their effectiveness in the context of social, economic and environmental security as components of sustainable development. Many Ukrainian and foreign scholars are involved in solving problems of pollution and resource conservation. Theoretical generalization was applied to study and systematize theoretical approaches to the essence of green investment [3, 4]. A scientific and methodological approach was used in developing the Strategy for Building a Green Finance Market in Ukraine [5, 6]. A systematic approach has been used in terms of both financial and environmental aspects by developing tools to accurately assess the level of environmental pollution by a particular economic entity [7]. The system-structural analysis was applied in the study of the green economy in the system of strategic priorities for the safe development of Ukraine [8]. The groupings and tabular method were used to characterize different "green" finance instruments and to compare "green economy", "green growth" and sustainable development [9, 10].

To achieve the goal of this article, general scientific and special methods were used, namely: the method of theoretical generalization - to study the essence of "green" finance in ensuring social and environmental security; normative method - for the development of norms and standards of environmental quality, emissions and other negative impacts; groupings and tabular method - to characterize financial instruments that promote the development of "green finance"; systematic approach - to determine the constituent segments and relevant financial instruments in the system of "green" finance; structural and functional method - to reveal the impact of "green" finance and their financial instruments on social and environmental security. We used this method to identify the impact of green finance on social and environmental security indicators. First, we identified aspects of the impact of green finance, and we found that they are interlinked within one system. Having identified threats to Ukraine's national security in the social and environmental spheres, we have identified areas for developing recommendations to minimize these threats, as well as the priorities for state policy on issues of social and environmental security; the comparison method was used to differentiate green finance instruments in Ukraine and other countries. This led to the conclusion that Ukraine should also work on the implementation of other tools for financing a "green" energy transition.

3. Theory/calculation

There is currently no generally accepted definition of "green" or "environmental" finance. Thus, the OECD refers to "green" finance as means to achieve economic growth while reducing pollutant emissions, minimizing waste and improving the efficiency of natural resource use; PriceWaterhouse Coopers defines "green" finance as the financial products and services that take into account environmental factors, including credit, monitoring and risk management decisions that can be used to
promote environmentally responsible investments. The People's Bank of China includes green finance as a part of political and institutional arrangements to attract private investment in green industries through financial services, including lending, private equity, bonds, stocks and insurance. Based on the foregoing, it can be concluded that this term describes a wide range of financial tools and instruments for environmentally friendly technologies, projects, industries or enterprises.

The Green Finance Study Group (GFSG) considers "green" finance as financing investments that provide environmental benefits in the broader context of sustainable development and include, in particular, improving energy efficiency as well as mitigation and adaptation to climate change.

Research in the field of "green" finance is given attention by foreign and Ukrainian scholars. Much work has been done on the concepts and principles of green investment. In particular, the Ukrainian researcher L. Gatska [11] notes that the basis of the concept of «green» economic development is "green" money. T. Kurbatova [12] investigated the principles of the trading system of "green" certificates.

Investigator N. Lindberg [13] believes that "green" finance should be singled out as a type of financial service and product used in environmental decision-making on loans, monitoring and risk management, promote environmentally friendly investment and deployment of low-carbon technologies, projects, industries and enterprises". According to the group of researchers Volz, U., Böhnek, J., Knierim, L. and others [14], "green" finance includes various types of investment or lending, which, in turn, have an impact on the environment and environmental sustainability.

Research on "green" finance tools is of a considerable interest in the writings of scholars. One of the most common instruments is "green" bonds, which have been considered by such researchers as A. Beshlossa and M. Machachehi [15] who have confirmed that the market of «green» bonds is reliable and scalable for various market participants. The mechanism of operation of credit instruments "green" finance has been investigated by scientist R. Schwarze [16].

From our point of view, "green" finance is a structured financial activity - a product or service - to provide better environmental outcomes that include debt instruments and investments, used to promote green projects or to minimize the impact of regular projects on the climate or their combination.

Thus, the formation of "green" finance is a modern trend in ensuring the security of the state in the context of globalization in order to reduce poverty, controlling the use of natural resources and increasing the number of jobs. And improving the environmental situation is not just the cost of the state budget, but the essence of the new economic system - a new economic business environment that calls for investment in the development of new "green" industries. Thus, forming the system of social and ecological security of the development of Ukraine in the context of globalization, it is advisable to implement the principles of «green economy» into various sectors of economy. Social and ecological security involves the following tasks: adaptation of the economy and the population to climate change; improvement of energy efficiency of housing; systemic measures to prevent technological emergencies [6].

4. Results

4.1 The impact of "green" finance on social and ecological security

The end of the twentieth century and the beginning of the twenty-first century were marked by the rapid development of modern technologies, the global environmental and energy crisis and attempts to create a new world outlook for the post-industrial society. Harmful practice of active interference in the natural processes have led to threatening changes in the biosphere. "The root cause of the crisis is the age-old conflict of material and spiritual in man", considered academician Vernadsky [17].

