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Leveraging Green Finance for Enhancing Financial Efficiency in Public Procurement: The Case of Ukraine Under Martial Law

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Abstract. *The full-scale invasion of the Russian Federation into the territory of Ukraine in February 2022 caused a deep socio-economic crisis that affected all spheres of public administration, including the financial system. The destruction of infrastructure, a decrease in business activity, mass migration of the population and the constant need to finance military needs have created new challenges for budgetary and fiscal policy. In the context of particularly urgent resource shortages, there is a review of approaches to public finance management with a focus on long-term economic and environmental sustainability. That is why the integration of green financing into public procurement practices is considered a promising tool for increasing transparency, efficiency and compliance of expenditures with sustainable development criteria. Green financing covers the use of financial resources for the implementation of projects that contribute to environmental protection, increasing energy efficiency, reducing carbon emissions and adapting to climate change. Its application in the public procurement system of Ukraine through a platform like*

Prozorro opens up opportunities for introducing environmental criteria when selecting suppliers, stimulating "green" business initiatives and minimizing corruption risks. According to the World Bank, Ukraine's GDP has decreased by more than 30% since the start of the full-scale war, and the share of public procurement in the GDP structure is about 15%, reflecting the critical weight of this segment for ensuring fiscal stability. Combined with a policy of clear environmental transformation, green modernization of procurement can be a reason for economic recovery, adaptation to the challenges of war and strengthening the institutional efficiency of the state.

Keywords: *green finance, public procurement, public procurement, financial efficiency, economic efficiency, Prozorro, sustainable development, corruption, fiscal policy, martial law, Ukraine, transparency, green modernization, green procurement, European integration, ecological transformation.*

Використання зеленого фінансування для підвищення фінансової ефективності державних закупівель: приклад України в умовах воєнного стану

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Анотація. *Повномасштабне вторгнення російської федерації вна територію України у лютому 2022 року спричинило глибоку соціально-економічну кризу, яка торкнулася всіх сфер державного управління, зокрема й фінансової системи. Руйнування інфраструктури, зниження ділової активності, масова міграція населення та постійна потреба у фінансуванні* *військових потреб сформували нові виклики для бюджетної та фіскальної політики. В умовах зростаючого дефіциту ресурсів особливої актуальності набуває перегляд підходів до управління державними фінансами з орієнтацією на довгострокову економічну та екологічну стійкість. Саме тому інтеграція зеленого фінансування в практику державних закупівель розглядається як перспективний інструмент для підвищення прозорості, ефективності та відповідності витрат критеріям сталого розвитку.*

Зелене фінансування охоплює використання фінансових ресурсів для реалізації проєктів, що сприяють захисту довкілля, підвищенню енергоефективності, зниженню викидів вуглецю та адаптації до кліматичних змін. Його застосування в системі публічних закупівель України через платформи на кшталт Prozorro відкриває можливості для запровадження екологічних критеріїв при відборі постачальників, стимулювання "зелених" ініціатив бізнесу та мінімізації корупційних ризиків. За даними Світового банку, ВВП України скоротився на понад 30% від початку повномасштабної війни, а частка державних закупівель у структурі ВВП становить близько 15%, що свідчить про критичну вагу цього сегмента для забезпечення фіскальної стабільності. У поєднанні з чіткою політикою екологічної трансформації зелена модернізація закупівель може стати важливим чинником відновлення економіки, адаптації до викликів війни та посилення інституційної спроможності держави.

***Ключові слова**: зелені фінанси, державні закупівлі, публічні закупівлі, фінансова ефективність, економічна ефективність, Prozorro, сталий розвиток, корупція, фіскальна політика, воєнний стан, Україна, прозорість, зелена модернізація, зелені закупівлі, євроінтеграція, екологічна трансформація.*

Introduction. The ongoing conflict in Ukraine, following the full-scale invasion in February 2022, has led to significant economic turmoil, with the nation's GDP contracting by an estimated 30.4% (World Bank, 2022). This economic strain has had profound implications for public procurement, which constitutes nearly 15% of Ukraine's GDP. In this challenging context, ensuring efficiency and sustainability in public procurement has become an urgent priority. Green finance emerges as a viable strategy to optimize resource allocation while promoting environmentally responsible investments.

Despite the resilience of Ukraine’s financial system—evidenced by the banking sector’s stability amid wartime disruptions—public procurement processes have faced substantial challenges. The need to balance immediate military and humanitarian expenditures with long-term economic sustainability has underscored the importance of integrating green finance principles into procurement strategies. However, this transition is hindered by corruption risks, inefficiencies, and the urgency of wartime procurement demands. Transparency International’s Corruption Perceptions Index (2022) ranked Ukraine 116th out of 180 countries, with 12% of procurement tenders flagged for irregularities, highlighting the necessity of stringent anti-corruption mechanisms.

