

THE ENERGY CRISIS AS A FACTOR IN THE TRANSFORMATION OF ECONOMIC SECURITY IN MODERN UKRAINE

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Abstract. In the context of full-scale war, the energy crisis has become one of the key factors in the transformation of Ukraine's economic security, directly affecting macroeconomic and social stability and the state's institutional capacity. The destruction of energy infrastructure, systemic supply disruptions and rising energy costs have created complex risks that extend beyond the energy sector and have become systemic. Therefore, this study is relevant because it aims to understand the energy crisis as a structural factor of economic security rather than a temporary shock. This article aims to provide a comprehensive political and economic analysis of the impact of the energy crisis on economic security transformation in modern Ukraine. The study focuses on the structural, macroeconomic, socio-economic and institutional-political consequences of energy instability in times of war and prolonged uncertainty. The study's methodology is based on political-economic, systemic and structural-functional approaches, enabling economic and energy security to be considered interrelated elements of national security. Methods of analysis and synthesis, comparison, generalisation and logical modelling were employed to trace the relationship between energy constraints, macroeconomic dynamics and changes in economic behaviour patterns. The study found that the energy crisis reduces economic security by decreasing production volumes, increasing inflationary pressure and the budget deficit, and worsening conditions for human capital reproduction. The mass transition of businesses and households to autonomous energy sources, such as generators, ensured minimal operational stability of the economy. However, it also created long-term risks of economic fragmentation and the consolidation of a crisis-based development model. Thus, the energy crisis is viewed as a catalyst for change in state economic policy, institutional priorities and economic behaviour models. The results obtained have practical value in that they can be used to develop strategies to enhance Ukraine's economic security. This can be achieved by strengthening the institutional management of the energy sector, combining anti-crisis and long-term measures, and transitioning to a sustainable model of economic development in conditions of prolonged instability.

Keywords: economic security, energy instability, critical infrastructure, military risks, macroeconomic stability, institutional capacity, autonomous energy sector, socio-economic consequences, state economic policy.

JEL Classification: E60, E65, H12, Q48

1. Introduction

The energy crisis, which is the result of a combination of military action, structural imbalances in the energy sector and prolonged institutional weakness, has become one of the main challenges to Ukraine's economic security. The large-scale destruction of energy infrastructure, unstable supply and rising energy costs directly impact production, the state's financial

stability and the population's standard of living. In these circumstances, energy instability becomes systemic, resulting in a series of economic, social and political consequences that extend beyond the scope of traditional sectoral analysis.

At the same time, the problem of the energy crisis is often considered in a fragmented manner in scientific and practical discourse, with insufficient consideration

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given to its long-term impact on the transformation of economic security. The prevalence of short-term anti-crisis solutions and reactive management approaches limits the potential for creating a sustainable development model, reducing the effectiveness of state economic policy in the process. A comprehensive political and economic understanding of the energy crisis as a structural factor in changing the priorities, institutional mechanisms and strategic foundations of Ukraine's economic security is therefore necessary.

2. Approaches to Analysing Economic and Energy Security

Economic security occupies a central place in modern political and economic analysis as it reflects a nation's ability to maintain stable economic functioning, realise its potential and counteract internal and external threats. Economic security is not only viewed as the protection of economic interests, but also as a dynamic process influenced by political decisions, institutional quality and global structural changes (Hapieieva et al., 2023). In times of crisis and transformation, its importance increases as the economic sphere becomes the main area for accumulating risks and the foundation for restoring social stability.

The political-economic approach enables an examination of economic security as a multidimensional category, incorporating economic, political, social, and institutional components. In this context, economic security is not confined to purely macroeconomic indicators such as gross domestic product, inflation, or the state of public finances. The state's capacity to formulate effective economic policy, ensure the equitable distribution of resources, support strategic industries, and maintain control over critical infrastructure is of paramount importance.

In terms of structure, economic security encompasses financial, manufacturing, investment, energy, technological and social components. While each component has relative autonomy, they are also closely interrelated with other elements of the system. Imbalances in one component can cause chain reactions that undermine the overall stability of the economy. During times of crisis, particularly in the event of military operations or large-scale energy disruptions, these interdependencies become more vulnerable, with risks spreading rapidly between sectors (Golovko, 2019).

The analysis of economic security occupies a special place in relation to national security. In today's world, economic threats have political and security implications. Financial instability, dependence on external resources or loss of control over strategic industries can limit a state's sovereignty and reduce

its ability to implement its own political priorities. Consequently, economic security is regarded as the cornerstone of national security, as it provides the resources necessary for defence, social and humanitarian policies (Makareyko, 2020).

