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ECONOMIC CHALLENGES AND APPROACHES TO IMPLEMENTING THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT IN UKRAINE

The article is devoted to a comprehensive study of the economic obstacles that hinder the achievement of sustainable development in Ukraine in the context of current challenges. The key problems are investigated, including the energy intensity of the economy, limited funding for environmental programs, insufficient integration of sustainable development principles into economic policy, inefficient waste management, and the impact of socio-economic instability. Based on the study of available information and data from institutions and organizations at various levels of the economic and managerial hierarchy, including the European Bank for Reconstruction and Development, etc., the article analyzes the causes of these problems and assesses their impact on the Ukrainian economy. In particular, high energy intensity is caused by existing technologies, especially in industrial sectors. Insufficient waste recycling hinders the transition to a circular economy, while limited funding for environmental programs hinders investment. The paper proposes ways for overcoming these problems, including stimulating energy efficiency through government subsidies and emissions trading, developing a circular economy by creating recycling infrastructure, attracting investment through environmentally friendly financial instruments, reforming economic policy through the introduction of environmental taxes and decentralization, and socio-economic measures to support the poor. Particular attention is paid to the adaptation of the international experience of transition economies, in particular Eastern European countries, to Ukrainian realities, taking into account the socio-economic context. The study emphasizes the need for cross-sectoral cooperation and the implementation of European standards, in particular within the framework of the European Green Deal, to ensure sustainable economic growth. The proposed recommendations are aimed at modernizing the state's economy, reducing dependence on imported energy resources, and improving the quality of life of the population.

***Keywords*:** sustainable development; energy efficiency; circular economy; economic policy; environmental programs; renewable energy sources;

environmental taxes; investments.

Relevance of the topic. Sustainable development, which harmonizes economic growth, social justice, and environmental safety, is key for Ukraine in the context of its integration into the European institutions, where the principles of climate neutrality are defined by the European green deal. However, economic obstacles, such as the energy intensity of the economy, limited funding for environmental programs, insufficient integration of sustainable development principles into economic policy, often inefficient waste management, and socioeconomic instability pose significant challenges.

Global warming compared to pre-industrial levels requires a reduction in greenhouse gas emissions, which remains relevant for Ukraine as its economy remains largely carbon-intensive. The hostilities have caused significant losses, which continues to limit investment in environmental projects. The country's poverty rate remains high, which in turn reduces the demand for energy-efficient technologies due to their high cost.

Ukraine's international obligations and the need to comply with the sustainable development goals require active reforms to reduce dependence on energy imports and develop a circular economy. Regional peculiarities, such as high energy intensity of industrial regions in the East of the country and the potential of agricultural regions in the West for the development of renewable energy sources, determine, on the one hand, the expediency of using individual approaches to addressing existing environmental, economic and social needs, and, on the other hand, the comprehensive development of universal integrated approaches. The study of economic problems of sustainable development is necessary to develop strategies that will promote economic recovery, reduce emissions and environmental pollution, and integrate with European standards.

Analysis of the latest research and publications. The economic aspects of sustainable development are being actively studied by scholars who analyze the interrelationship between economic growth, environmental safety and social justice. The concept of sustainable development as a balance between economic, social and environmental goals emphasizes the need for resource efficiency and low-carbon technologies for countries with economies in transition. Many scientists

in Ukraine and abroad, including E. Bezsonov, V. Bogolyubov, L. Zaitseva, O. Pankov, O. Chmut, A. Ogienko, E. Weizsäcker, K. Christensen, D. Sachs, V. Senchenko, M. Smith, V. Tarasenko, K. Hargroves, and others, are actively researching this topic in various areas.