In Ukraine, the highest social value is recognized as the individual, his or her life and health, honour and dignity, inviolability and security, and ensuring human rights and freedoms are the primary responsibility of the state. Effective and rational management and sustainable use of natural resources are vital for human security, political stability and conflict prevention. Environmental threats
weaken economies, impoverish populations and increase the risks of political and violent conflict. Climate change exacerbates these environmental stresses.

In our opinion, social and ecological security, narrowly defined as the degree (level) of protection of the social and environmental sphere from internal and external, real and potential threats. In a broad sense, social and ecological security is the level of protection against endogenous and exogenous, real and potential social-environmental threats in the environmental sphere, in order to ensure ecologically safe living conditions for citizens and society and to preserve the natural environment. Social and ecological security can be considered at the micro-, meso-, macro- and global levels.

The legislation defines the priorities of Ukraine’s national interests, among which an important place is given to strengthening political and social stability in society; ensuring ecologically and technologically safe living conditions for citizens and society; environmental conservation and rational use of natural resources, etc. Therefore, "green" finance in the context of ensuring social and ecological security should be considered on three scales: economic, social and environmental [10] (Fig. 1).

![Figure 1. Spheres of influence of the "green" economy.](image)

Source: compiled by the authors according to the data [10]

However, the effective functioning of "green" finance is hampered by threats affecting national security in the social and environmental spheres.

The following are among the threats to Ukraine’s national security in the social sphere: the inefficiency of state policy to increase citizens' income, to overcome poverty and to balance productive employment of the working-age population; the social protection crisis and the worsening of the demographic crisis; the decline in access to quality education by the poor; the spread of social diseases; as well as moral and spiritual degradation of society.

In the environmental sphere, these threats are: the irrational use of natural resources; increasing the scale of human impact on the environment; the uncontrolled import to Ukraine of environmentally hazardous technologies and materials, as well as pathogens; increasing risks man-made and natural disasters; ineffective measures to deal with the negative effects of military and environmentally hazardous activities; inadequate and obsolete complexes for the disposal of toxic and environmentally hazardous wastes [18].

The main priorities of state policy in matters of social and ecological security of Ukraine are primarily the development of the economic sphere, in particular: providing an effective system of social protection; creating favorable conditions for overcoming poverty and excessive property stratification in society; raising the living standards of the population by increasing the cost of wages
and social benefits guaranteed by law; ensuring energy security through diversification of energy sources; food security; protection of the domestic market against the supply of products that may be harmful to human health and the environment; preservation and strengthening of the country's labor potential; implementation of the latest and environmentally-friendly technologies; development of mechanisms to reduce the negative impact of global environmental problems on the state of ecological security of Ukraine [18].

4.2 "Green" finance tools to ensure social and ecological security

Having a wide range of financial tools or products is essential to ensure social and environmental transformation that will end to the highly uneven and excessive use of global environmental resources. They should be divided into the following segments: bank lending, corporate finance, green funds and green insurance.

![Figure 2. Characteristics of "green" financial tools that contribute to the development of "green" economy.](source)

Source: compiled by the authors according to the data [9].

One of the main tools of "green" finance is "green" credit, which is provided by so-called "green" banks, which is beginning to develop in the leading EU countries. "Green" credits are intended for environmental projects related to agriculture, renewable energy sources, green industry, etc. Nowadays, the "green" market is the most common among China’s lenders and borrowers. The Loan Market Association classifies "green" credits into two main types: loans for environmental protection and emission reduction projects and services; credit to developing strategic industries.

Currently, there are many types of "green" credit products that banks offer: "green" loans to borrowers of certain industries, environmental protection, environmental rehabilitation and disaster prevention projects, resource processing projects, waste disposal and pollution prevention projects, renewable and clean energy projects, rural and urban water projects, energy conservation or eco-building projects, environmental transport projects, energy-saving and environmental services.

The principles of the «green» credit are based on the following four main components: use of proceeds, project appraisal and selection process, revenue management, reporting.

In Ukraine, some state banks that have received foreign "green" investments are starting to use such a credit mechanism to encourage our people to use solar panels, wind turbines and biomass boilers [19]. "Green" credit should become a new form of financial regulation of environmental management at the local level in Ukraine [4].

Corporate sector finance includes green project finance, green securitization, green venture capital and private investment, green indexes and carbon products. To finance projects with environmental benefits, "green" bonds have become a priority tool for attracting private and public sector investment and one of the fastest-growing financial instruments in the world.
"Green" bonds are debt financial instruments whose proceeds are channeled exclusively to finance green projects. Their issuers are not only enterprises, but also international financial organizations, authorities and banks. The largest issuers to date are the International Finance Corporation and the World Bank. Since 2008 the World Bank issued 135 "green bonds" in 19 currencies totaling more than US $11 billion. A total of 77 issues in 12 currencies were issued by the International Finance Corporation for a total of US$ 5.8 billion. The price of bonds is quite high, so they are primarily invested by organizations and institutions that have the capacity to accumulate large amounts of monetary resources in order to increase them. These investors are mainly insurance companies, investment and pension funds [20].