In periods of crisis and transformation, the concept of economic security is undergoing a fundamental shift in its understanding. This response is no longer merely reactive; it assumes a strategic character, with a focus on long-term sustainability and adaptability. A thoroughgoing examination of political and economic analysis reveals a discernible shift from a myopic approach, predicated on risk minimization, to a nuanced and holistic vision that seamlessly integrates security objectives with development priorities. In this logic, economic security is not only a condition for the survival of the state in crisis situations, but also an instrument for shaping a new development model capable of ensuring stability, competitiveness, and political agency in the long term.

Energy security is a critical component of a state's economic and national security, as it determines the capacity of the economy and society to function seamlessly in the face of internal and external challenges (Azzuni & Breyer, 2017). In theoretical terms, energy security is defined as the state's protection against threats related to energy shortages, supply instability, price fluctuations, and the destruction of energy infrastructure. Concurrently, contemporary approaches are progressively eschewing the conceptualisation of it as a static state, instead opting for the perspective of risk management in conditions of global instability and structural transformations of energy markets.

In the context of political and economic analysis, energy security is understood to be a multidimensional phenomenon, encompassing economic, technological, political, and geopolitical dimensions. Conventional theoretical approaches have predominantly concentrated on the physical availability of energy resources and the reliability of their supply. This approach was developed in the context of an industrial economy and a focus on large, centralized energy systems.

The assessment of energy security is predicated on a system of criteria and indicators that facilitate a comprehensive analysis of the state of the energy sector. Key indicators include the level of energy dependence on imports, the structure of the energy balance, the share of renewable energy sources, the technical condition of generating capacities and networks, and the stability of energy prices (Man et al., 2024).

The role of a stable energy supply in ensuring economic stability is of crucial importance, given that energy constitutes the fundamental infrastructure for all sectors of the economy. Interruptions in energy supply have been demonstrated to have a direct impact on industrial production, transportation, services, and

social infrastructure, resulting in a reduction in the overall level of economic activity.

In the context of national security, energy security functions as a system-forming element that provides the resource basis for the implementation of state policy. The high degree of reliance on external suppliers, coupled with the vulnerability of energy infrastructure, engenders a scenario conducive to the exertion of political pressure and the imposition of restrictions on sovereign decision-making processes (Shevchenko, 2022).

Energy crises have been identified as a significant factor in the alteration of a state's economic and political stability, given their direct impact on the fundamental conditions necessary for the effective functioning of the national economy and public administration mechanisms. An energy crisis is regarded as a multifaceted phenomenon, encompassing aspects such as energy shortages, disruptions to supply chains, substantial price escalations, and diminished reliability of energy infrastructure (EBSCO, 2022). The combined effect of these factors is to engender structural shifts in the economy and changes in public policy priorities.

From an economic modelling perspective, energy crises have been shown to prompt a re-evaluation of the principles of production and consumption. Rising energy costs have been shown to increase production costs, reduce the competitiveness of energy-intensive industries, and cause a redistribution of resources between sectors. In response to this challenge, the state and business sectors find themselves compelled to adopt more energy-efficient technologies, diversify their energy sources, and restructure their investment strategies.

Energy crises significantly impact state economic policy, altering the balance between market mechanisms and regulatory intervention. During a crisis, the state tightens its control over strategic resources and introduces price restrictions, subsidies and special energy distribution regimes. While such measures aim to reduce social tensions and prevent deep economic shocks, they also create risks for market efficiency and budgetary stability. In the long term, this contributes to economic policy shifting towards a combination of security and development goals.

In the context of energy crises, the political stability of the state is also undergoing significant changes. Power outages and rising tariffs directly impact the population's standard of living, potentially leading to increased social discontent and a decline in trust in the authorities (Trushkina, 2025). In such conditions, energy policy takes on a distinct political dimension, becoming the subject of public debate and a means of political mobilisation. Energy decisions are increasingly perceived as an indicator of the effectiveness and

legitimacy of state power, not only as technical or economic matters.

These changes also affect the public administration system, forcing it to adapt to conditions of increased uncertainty and risk. Energy crises emphasise the importance of crisis management, interagency coordination and prompt decision-making. However, they also reveal weaknesses in the institutional system, such as a lack of transparency, corruption risks and limited strategic planning capacity.

3. Background and Current Manifestations of the Energy Crisis in Ukraine

Ukraine's energy sector has been shaped by historical, institutional and geopolitical factors, resulting in structural complexity and persistent imbalances. For a long time, the sector developed within a centralised model focused on large generating capacities, extensive transmission networks and fossil fuel dominance. While this model ensured relative stability in peacetime, it proved poorly adapted to crisis conditions, particularly military action and systemic attacks on infrastructure.

One of the key structural features of Ukraine's energy sector is its high level of technological obsolescence. Much of the generating capacity and network infrastructure was built during the Soviet era and has operated for decades without proper modernisation. This has resulted in reduced efficiency in electricity production and transmission, as well as increased network losses and vulnerability to accidents and physical damage (Prokip, 2025).