Scientists conducting research in these areas, among other things, study the economic barriers to sustainable development in Ukraine, focusing on the high energy intensity of industrial sectors, in particular metallurgy, which can use a significant share of the country's energy resources. The potential for modernization to reduce energy consumption in the short and medium term is explored. The issues of limited funding for environmental programs are considered, taking into account the fact that the costs incurred by the state are not always sufficient to achieve climate neutrality. Ineffective waste management is studied, usually in view of the fact that only a small share of waste is recycled, which hinders the transition to a circular economy. The impact of corruption on attracting investment in environmental projects is analyzed, emphasizing the need to ensure transparency in the implementation of relevant measures. Important attention is paid to the study of aspects of the mechanism of sustainable development of enterprises [1], the implementation of innovation policy at the regional level as a determining factor in the implementation of the principles of sustainable development of modern economic systems, as well as an integrated study of the sustainable development strategy [2].

Among many other aspects of the economic impact on the balanced development of economic systems, research conducted by foreign scientists examines the issue of reducing the energy intensity of gross domestic product through the mechanism of subsidies for renewable energy sources, suggesting the adaptation of such experience for the respective countries. Research is being carried out on environmentally oriented financial instruments that make it possible to attract significant funds to finance relevant programs, the need for digitalization of energy systems is being substantiated, which in many cases can also significantly reduce electricity losses, and the issues of integrated formation of a sustainable development state are being studied [3].

The purpose of the article is to study the economic obstacles to ensuring the implementation of the principles of sustainable development in Ukraine, to identify their causes and to develop practical steps and recommendations for achieving the relevant goals. The study covers the issues of energy intensity of the economy, limited funding for

environmental programs, insufficient integration of sustainable development principles into economic policy, aspects of inefficient waste management, and challenges caused by socio-economic instability. The paper discusses such areas of solving existing problems as stimulating energy efficiency, developing a circular economy, attracting investment, reforming economic policy, and socio-economic measures. Particular attention is paid to the adaptation of the experience of foreign countries to Ukrainian realities, taking into account the socio-economic characteristics of the respective countries and the current state of development of the Ukrainian economy. Based on the current needs of the state's economy, the article identifies relevant areas for further research, including the development of economic models for the implementation of environmental projects with regional characteristics, taking into account their impact on economic growth, reduction of emissions and environmental pollution, as well as an increase in the level of prosperity and quality of life of the population.

Outline of the main material

The energy intensity of the Ukrainian economy remains one of the highest in Europe: in 2023, about three times more conventional fuel was consumed to generate one dollar of GDP than in the European Union [4]. The main reason for this situation is the often outdated technology in industrial sectors, in particular metallurgy, which remains more energy-intensive than the corresponding industries in many other countries. The use of outdated equipment can lead to significant energy losses, reduced labor productivity, and thus to a decrease in the efficiency of production processes and industries in general. Therefore, the reconstruction, re-equipment and modernization of many enterprises using modern machinery and equipment is an important area of economic development, which can ensure a significant reduction in energy consumption in the coming years, which will contribute to significant resource savings, reduce losses and costs, and thus create opportunities for alternative use of released energy resources.

The issue of energy supply remains particularly relevant and requires the urgent development of a comprehensive program to address it. In recent years, energy imports have accounted for a significant portion of gross domestic product, which in turn has a negative impact on the balance of payments. The transition to renewable energy sources is not proceeding at a sufficient pace. Thus, last year, the share of renewable

energy sources was about three times lower than in the European Union. The southern regions of the country, such as Kherson and Odesa oblasts, have significant potential for the installation and use of solar energy facilities, but the actual opportunities realized remain significantly lower. The reasons for this are socio-economic problems caused, among other things, by military operations, as well as a lack of investment resources and other factors.

Ensuring energy efficiency in households is also an important issue today. On average in the country, households consume 30% more energy for heating than in European countries, which is mainly due to the low level of thermal insulation of buildings. In old-fashioned apartment buildings, which account for more than half of the housing stock, heat losses reach approximately forty percent. This is why it is particularly important to implement energy efficiency programs for residents, particularly in apartment buildings, which are currently under-resourced due to limited funding and the need to expand awareness. Another factor in improving the level of energy efficiency is to increase the use of energy-efficient appliances by the population, as today, in particular due to their often high-cost, the share of their use remains relatively low. It is worth noting that the share of rural households with access to relevant technologies is about three times lower than in urban areas, which is primarily due to insufficient income and other objective factors.