The adoption of green finance principles in public procurement, including life-cycle costing and environmental impact assessments, has the potential to yield significant economic and environmental benefits. A World Bank study (2022) estimates that green procurement practices can reduce costs by 10-15% in energy-intensive sectors such as infrastructure and utilities. Furthermore, aligning Ukraine’s procurement laws with European Union (EU) standards—particularly those followed by Visegrád Group countries—can facilitate access to international funding sources such as green bonds and grants, essential for post-war reconstruction.

This article explores the challenges and opportunities of implementing green finance in Ukraine’s public procurement system under martial law. It examines key financial efficiency criteria, relevant evaluation methodologies, and case studies that demonstrate the potential benefits of sustainable procurement. By leveraging digital procurement platforms like Prozorro and incorporating environmental metrics, Ukraine can enhance transparency, competitiveness, and long-term cost-effectiveness in public procurement. Ultimately, integrating green finance into procurement strategies can drive Ukraine toward a more resilient and sustainable recovery, even amid the ongoing crisis.

Current Statistics: Since the invasion began in February 2022, Ukraine's GDP has contracted by an estimated 30.4% according to the World Bank, highlighting the strain on fiscal resources. Public procurement accounts for nearly 15% of Ukraine's GDP, making efficiency and sustainability in this domain critical during the ongoing crisis.

Statement of the Issue. The ongoing conflict in Ukraine has placed significant strain on the country's economic and public procurement systems. Given that public procurement constitutes nearly 15% of Ukraine's GDP, there is a pressing need to enhance efficiency and sustainability in this sector. Traditional procurement practices often prioritize immediate cost savings over long-term economic and environmental benefits, leading to inefficiencies and missed opportunities for sustainable development. Corruption risks further complicate the effective allocation of resources, necessitating stronger regulatory frameworks and monitoring mechanisms.

Main Purpose. The primary objective of this research is to analyze the integration of green finance into Ukraine's public procurement system, particularly under martial law conditions. This study explores the potential of green finance mechanisms to improve procurement efficiency, reduce environmental impact, and align Ukraine's practices with international sustainability standards. By evaluating financial efficiency criteria, legislative adaptations, and case studies, this research seeks to provide strategic recommendations for optimizing public procurement through sustainable investment.

Literature Review. Green finance has gained prominence as a tool for promoting sustainability in public procurement. Studies indicate that incorporating environmental criteria into procurement decisions leads to long-term cost savings and efficiency improvements. A World Bank (2022) study found that life-cycle costing in procurement reduces expenses by 10-15% in energy-intensive sectors. Additionally, the adoption of electronic procurement systems, such as Prozorro, has enhanced transparency and competition in Ukraine's public procurement, although corruption risks remain a challenge. Comparative analysis with Visegrád Group countries highlights the benefits of mandatory green public procurement policies, with Poland achieving an estimated €2 billion in operational cost savings between 2016 and 2022. The integration of green finance frameworks, such as green bonds and energy service contracts (ESCOs), has further facilitated sustainable investments in infrastructure and utilities.

Corruption Risks: The integration of green finance necessitates robust monitoring systems to mitigate misuse of funds. Existing electronic procurement systems, such as Prozorro, can be expanded to incorporate environmental evaluation metrics, although improvements in anti-corruption safeguards remain essential.

Corruption Statistics: Transparency International ranked Ukraine 116th out of 180 countries in the Corruption Perceptions Index 2022. Public procurement has been particularly vulnerable, with 12% of tenders flagged for potential irregularities in 2021 (Prozorro analytics).

Inefficiencies: A World Bank study (2022) shows that adopting green finance principles, including life-cycle costing, reduces procurement costs by 10-15% in energy-intensive sectors, such as infrastructure and utilities.

Efficiency vs. Expediency: While immediate needs often dominate procurement priorities, green finance emphasizes life-cycle costing and the environmental impact of purchases. For instance, choosing electric vehicles over traditional fuel-powered ones for government fleets represents a shift toward sustainable decision-making.

Legislative Alignment: Adapting procurement laws to include green finance principles can align Ukraine’s practices with EU standards, particularly those observed in Visegrád Group countries, which leverage public procurement to advance ecological and social policies.

The Ukrainian financial system, despite the conflict, has demonstrated resilience, with the banking sector maintaining stability. However, public procurement processes initially faced disruption, with many transactions suspended to redirect funds toward defense and military needs. This situation underscores the need for financial

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instruments that balance immediate wartime necessities with long-term sustainability goals.