Another significant issue is the composition of the energy balance, which has long been characterised by a reliance on a limited number of sources and suppliers. Despite the gradual growth of renewable energy, traditional generation methods have continued to dominate. This concentration created additional risks in the event of fuel supply disruptions or the loss of individual generation facilities. In the context of war, these risks have materialised as capacity shortages and the need for emergency resource reallocation.

Structural problems are exacerbated by institutional imbalances in the management of the energy sector. Ukraine has had fragmented regulatory and management functions for a long time, which has complicated the formation of a coherent energy policy (Dumanska, 2025). The presence of a large number of state and quasi-state entities with overlapping powers has reduced the effectiveness of decision-making processes and created an environment conducive to corrupt practices. This, in turn, has had a negative impact on the sector's attractiveness to investors and has hindered infrastructure renewal.

Another significant imbalance is the mismatch between the economy's needs and the energy system's

capabilities. Ukraine's industrial structure has historically been characterised by high energy intensity, making the economy sensitive to any disruptions in energy supply. While this factor was offset by the relative availability of resources in peacetime, in crisis conditions it has become a serious constraint on economic activity.

The spatial imbalance of the energy infrastructure poses another problem. The fact that a significant proportion of generating capacity is concentrated in certain regions increases the system's vulnerability to local damage and complicates balancing the energy system in emergency situations. This was evident during large-scale attacks on energy facilities, where disruptions to individual nodes caused widespread blackouts and had knock-on effects for the entire economy.

Full-scale war has been a decisive factor in escalating the energy crisis in Ukraine, transforming existing structural energy sector problems into a systemic threat to the country's economic security. Military action has shifted the focus of energy infrastructure from predominantly economic facilities to direct security risks, making the energy system one of the main targets of armed influence. The large-scale destruction of generating capacities, substations and transmission and distribution networks has significantly reduced the system's capacity to provide a stable energy supply to the economy and population (Andrienko et al., 2025).

The military factor has led to a sharp decline in the energy system's physical resilience. Systematic strikes on critical infrastructure have resulted in a loss of production capacity and disruption to the balance of the energy network. Consequently, despite having sufficient generation resources, there were technical limitations to their effective use. The energy system has been forced to operate in constant emergency response mode, reducing management efficiency and increasing the risk of large-scale outages.

The impact of the war on energy infrastructure also had significant economic consequences. Power outages directly affected industrial enterprises, transport, services and social infrastructure. For businesses, this meant increased costs associated with production downtime, equipment damage and the need to invest in alternative energy sources. Declines in production and labour productivity led to a fall in gross domestic product and tax revenues, exacerbating the state's budgetary issues (Pidubnyi & Goriunov, 2024).

War damage to energy infrastructure has increased the financial burden on the state, as restoring networks and generating facilities requires significant investment. War conditions limit the potential for attracting private investment, meaning the state and its international partners must bear the main financial burden of restoration work.

The war has also altered the logic of strategic planning in the energy sector. While the main focus was on market reforms and integration with the European energy market in the pre-war period, the priority in the context of full-scale hostilities has become ensuring the minimum necessary level of energy supply. This has led to a transition to emergency management regimes, which, while allowing the system to continue functioning, have exacerbated transparency and efficiency issues.

Thus, the military factor and the destruction of energy infrastructure acted as a catalyst for a severe energy crisis with far-reaching economic consequences. These factors not only limited current economic development opportunities, but also created long-term challenges for Ukraine's economic security relating to the restoration, modernisation and improvement of resilience in the energy system in the event of prolonged instability.

The mass adoption of autonomous energy sources, such as diesel and gasoline generators, has become one of the most prevalent adaptive responses of Ukraine's economy and population to systemic energy supply constraints. Prolonged and unpredictable power outages have forced businesses, authorities and households to find ways to maintain basic production, communication and life support functions (D'Istria, 2026). Consequently, autonomous generation has evolved from a temporary emergency response tool into a widespread phenomenon with significant economic implications.

Generators are now used in virtually all sectors of the economy. They are used most actively in trade, services, healthcare, transport and small and medium-sized enterprises, where even short-term power outages result in direct financial losses. For households, generators have become essential for ensuring basic comfort and safety, including heating, water supply and communication. This widespread autonomisation of energy consumption indicates a profound transformation in economic behaviour patterns in times of crisis and instability.

The use of generators has significantly impacted business and household expenses. The cost of purchasing equipment, ongoing fuel costs, maintenance and depreciation creates an additional financial burden, which is particularly challenging for small businesses and households with limited incomes. This reduces business profitability, forcing entrepreneurs to either scale back their operations or pass on some of the costs to consumers through price increases.