Regional characteristics have an impact on energy efficiency. In industrial regions, it is necessary to ensure sufficient energy supply through traditional sources of electricity generation due to high energy intensity, while agricultural regions have significant potential for using bioenergy opportunities. Therefore, it is important to increase the number of biogas plants to meet a growing percentage of local energy needs. For this purpose, it is important to introduce and implement relevant regional programs. The use of foreign experience may be useful here. As practice shows, providing subsidies for the development and implementation of renewable energy sources allows both to increase the efficiency of the energy supply sector and to optimize the use of energy resources.

Funding for environmental programs at all levels of the economic hierarchy should be a priority. To ensure the implementation of sustainable development goals, it is necessary to significantly increase measures to ensure the environmental and economic efficiency of business processes. Today, for objective reasons, the costs of

environmental programs in Ukraine are significantly lower than in other countries, including Eastern Europe. For example, in 2022, Poland allocated about EUR 2 billion for the relevant needs, and attracted up to EUR 4 billion of private investment.

It is necessary to ensure the transparency of investment procedures, which will stimulate the flow of additional resources to energy efficiency. In 2023, investments in renewable energy sources amounted to USD 320 million, which is insufficient given the existing investment needs [5]. Small and medium-sized businesses, which should have free access to credit resources for their needs, have limited access to credit. The limited availability of loans to finance energy efficiency measures is largely due to interest rates, which are not conducive to the wide availability of credit.

The losses and damage to energy infrastructure caused by the hostilities require urgent attraction of significant resources for restoration. The disabling of energy facilities reduces energy efficiency in general and slows down the full implementation of sustainability principles in the economic mechanism in general and the energy sector in particular. International organizations allocate the necessary resources to address a range of economic, environmental, and social issues, including the implementation of environmental projects. However, quite often, such funds are not sufficient to achieve optimal results in ensuring sustainable development, so the search for and use of internal resources and reserves is an important area of the current stage of development of the state's economy.

Depending on the territorial and other peculiarities, energy efficiency issues can be addressed in different ways: from the effective use of grant funds, which can provide a significant percentage of energy needs for improving the energy efficiency of the housing stock, to solving budgetary problems, which today may not be fully oriented to cover all energy problems. In this regard, it is important to increase the volume of subsidies, widely introduce the so-called "green" bonds, which, again, has been implemented in many countries of Eastern Europe, and develop cooperation between the European Bank for Reconstruction and Development and the World Bank, which can significantly contribute to the effective solution of many of today's energy efficiency problems.

The implementation and use of a national sustainable development strategy is a priority, which will help achieve the principles of balanced

development and, accordingly, significantly reduce air emissions and environmental pollution in general. Among other things, fiscal levers, in particular tax incentives, which currently cover only a small share of small and medium-sized businesses, are effective in implementing the sustainability strategy. In Germany, for example, such incentives led to a 20% reduction in emissions between 2000 and 2020.

In today's environment, a significant share of funds is allocated for capital investments, mainly for the restoration of infrastructure. At the same time, in many European countries, a significant share of budget funds can be allocated to environmental initiatives, which contributes to the accelerated and comprehensive solution of both existing environmental problems and energy efficiency issues.

It is important to optimize waste sorting measures and ensure funding for relevant programs. It is necessary to implement the development of appropriate medium- and long-term measures, as well as to consider effective environmental taxes, rational expansion of decentralization, and ensuring an effective mechanism for monitoring the implementation of the developed tasks and steps.

In this context, it is necessary to further expand the volume of waste recycling, as only about 6% of waste is recycled, which is significantly less than in the European Union. Also, due to insufficient infrastructure development, only about a tenth of households in cities sort waste, which generally indicates that there are significant optimization reserves in this aspect of ensuring the sustainable development of the economic mechanism as a whole.

