

## **UKRAINE'S ENERGY SECTOR DURING THE WAR: CHALLENGES AND THE ECONOMICS OF OVERCOMING THEM**

**Zharova L.<sup>1</sup>, Khlobystov I.<sup>2</sup>**

*<sup>1</sup>University of Economics and Humanities, м.Бельсько-Бяла,*

*<sup>2</sup>National University of "Kyiv-Mohyla Academy", м. Київ*

The energy sector of Ukraine represents both the heart and the circulatory system of the country's economic security. This paper explores the key challenges the Russian war against Ukraine poses and the strategic responses to these challenges. Furthermore, it aims to project the potential for mobilizing internal and external resources to overcome current threats and assess Ukrainian society's readiness for such efforts. Since the onset of the full-scale invasion at the end of February 2022, Ukraine has lost approximately 9 GW of generating capacity. This figure equals nearly 50% of the current winter peak consumption. The remaining theoretically intact capacity is approximately 11.435 GW, a substantial portion of which consists of solar power plants that, due to seasonal limitations, cannot produce significant electricity volumes during the winter months. A critical concern is the loss of distribution networks, affecting all occupied territories and every type of power generation facility. From the beginning of the full-scale invasion to early 2025, Ukraine has lost 22.565 GW of generation capacity. If we account for the cumulative losses since March 2014, the total amounts to approximately 40 GW of lost generation.

We identify two principal challenges: the cost of the damage inflicted and the capacity to restore lost generation. The first challenge concerns financial value. Here, we encounter the "capability trap." It is not unrealistic to secure the monetary equivalent of lost capacity – estimated at USD 2.7 billion (according to publicly available data). Our international partners have already provided significant funding – up to 70% of Ukraine's needs – for defense and budgetary support since the beginning of the invasion. Thus, the issue is not financial resources per se. The actual obstacle lies in the technical capacity to restore lost generation. Manufacturing the necessary components for energy infrastructure can take years, and this time factor significantly limits rapid recovery.

The segmentation of Ukraine's energy system into three parts: the partial resumption of electricity exports (up to 1.5 GW, with a technical ceiling of 2 GW), and a decline in consumption due to the suspension or shutdown of industrial enterprises—all these factors suggest that a stable electricity supply can be maintained through the summer. Nevertheless, uncertainty remains: inconsistent commitments from partners regarding air defense systems, the adversary's unwillingness to pursue any genuine de-escalation measures, and the limited reserves available to compensate for lost generation capacity—all these contribute to an environment in which making accurate forecasts becomes highly complex. Yet, it is worth emphasizing that Ukrainian society is significantly better prepared for potential blackouts than at the beginning of the war. Most importantly, the nation continues to demonstrate resilience and unity, which is the cornerstone for overcoming the energy challenges ahead.