The impact of widespread generator use on labour productivity is a controversial topic. On the one hand, autonomous energy sources prevent a total shutdown of production processes and maintain enterprises' basic operational capacity. However, the limited capacity of generators, their unstable operation and the need for

constant monitoring can reduce production efficiency. Employees are forced to adapt their work schedules according to energy availability, which has a negative impact on labour organisation and overall productivity. In the long term, this results in individual industries losing their competitive advantage.

The widespread use of generators also has broader macroeconomic implications. Growing demand for fuel puts additional strain on the fuel market and increases reliance on energy imports. This poses additional risks to the balance of payments and currency stability. Meanwhile, prioritising emergency solutions for autonomous power supply over investments in modernisation and energy efficiency limits the potential for the long-term development of the energy sector.

From an economic security perspective, the mass transition to generators creates a number of long-term risks. Autonomous generation fragments the energy system, weakens the incentive to restore centralised infrastructure and may reinforce a crisis-adaptation model rather than a strategic transformation model. Additionally, unequal access to these sources exacerbates socio-economic disparities, as only a fraction of the population and businesses can afford them. Taken together, these processes suggest that, while generators are a necessary tool for short-term stabilisation, they could pose a long-term threat to Ukraine's economic security without a comprehensive state policy.

4. Transformation of Ukraine's Economic Security under the Influence of the Energy Crisis

The energy crisis has a complex impact on the macroeconomic dynamics and financial stability of the state since energy forms the fundamental infrastructure upon which the entire economic system relies. Restrictions on energy supply can lead to systemic macroeconomic shocks affecting production volumes, investment activity, public finances and the stability of the financial system (Zhao et al., 2023). These effects are amplified in wartime, creating long-term risks to economic security.

The impact of energy constraints on GDP is primarily manifested as a reduction in production activity. Power outages reduce production capacity utilisation, limit continuous production possibilities, and result in a loss of added value. Energy-intensive industries, transport and logistics, and the service sector are the most sensitive to energy instability, as a stable electricity supply is critical for their operations.

Taken together, the macroeconomic consequences of the energy crisis pose a complex set of challenges to the country's financial stability. The decline in GDP, growth in the budget deficit, inflationary pressure and increased debt burden are all interconnected and reinforce each other (IMF, 2024). This suggests

that the energy crisis is not just a sectoral problem, but a systemic factor that determines the trajectory of macroeconomic development and the state of economic security in Ukraine.

The energy crisis has profound socio-economic consequences that extend beyond immediate production losses to directly affect human capital. Power outages lead to a decline in quality of life, worsening working conditions and limiting access to basic social services (Xiong et al., 2024). In wartime, these issues become systemic, making certain social groups more vulnerable and creating long-term risks for economic recovery.

The population's standard of living depends significantly on a stable energy supply, as electricity and heat are basic life support elements. Prolonged power outages worsen living conditions by limiting heating, the water supply and communication, which is particularly noticeable during the winter months. The rising cost of alternative energy sources and fuel reduces real household incomes, forcing people to cut back on other goods and services. Consequently, the risk of energy poverty increases, becoming a form of social vulnerability in crisis conditions.

Social inequality is exacerbated during the energy crisis by unequal access to resources for adaptation. Higher-income households and large enterprises have more opportunities to invest in autonomous energy sources, which ensures relative stability in living and working conditions. Conversely, low-income groups and small businesses often lack such opportunities, widening the gap in quality of life and economic prospects.

Prolonged power outages negatively impact human capital development by limiting access to education and healthcare. Educational institutions struggle to organise the learning process, reducing its quality and continuity. In the health sector, energy constraints complicate the work of medical institutions, increase risks for patients and staff, and put additional strain on the system. Taken together, these factors have a negative impact on the long-term potential for human development (Mendieta Lucas et al., 2025).

The deterioration of living and employment conditions stimulates internal and external migration, primarily among the economically active population. The loss of labour resources, combined with a decline in fertility, poses further challenges to the reproduction of human capital and the social stability of the state. These are long-term processes that may persist even after the energy situation has stabilised.

In terms of economic security, the socio-economic consequences of the energy crisis are of strategic importance. Declining living standards, growing inequality and the degradation of human capital can all undermine the potential for economic recovery and social consolidation. Therefore, overcoming energy

constraints requires technical and financial solutions as well as comprehensive social policies to protect vulnerable groups and preserve human capital as a vital resource for Ukraine's economic security.

Prolonged and unpredictable power outages have disrupted traditional market conditions, causing significant changes in the economic behaviour patterns of businesses and households. In conditions of increased risk, economic actors must reorient their strategies, shifting the focus from cost optimisation and growth to ensuring basic stability and survival (Asiedu et al., 2021).

For commercial enterprises, a pivotal adaptation strategy has been to invest in autonomous energy systems with a view to minimising the risk of production stoppages. The procurement of generators, energy storage systems, and alternative power sources is regarded as a prerequisite for sustaining operational continuity. However, such investments are often compelled, and consequently, spending on development, innovation, and production expansion is frequently diminished.