The world market for "green" bonds is showing rapid growth. A significant number of renewable energy projects have been introduced in some European countries, the United States of America and China through "green bond" emissions. Despite the fact that the market of «green» bonds in Ukraine is at an early stage of development, it has great potential for its implementation, which in the future will provide financing of national clean energy projects [21].

"Green" securitization allows for the pooling of small loans and helps attract another investor base. Importantly, the securitization of existing loans also enables banks and other primary lenders to refinance existing loan portfolios and reuse capital to create new "green" loan portfolios. Various structures can be used, such as secured bonds and asset-backed securities.

"Green" leasing is still only at the stage of formation and presents leasing of equipment or property etc. for a realization of «green» investment projects. Areas in which it applies include the following types: "green" rental housing, "green" car rental, energy efficiency and «green» mortgages.

Green venture capital and private investment pay more attention to environmental aspects in financing companies through the capital market. Investment banks assist in IPO entry for companies that supply environmental goods and services. Banks can also establish an investment base for environmental projects through dedicated private capital management units.

Green insurance or environmentally friendly insurance not only covers people in case of injury or damage, but also protects our environment. This could mean that part of the insurance premium is transferred to environmental organizations for the purpose of planting trees and so on. It covers two areas: first, insurance products that differentiate insurance premiums according to environmental characteristics; second, insurance based on clean technology and emissions. There are many different types of environmental insurance: green car, green business, green home insurance, green travel insurance, green life insurance, green health insurance.

Green investment funds are environmentally responsible, accumulate investment resources and channel funds to finance green projects and companies. The development of the market of «green» funds is stimulated by the countries which first became the responsible investors in this sphere - France, and big financial centers such as Switzerland and Great Britain. There are currently more than 200 different types of "green" investment funds in Europe.

"Green" funds are different in different parameters. Depending on the degree of state participation, the following are distinguished: a) by the sources of financing: "green" funds which receive state support, "green" funds as a form of public-private partnership, fully private "green" Funds; b) by object of investment: project "green" funds, "green" bond funds, "green" equity funds, "green" fiscal funds, "green" hybrid funds.

5. Discussion.
The effective application of the suggested "green" financial instruments should result in an increase in the indicators of social and ecological security in Ukraine. Theoretical and practical aspects of the application of "green" finance, "green" technologies and "eco-innovations" in Ukraine, which will form an innovative investment model for "green" development, require further research and the implementation of the priority tasks of ensuring social and ecological security in Ukraine.
6. Conclusions
The transition to green is a common trend related to the protection and preservation of the environment. People all over the world are beginning to consider the impacts on air, water, land and life around them and are overestimating their way of life.

By now, climate change has become one of the major and relevant themes. According to KPMG experts, achieving emission reduction goals and "green" transformation of economies will require unprecedented levels of investment. The "green" bonds and "green" investment funds that already exist in some countries are likely to fail to provide this level of financing. There is, therefore, an urgent need to strengthen the ability of the financial system to mobilize private capital for green investment in sustainable development.

This, in turn, requires the development of new financing instruments to match potential investors with green finance needs and to help mobilize the necessary levels of capital. So, the main directions of development of «green» finance are the following:

‒ the strengthening of state support is very important for the implementation of large-scale transformations. It has now become clear that a combination of public and private sector capital will be necessary to ensure the transition to a decarbonized future, as only public funds can not cover these costs;

‒ public-private partnerships, which are widely used to support infrastructure projects and are a valuable tool for financing climate-relevant activities, especially taking into account the need to engage both the public and private sectors in mitigating climate change;

‒ climate risk insurance includes sovereign risk and process risk insurance products. In the case of increasing climate risk, financial protection becomes relevant, even as costs rise. It is important to note that climatic risk has a significant social impact, namely the growth in migratory flows (ecological or climatic refugees, humanitarian problems, increased mortality due to heat waves, raised health risk of some social groups);

‒ sustainability bonds used by companies in industries such as oil and gas or heavy industry, as "green" bonds may not be available due to non-compliance with certain criteria;

‒ islamic financing aimed at mitigating climate change, with a wide variety of tools to tackle climate change and attract appropriate investment partners.

‒ investment in education with the aim of creating a highly qualified workforce and an appropriate expert environment in the sphere of «green» finance. The country needs high-quality professionals if it is to make a breakthrough in this direction and become a successful new, cost-effective engine that works for a "green" economy;

‒ improvement of cooperation with foreign companies, international financial organizations and foundations on issues of attracting «green» financing in Ukraine; consultation with banking institutions, institutional investors and financial regulators at the national level. Together, this will further enhance social and ecological security, not only at the macro level, but also at the global level.

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