There are significant differences in the volume of recycling approaches in different regions, depending on both territorial features and the priority of addressing the relevant issues. An important step here could be the creation of regional recycling centers, the introduction of preferential mechanisms in the context of recycling, and the implementation of effective educational campaigns that will contribute to both the dissemination of relevant knowledge and potentially increase the volume of relevant activities.

The insufficient solvency of a significant number of citizens may be a factor in the insufficient demand for energy efficient technologies, which, in many cases, are an important aspect of the implementation of the sustainability strategy, to comprehensively achieve the sustainable development goals. Damage to the energy infrastructure necessitates additional repair costs, which can slow down the implementation of a set

of progressive solutions. Households' access to energy efficiency solutions can vary significantly, for example, in rural and urban areas, which can lead to insufficient integrated efficiency, including energy efficiency solutions. Here, again, grant programs can be effective. Low-income groups of the population should be covered by subsidy and microcredit programs to the maximum extent possible.

To overcome the problems of energy efficiency and the use of renewable energy sources, it is necessary to optimize the mechanism of targeted subsidies for renewable energy sources, to effectively implement the emissions trading mechanism, which, for example, in the European Union, has reduced emissions by about a third. Where appropriate and economically feasible, increase investments in solar energy technologies, which can potentially provide a significant share of the energy needs of the respective communities.

A necessary step to overcome the economic problems that exist in this area is to significantly expand the volume of attracted investments. For this purpose, both appropriate economic conditions and effective and transparent procedures should be ensured. Cooperation with international organizations can also be important and effective, since, at the current stage of economic development, increasing the amount of funding, including economic, environmental, and social programs to ensure sustainable development goals, will contribute to accelerating the growth of the state's economy as a whole.

Implementation of the circular economy principles, including the development of a network of regional recycling centers, effective application of the incentive mechanism, and further development of the thematic educational component, including those aimed at small and medium-sized businesses, should also become an integral part of a comprehensive energy efficiency growth program in the short and medium term. At the same time, addressing social problems, including those of low-income groups, restoration of the affected infrastructure, and other social measures should be prioritized.

Modernization of industrial sectors of the economy is important. Replacing or reconstructing and upgrading outdated equipment with energy-efficient equipment can significantly reduce energy consumption and thus costs, and thus optimize the cost of finished products and demand for them on foreign and domestic markets. Expanding the use of support mechanisms and, in particular, subsidizing small and medium-

sized businesses in the context of renewable energy development will also serve as an additional factor in boosting reconstruction and modernization.

Particular attention should be paid to further optimizing cross-sectoral cooperation of all stakeholders in the economic mechanism at different levels of the economic hierarchy, which will significantly improve the effectiveness of the relevant programs.

In addition, the introduction of modern innovative solutions and the implementation of digital approaches to reducing energy losses and consumption can be particularly effective today, especially in industrial regions where energy needs are particularly high. Foreign experience shows that the rapid implementation of advanced solutions can again provide competitive advantages for both individual industrial sectors and the state's economic mechanism as a whole.

Conclusions. The energy intensity of the economy, the amount of funding for environmental programs, the level of integration of sustainable development principles into economic policy, approaches to waste management, and socio-economic instability may be factors that determine the level of achievement of sustainable development goals. Other factors affecting the achievement of social and economic balance include the need for significant energy imports, the pace of renewable energy development, the amount of investment attracted, and the need to upgrade and optimize infrastructure. The level of solvency of a large part of the population and regional peculiarities require additional resources for the implementation of energy efficient technologies.

Accordingly, there is a need to focus on economic models for environmental projects with regional characteristics – from assessing and taking into account the potential of the circular economy to technical renewal and modernization. Implementation of mechanisms for involving young people from the scientific and business communities in the implementation of environmental startups, using various sources of funding, will help accelerate the implementation of innovations.

Implementation of the above measures in the short and medium term will contribute to intensive economic development, reduce environmental burden, and, consequently, improve living standards, while ensuring Ukraine's integration into European institutions.