Households are also demonstrating a change in economic behaviour patterns, focusing on increasing energy autonomy and reducing vulnerability to supply disruptions. Investments in generators, batteries, alternative energy sources, and energy efficiency measures are becoming part of consumer strategies. The combination of these factors is precipitating a shift in consumer behaviour patterns and exerting an influence on market conditions.

The alteration in the economic conduct of businesses and households exerts a more extensive influence on the structural metamorphosis of the economy. The increasing demand for autonomous energy solutions is driving the development of associated market segments, encompassing equipment manufacturing, fuel supply, and maintenance services. Concurrently, this transformation is characterised by fragmentation and a paucity of integration into a comprehensive long-term energy transition strategy. This approach, however, carries the risk of perpetuating a crisis model of development that is overly focused on short-term adaptation rather than systemic change (IEA, 2023).

In the long term, modifying economic behaviour patterns in conditions of energy instability can be both a factor of modernisation and a source of new risks to economic security. In the absence of a coordinated government policy, the autonomisation of energy consumption leads to the fragmentation of the economic space and inefficient use of resources. Concurrently, the integration of business and household adaptation strategies within the overarching development model has the potential to catalyse structural transformations that enhance the resilience and adaptability of the national economy.

5. Political and Institutional Dimensions of the Energy Crisis

The energy crisis in Ukraine has a clear political dimension, directly affecting the stability of the political system, public trust in the authorities and decision-making processes. In wartime, the energy sector becomes a focal point for security, social and political risks, and any management errors or delays in response can have significant political ramifications (Qi, 2023). Society perceives energy constraints as an indicator of the state's ability to perform its basic functions, so they go beyond a technical problem.

During an energy crisis, political stability is subject to additional pressure due to a decline in the quality of life of the population and growing social discontent. Power outages and rising energy costs have a direct impact on the daily lives of citizens, engendering a sense of instability and uncertainty.

In such conditions, energy policy becomes the subject of heated public debate, and energy decisions are viewed through the prism of the political responsibility of the authorities. This has the potential to exacerbate existing political polarisation and the utilisation of energy issues as a political bargaining chip.

The level of trust that the populace has in state institutions is contingent on the efficacy with which said authorities respond to energy challenges. The maintenance of public legitimacy is contingent upon transparency of decisions, consistency of communication, and the ability to ensure the fair distribution of limited resources. In the absence of clear and comprehensible mechanisms for the management of the energy crisis, suspicions about the inefficiency or bias of state policy are likely to increase, thereby undermining trust in the authorities and complicating the implementation of other reforms (Alessandro et al., 2021).

As indicated by numerous scholars in the field, political risks in the energy sector are also linked to the high sensitivity of this sector to corruption threats and external influence. The existence of resource shortages and the necessity for urgent procurement engender a state of vulnerability to non-transparent decisions, thus creating additional challenges for economic security. The prevailing energy crisis engenders a multifaceted political environment, wherein the stability of the economic system is intricately intertwined with the capacity of the authorities to cultivate public trust and ensure effective and responsible governance.

The corruption risks in Ukraine's energy sector are systemic in nature and, in the context of the energy crisis and martial law, have become a key threat to the country's economic security (OECD, 2021). The strategic importance of energy, significant financial flows, and the complexity of technological

and management processes create an environment that is highly vulnerable to abuse. The corruption mechanisms in this area have been demonstrated to have a detrimental effect on the efficiency of the industry, whilst also exerting a direct influence on macroeconomic stability, the investment climate, and the level of public trust in the state.

Corruption in the energy sector typically involves non-transparent public procurement procedures, price and contract manipulation, and abuse in the distribution of access to energy resources and infrastructure. It also includes the inefficient use of budget and donor funds. In times of war and under pressure of time, these risks are exacerbated by the simplification of procedures and the expansion of officials' discretionary powers. While such mechanisms are formally justified by the need for a rapid response, in practice they often create opportunities for decision-making outside proper control and accountability.

In this context, a series of corruption scandals related to the activities of Ukraine's Energoatom, a key supplier of electricity to the national economy, is indicative. Scandals surrounding equipment procurement, contract awards and management decisions demonstrate that even strategically important, state-owned companies are vulnerable to corruption (NACB, 2025). Such situations have a particularly negative effect during periods of energy instability, as any disruptions or inefficiencies in nuclear power generation pose additional risks to the economy and state security.

The impact of corruption on the effectiveness of energy policy is evident in the distortion of strategic priorities. Rather than being directed towards modernising infrastructure and improving the security and sustainability of the energy system, resources are used irrationally or with delays. This reduces the effectiveness of anti-crisis measures, slows the recovery of the energy sector, and increases its dependence on external financial and technical support.