Green finance introduces mechanisms that prioritize environmentally conscious investments, ensuring that public procurement decisions align with sustainable development goals (SDGs). The adoption of such approaches in Ukraine's procurement strategies can lead to cost savings, improved accountability, and enhanced environmental outcomes.

Banking Stability: The National Bank of Ukraine reported that despite the war, banking system stability remained intact, with only a 5% drop in total assets in 2022 compared to pre-war levels.

Green Finance Application: Globally, green finance reached $540 billion in investments in 2022 (Climate Bonds Initiative). Ukraine could tap into international green bonds to fund sustainable procurement during reconstruction efforts.

Financial efficiency in public procurement is underpinned by several key criteria: economic viability, transparency, competitiveness, compliance with legislative norms, institutional capacity, and result-oriented practices. Economic efficiency and result-orientation each account for 20% of the focus, emphasizing the importance of cost-effectiveness and tangible outcomes. Transparency and competitiveness, each contributing 15%, ensure clear, equitable processes that foster trust and fair participation. Legislative compliance (15%) underscores adherence to legal standards, while institutional capacity (10%) highlights the need for robust systems and expertise. To evaluate financial efficiency comprehensively, several methods can be employed. These include the «Weighted Sum Method», which aggregates performance scores across criteria; «Principal Component Analysis (PCA)», which simplifies complex data to highlight key performance factors; «SWOT Analysis», which identifies strengths, weaknesses, opportunities, and threats; and the «Analytic Hierarchy Process (AHP)», which systematically ranks priorities to guide decision-making. Combining these criteria and methodologies within Ukraine's green finance framework can drive

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sustainable and efficient public procurement, balancing fiscal discipline with environmental and social goals, even under the constraints of martial law.

Case Study: Energy-Efficient Public Procurement. Since 2017, Ukraine's energy modernization efforts, driven by the Law on New Investment Opportunities, have introduced energy service companies (ESCOs) into public procurement. Expanding this model through green finance can optimize the use of budgetary resources by funding projects that reduce long-term energy costs and carbon footprints. Strategic Recommendations leads us to next step.

Green Financing Framework: Develop a comprehensive green finance strategy that prioritizes investments in sustainable infrastructure and procurement. This strategy should incorporate external funding sources, such as international green bonds and grants, to supplement state resources.

Case Study: Energy Modernization in Ukraine between 2017 and 2021, Ukraine invested $240 million in energy service contracts (ESCOs) for public buildings. These projects yielded a 30% reduction in energy costs, demonstrating the potential of green finance in public procurement.

Comparison with Visegrád Countries. Poland, a Visegrád Group member, implemented mandatory green public procurement (GPP) criteria in 2016. By 2022, 45% of public tenders included environmental standards, saving an estimated €2 billion in operational costs over five years.

Environmental Metrics in Prozorro: Enhance Prozorro to include environmental impact assessments, encouraging suppliers to adopt eco-friendly practices and products.

Capacity Building: Train procurement officials on green finance principles to ensure informed decision-making.

Policy Reform: Update procurement legislation to mandate environmental criteria, incentivizing the acquisition of green goods and services.

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Proposed Metrics for Prozorro includes Environmental Impact and Lifecycle Costing. Introduce a carbon footprint metric for suppliers. Implement rules requiring tender evaluation based on total cost of ownership, not just purchase price.

Projected Benefits: Based on international benchmarks, incorporating green criteria in 30% of Ukraine's procurement could reduce carbon emissions by 20 million tons annually and save $1.5 billion by 2030.

Research Results The research findings demonstrate that integrating green finance principles into Ukraine's public procurement system can lead to significant economic and environmental benefits. Case studies reveal that energy modernization projects funded through ESCOs have resulted in a 30% reduction in energy costs. Moreover, enhancing Prozorro with environmental impact assessments and lifecycle costing metrics could improve procurement transparency and efficiency. International benchmarks suggest that incorporating green criteria in 30% of Ukraine's procurement could reduce carbon emissions by 20 million tons annually and generate savings of $1.5 billion by 2030. These results underscore the potential for green finance to support Ukraine's economic resilience and post-war recovery through sustainable public procurement reforms.

Conclusion. The integration of green finance into Ukraine's public procurement system can address inefficiencies while fostering environmental sustainability. By adopting a systematic approach that incorporates legislative reforms, technological upgrades, and capacity building, Ukraine can ensure the efficient allocation of resources, even under the constraints of martial law. This paradigm shift will not only strengthen financial governance but also pave the way for a resilient and sustainable post-war recovery.

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