1. Чмут О. Фундаментальні аспекти механізму сталого розвитку підприємств: концептуальний і нормативний базис. *Науковий вісник Херсонського державного*

університету. 2024. № 53. С. 33–38. **2.** Боголюбов В. Стратегія сталого розвитку : підручник. Київ, 2018. 446 с. **3.** Наїр Ч. Держава сталого розвитку. Майбутнє урядування, економіки та суспільства / пер. з англ. Ірина Гнатовська. Київ : Наш формат, 2020. 288 с. **4.** Державна служба статистики України. URL: https://www.ukrstat.gov.ua/ (дата звернення: 10.03.2025). **5.** European Bank for Reconstruction and Development. URL: https://www.ebrd.com/home/news-and-events/publications.html. (дата звернення: 10.03.2025).

REFERENCES:

1. Chmut O. Fundamentalni aspekty mekhanizmu staloho rozvytku pidpryiemstv: kontseptualnyi i normatyvnyi bazys. *Naukovyi visnyk Khersonskoho derzhavnoho universytetu*. 2024. № 53. S. 33–38. **2.** Boholiubov V. Stratehiia staloho rozvytku : pidruchnyk. Kyiv, 2018. 446 s. 3. Nair Ch. Derzhava staloho rozvytku. Maibutnie uriaduvannia, ekonomiky ta suspilstva / per. z anhl. Iryna Hnatovska. Kyiv : Nash format, 2020. 288 s. **4.** Derzhavna sluzhba statystyky Ukrainy. URL: https://www.ukrstat.gov.ua/ (data zvernennia: 10.03.2025). **5.** European Bank for Reconstruction and Development. URL: https://www.ebrd.com/home/news-and-events/publications.html. (data zvernennia: 10.03.2025).

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ЕКОНОМІЧНІ ВИКЛИКИ ТА ПІДХОДИ РЕАЛІЗАЦІЇ ЗАСАД СТАЛОГО РОЗВИТКУ В УКРАЇНІ

Статтю присвячено комплексному вивченню економічних перешкод, які стримують досягнення сталого розвитку в Україні в контексті сучасних викликів. Досліджено ключові проблеми, серед яких енергоємність економіки, обмежене фінансування екологічних програм, недостатня інтеграція принципів сталого розвитку в економічну політику, неефективне управління відходами та вплив соціально-економічної нестабільності. На основі вивчення доступної інформації та даних установ і організацій різних рівнів економічної та управлінської ієрархії, зокрема Європейського банку реконструкції та розвитку тощо, у статті проаналізовано причини цих проблем та оцінено їх вплив на економіку України. Зокрема, висока енергоємність зумовлена існуючими технологіями, особливо в промислових секторах. Недостатня переробка відходів перешкоджає переходу до циркулярної економіки, а обмежене

фінансування екологічних програм стримує залучення інвестицій. У роботі пропонуються напрямки подолання цих проблем, включаючи стимулювання енергоефективності через державні субсидії та торгівлю квотами на викиди, розвиток циркулярної економіки шляхом створення інфраструктури переробки відходів, залучення інвестицій через екологічно спрямовані фінансові інструменти, реформування економічної політики через запровадження екологічних податків та децентралізацію, а також соціально-економічні заходи для підтримки малозабезпечених верств населення. Особливу увагу приділено адаптації міжнародного досвіду країн з перехідною економікою, зокрема країн Східної Європи, до українських реалій з урахуванням соціально-економічного контексту. У дослідженні наголошується на необхідності міжсекторальної співпраці та імплементації європейських стандартів, зокрема в межах Європейського зеленого курсу, для забезпечення сталого економічного зростання. Запропоновані рекомендації спрямовані на модернізацію економіки держави, зниження залежності від імпорту енергоресурсів і підвищення якості життя населення.

Ключові слова: сталий розвиток; енергоефективність; циркулярна економіка; економічна політика; екологічні програми; відновлювальні джерела енергії; екологічні податки; інвестиції.

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