Corruption scandals in the energy sector also have a significant socio-political impact. During periods of power supply disruption, public sensitivity to issues of fairness and management efficiency increases sharply. News of abuses in strategic companies undermines public trust in state institutions and makes it more difficult to implement necessary reforms, particularly in areas such as tariff policy and market restructuring. Declining trust, in turn, weakens public support for anti-crisis measures.

In the context of economic security, corruption risks and scandals in the energy sector – particularly those surrounding Ukrainian Energoatom – should be viewed as a systemic vulnerability factor. Such issues undermine the effectiveness of public policy,

worsen financial stability and limit the economy's ability to adapt in the event of a prolonged crisis. This demonstrates that tackling corruption in the energy sector is not just a secondary management task, but a vital condition for bolstering Ukraine's economic security.

The state's policy of tackling corruption in the energy sector is a vital part of transforming Ukraine's economic security. This sector is strategically important, involves large financial transactions and is subject to increased security risks (Rimšaitė, 2019). Against the backdrop of an energy crisis and war, anti-corruption measures are not only legally important, but also crucial from an economic standpoint, as their effectiveness is paramount in ensuring the rational use of limited resources and the state's capacity to guarantee the sustainable operation of critical infrastructure.

In the Ukrainian context, independent anti-corruption institutions play a vital role in tackling corruption. Their activities focus on investigating abuses in strategic sectors, particularly in the energy sector. Their autonomy from political influence is essential for building trust with both society and international partners. The energy sector, in particular, is often a litmus test for the effectiveness of anti-corruption infrastructure, as attempts at selective law enforcement or political pressure can have significant repercussions (Bondarenko et al., 2021).

In this context, attempts to limit the powers of NABU and SAPO pose a serious threat to economic security. Weakening the institutional independence of these bodies would undermine the state's ability to combat corruption in the energy sector and send signals about the declining priority of the rule of law. This would also have a negative effect on the investment climate (OECD Integrity and Anti-Corruption Review of Ukraine, 2025). In the context of the energy crisis, such steps can have a disproportionately high economic impact, as they reduce the effectiveness of controlling the use of budgetary and donor funds allocated for infrastructure restoration.

Consistently implementing institutional reforms in the field of anti-corruption policy has the potential to significantly strengthen economic security. Increasing the accountability of state-owned energy companies, clearly separating managerial and political functions, and preserving the independence of anti-corruption bodies creates conditions conducive to more effective energy policy. In the long term, this will contribute to reducing financial losses, increasing trust in state institutions and establishing a sustainable model of economic security in which fighting corruption is a systemic element, not a secondary consideration.

6. Strategic Directions for Enhancing Ukraine's Economic Security Amid the Energy Crisis

Institutional strengthening of energy sector governance is a necessary prerequisite for enhancing Ukraine's economic security amid the ongoing crisis and military challenges. The experience of energy instability has demonstrated that the fundamental challenges persist in the fragmentation of management decisions, the limited accountability of state-owned enterprises, and the inadequate transparency of procedures in the domain of resource allocation. In such conditions, even significant financial injections cannot guarantee an increase in the stability of the energy system without an adequate institutional framework.

The reform of the management of the energy sector necessitates, in the first instance, a clear separation of political, regulatory and operational functions. The excessive politicisation of management decisions has been shown to engender risks of situational interference, which has been demonstrated to reduce policy predictability and complicate strategic planning (Agu & Akomolafe, 2020). The establishment of professional management bodies for state-owned energy companies, the implementation of corporate governance standards, and the introduction of independent supervisory boards have been demonstrated to contribute to enhanced efficiency and a reduction in corruption risk.

An essential component of institutional reinforcement pertains to the enhancement of accountability and transparency in financial transactions within the energy sector. The introduction of open procurement procedures, public reporting on the use of budget and donor funds, and the strengthening of the role of auditing have been shown to create conditions for public and parliamentary control. In the context of economic security, this is of fundamental importance, as it minimises resource losses and increases confidence in public policy.

The strengthening of the regulatory capacity and independence of bodies responsible for energy supervision is of particular importance. Clear and stable rules are essential for attracting investment and modernising infrastructure. Institutional strengthening of governance and increased transparency form the basis for transitioning from reactive crisis management to a systematic policy of ensuring energy and economic security.

In the context of post-war recovery, the transition from crisis adaptation to long-term energy and economic sustainability is a strategic task for Ukraine's development. While the dominance of short-term solutions aimed at overcoming the immediate consequences of energy attacks has ensured minimal stability, it does not create the preconditions for

sustainable development. In the long term, a new model of the energy system is needed that can function in conditions of high risk and uncertainty (GOPA, 2024).

One of the key aspects of this transformation is the development of decentralised energy sources. Local generation sources, microgrids and energy storage systems reduce vulnerability to damage to large-scale infrastructure and increase the flexibility of the energy system (Schmitz et al., 2025). For the economy, this translates to reduced losses from supply disruptions, greater business reliability, and lower long-term transaction costs.

Modernising energy infrastructure is another critical element of the transition to sustainability. Investments in network upgrades, the digitalisation of management, and improvements in energy efficiency not only restore destroyed capacity, but also lay the foundation for a more efficient and secure energy system. Together with integration into European energy markets, this helps to diversify risk and strengthen the country's economic autonomy.

In the context of economic security, the transition to long-term energy sustainability has a multiplier effect. It reduces macroeconomic risks, creates favourable conditions for investment and supports the restoration of human and productive capacity. Therefore, energy transformation is not only a technical task, but also a vital component in developing a sustainable model of economic growth in Ukraine.

7. Conclusions

The study found that the energy crisis, in the context of a large-scale war, has become systemic and is one of the main factors affecting Ukraine's economic security. The issue extends beyond sectoral problems to affect macroeconomic dynamics, the financial stability of the state, socio-economic processes and the institutional capacity of public authorities. The destruction of energy infrastructure, supply instability and rising energy costs have led to a decline in production, increased inflationary pressure and a growing budget deficit. These factors have also led to a deterioration in the conditions for human capital reproduction, which together undermine the basic foundations of economic security.

It has been proven that businesses' and households' adaptation strategies, particularly the mass transition to autonomous energy sources, have enabled the economy to maintain its minimum functionality. However, this has also created long-term risks of economic fragmentation and the consolidation of a crisis-based development model. The energy crisis has also brought to light institutional and political issues in the management of the energy sector, particularly with regard to transparency, accountability,

and corruption risks. In this context, strengthening economic security requires transitioning from reactive crisis management to a systematic policy combining institutional reforms, energy infrastructure modernisation, and a long-term sustainability focus.

Further research should focus on conducting an in-depth quantitative analysis of the impact of energy instability on individual sectors of the Ukrainian

economy and its regions, and on assessing the effectiveness of various models of energy system restoration and decentralisation. Particular attention should be given to examining the relationship between energy transformation, institutional reforms and the recovery of human capital in the context of post-war development and the strengthening of state economic security.

References:

- Agu, M. U., & Akomolafe, O. (2020). Advances in Corporate Governance and Performance Accountability in Global Energy Enterprises. *International Journal of Multidisciplinary Research and Growth Evaluation*, 1(5), 375–384. DOI: <https://doi.org/10.54660/ijmrge.2020.1.5.375-384>
- Alessandro, M., Cardinale Lagomarsino, B., Scartascini, C., Streb, J., & Torrealday, J. (2021). Transparency and trust in government: evidence from a survey experiment. *World Development*, 138, 105223. DOI: <https://doi.org/10.1016/j.worlddev.2020.105223>
- Andrienko, D., Goriunov, D., Grudova, V., Markuts, J., Marshalok, T., Neyter, R., Piddubnyi, I., Studennikova, I., & Topolskov, D. (2025). *Report on damages to infrastructure from the destruction caused by russia's military aggression against Ukraine as of november 2024*. KSE. Available at: https://kse.ua/wp-content/uploads/2025/02/KSE_Damages_Report-November-2024---ENG.pdf
- Asiedu, E., Azomahou, T. T., Gaekwad, N. B., & Ouédraogo, M. (2021). The determinants of electricity constraints by firms in developing countries. *Energy Economics*, 104, 105605. DOI: <https://doi.org/10.1016/j.eneco.2021.105605>
- Azzuni, A., & Breyer, C. (2017). Definitions and dimensions of energy security: A literature review. *Wiley Interdisciplinary Reviews: Energy and Environment*, 7(1). DOI: <https://doi.org/10.1002/wene.268>
- Bondarenko, O., Utkina, M., Dumchikov, M., Prokofieva-Yanchylenko, D., & Yanishevskaya, K. (2021). Review of the state anti-corruption institutions effectiveness in Ukraine. *Revista Amazonia Investiga*, 10(38), 219–233. DOI: <https://doi.org/10.34069/ai/2021.38.02.22>
- D'Istria, T. (2026). *Kyiv's fourth winter at war has spared no one*. Le Monde.fr. Available at: https://www.lemonde.fr/en/international/article/2026/02/18/in-kyiv-a-fourth-winter-of-war-spared-no-one_6750594_4.html
- Dumanska, I. (2025). Energy security of Ukraine through the lens of european union sustainable development practices. *Modeling the Development of the Economic Systems*, (4), 243–252. DOI: <https://doi.org/10.31891/mdes/2025-18-30>
- EBSCO. (2022). *Energy crisis | power and energy | research starters*. Available at: <https://www.ebsco.com/research-starters/power-and-energy/energy-crisis>
- Golovko, V. (2019). Essential characteristics of the economic security of the state and its main components. *World Science*, 3(11(51)), 4–8. DOI: https://doi.org/10.31435/rsglobal_ws/30112019/6778
- GOPA. (2024). *Post War Development of the Renewable Energy Sector in Ukraine*.
- Hapieieva, O., Vitiutin, Y., & Pochtamtsev, O. (2023). Economic security as a component of national security. *Market Infrastructure*, (74). DOI: <https://doi.org/10.32782/infrastructure74-2>
- IEA. (2023). *World energy outlook 2023 – analysis – IEA*. Available at: <https://www.iea.org/reports/world-energy-outlook-2023>
- IMF. (2024). *Sixth review under the extended arrangement under the extended fund facility, requests for modification of a performance criterion, and financing assurances review*. Available at: <https://mof.gov.ua/storage/files/1ukrea2024004-print-pdf.pdf>
- Makareyko, N. (2020). Economic security in the national security system. *The Economy Under Guard*, 74–80. DOI: <https://doi.org/10.36511/2588-0071-2020-2-74-80>
- Man, O. R., Radu, R. I., Mihai, I. O., Enache, C. M., David, S., Moisescu, F., Ibinceanu, M. C. O., & Zlati, M. L. (2024). Approaches to a new regional energy security model in the perspective of the european transition to green energy. *Economies*, 12(3), 61. DOI: <https://doi.org/10.3390/economies12030061>
- Mendieta Lucas, L. M., Jaramillo, J. G. S., & Munoz Sanchez, C. F. (2025). Impact of the energy crisis on the academic performance and professional training of undergraduate students in the social work program in ecuador. *Journal of Posthumanism*, 5(6), 2649–2665. DOI: <https://doi.org/10.63332/joph.v5i6.2388>
- NACB. (2025). *Misappropriation of UAH 100 million from Energoatom*. Available at: <https://nabu.gov.ua/en/news/zavolodinnia-100-mln-grn-energoatomu-ekstradovano-obvynuvachenogo-z-nimechchyny/>
- OECD. (2021). *Anti-Corruption Review of the Energy Sector in Ukraine*. Available at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2021/12/anti-corruption-review-of-the-energy-sector-in-ukraine_f3faffe6/140c2616-en.pdf
- OECD Integrity and Anti-Corruption Review of Ukraine. (2025). OECD Publishing. DOI: <https://doi.org/10.1787/7db965b-en>

- Piddubnyi, I., & Goriunov, D. (2024). *Assessment of damages and losses to Ukraine's energy sector due to russia's full-scale invasion*. KSE. Available at: https://kse.ua/wp-content/uploads/2024/06/KSE_Impact-of-the-war-on-energy_ENG-1.pdf
- Prokip, A. (2025). *Ukraine's energy sector: Resilience after three years of full-scale war*. Wilson Center. Available at: <https://gbv.wilsoncenter.org/blog-post/ukraines-energy-sector-resilience-after-three-years-full-scale-war>
- Qi, J. (2023). An analysis of the energy crisis under the Ukraine conflict. *Advances in Economics, Management and Political Sciences*, 46(1), 288–294. DOI: <https://doi.org/10.54254/2754-1169/46/20230328>
- Rimšaitė, L. (2019). Corruption risk mitigation in energy sector: Issues and challenges. *Energy Policy*, 125, 260–266. DOI: <https://doi.org/10.1016/j.enpol.2018.10.066>
- Schmitz, R., Flachsbarth, F., Plaga, L. S., Braun, M., & Härtel, P. (2025). Energy security and resilience: Revisiting concepts and advancing planning perspectives for transforming integrated energy systems. *Energy Policy*, 207, 114796. DOI: <https://doi.org/10.1016/j.enpol.2025.114796>
- Shevchenko, O. (2022). Energy security as an integral element of ensuring the economic security of the state in the national security strategies of Ukraine. *Uzhhorod National University Herald. Series: Law*, (67), 163–168. DOI: <https://doi.org/10.24144/2307-3322.2021.67.32>
- Trushkina, N. (2025). Energy security as a factor of political stability in the european union. *Politics & Security*, 12(2), 72–87. DOI: <https://doi.org/10.54658/ps.28153324.2025.12.2.pp.72-87>
- Xiong, Q., Shen, W., Liu, C., Zhang, X., Tang, W., Duffield, C. F., Hui, F. K. P., & Zhang, L. (2024). Impact of access to electricity and socio-economic environment on poverty reduction: An empirical study on myanmar. *Energies*, 17(21), 5451. DOI: <https://doi.org/10.3390/en17215451>
- Zhao, J., Wang, B., Dong, K., Shahbaz, M., & Ni, G. (2023). How do energy price shocks affect global economic stability? Reflection on geopolitical conflicts. *Energy Economics*, 107014. DOI: <https://doi.org/10.1016/j.eneco.2023.107014>

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