

Piotr Anklewicz, MA

WSB University in Dąbrowa Górnicza

anklewiczpiotr@gmail.com

DOI: 10.26410/SF_2/23/7

THE SOCIAL IMPACT OF THE DESTRUCTION OF UKRAINE'S ELECTRICITY INFRASTRUCTURE BY THE RUSSIAN FEDERATION

Abstract

Russian attacks on Ukraine's electricity infrastructure have had a serious impact on Ukrainian society. Disruptions in electricity supply have endangered health and life, restricted access to education, worsened the economic situation and led to environmental degradation. These attacks were part of Russia's military and political strategy to undermine Ukraine's sovereignty and territorial integrity. The lack of electricity had a major impact on the economy which translated into an impoverished society. The consequences of energy supply disruptions were also one of the important causes of internal and external migration. These attacks were part of Russia's extensive military and political campaign to undermine Ukraine's sovereignty and territorial integrity, stir up anti-government sentiment and fracture the morale of the Ukrainian people. Their effects will be felt for many years after the war ends.

Key words

war, energy, society, Ukraine, Russian Federation

Introduction

The Special Military Operation conducted by the Russian Federation in Ukraine began 4 hours after the disconnection of Ukraine's power system from the power systems of the Russian Federation and Belarus¹. This was a planned disconnection caused by the transition to an isolated mode of operation of the Ukrainian system in preparation for its future synchronisation with the European Network of Transmission System Operators (ENTSO-E). Russian shelling of power plants and transmission networks had been taking place since the first weeks of the aggression, but the first targeted attack on Ukraine's energy infrastructure took place on 11 September 2022. According to the Ministry of Energy, this was one of the most indiscriminate attacks on Ukraine's energy infrastructure – both power plants, high-voltage substations were attacked. Hundreds of thousands of Ukrainians were consequently left without electricity in the Poltava, Dnipropetrovsk, Kharkiv, Sumy and Donetsk regions. Eight hundred and seventeen settlements and 7978 transformer stations remained without electricity, totalling some 667,600 consumers. At the same time, in some areas emergency rescue work was complicated or impossible due to the intensification of hostilities, mine clearance, the emergence of new damage

to electricity networks². A month later, General Sergei Surovikin, known in the media as the 'butcher of Syria', the 'cannibal' or 'General Armagedon', took command of the Russian invasion forces. On 10 October 2022, prompted by a lack of progress and military successes and in revenge for damage to the bridge linking Russia to Crimea³, the Russian Federation began systematic, massive shelling with rockets, missiles and kamikaze drones of Ukraine's energy infrastructure which did not lead to a total black out, but caused a serious destabilisation of the work of the power grid and daily blackouts lasting several to several hours in all regions of the country. The targets of most of the shelling were nodal elements of the transmission infrastructure. A statement released by Ukrainian transmission infrastructure operator Ukrenergo shows that between 10 October 2022 and 10 February 2023, the Russian Federation carried out 14 missile and 17 drone massed attacks on the Ukrainian energy system. As a result, more than 40% of the energy infrastructure was affected. All major thermal and hydroelectric power plants suffered damage and the Ukrenergo Dispatch Centre was forced to reduce electricity consumption by 50%. For four months an average of up to 12 million Ukrainians were left without electricity every hour. The energy services managed to repair more than 10,000 kilometres of transmission lines

1 *Ukraina całkowicie odłączyła się od systemów energetycznych Rosji i Białorusi*, <https://www.ukrinform.pl/rubric-economy/3411390-ukraina-cakowicie-odacza-sie-od-systemow-energetycznych-rosji-i-biaorusi.html> (access: 11.05.2023 r.).

2 *Davaite vzhe pislya viini: stan enerhetychnoi infrastruktury Ukrainy ta maibutnie haluzi*, <https://delo.ua/energetics/davaite-vze-pislya-viini-stan-energeticnoyi-infrastrukturi-ukrayini-ta-maibutnje-galuzi-404840> (access: 04.04.2023 r.).

3 *Putin, drink in hand, blames Ukraine for Russia's bombing of its energy infrastructure: "Who started it?"*, <https://www.businessinsider.com/putin-drink-in-hand-blames-ukraine-for-russia-bombing-infrastructure-2022-12?r=US&IR=T> (access: 24.04.2023 r.).

damaged by the attacks. Of the 43% of energy infrastructure facilities destroyed, around 70% were partially repaired⁴. From the start of the war until February 2023. The Russian Federation carried out 255 successful attacks on 112 elements of critical electricity infrastructure, 77% of which occurred during the months with the lowest temperatures, i.e. October 2022 – February 2023⁵. Massive attacks on critical infrastructure began in autumn and continued with great intensity through the winter months. The course of the average temperature can be illustrated by its measurement in Cherkasy (a town near the geographical centre of Ukraine) in December – for a typical day it ranges from a maximum of 0°C to a minimum of -6°C. The perceptible daily conditions can be described as poignantly cold and slightly windy⁶.

The social impact of attacks on electricity infrastructure

Triggered by attacks on critical infrastructure by Russia, the lack of electricity has had a severe impact on Ukrainian society, leading to disorganisation and social isolation. The efficient functioning of the electricity infrastructure is crucial for the provision of social services such as healthcare, education, transport, communication, access to clean water or wastewater treatment. In addition, electricity plays a vital role in the

maintenance of other infrastructure systems, such as the supply system for gaseous or liquid fuels, the transport of which over long distances requires the use of electricity to power technical equipment. Consequently, disruptions to electricity supply affect both people directly and indirectly through impacts on other energy-dependent infrastructure. Uninterrupted Russian attacks on energy infrastructure have worsened living conditions, with frequent power cuts regularly plunging much of Ukraine into darkness throughout the winter season. WHO Regional Director for Europe Dr Hans Henri P. Kluge, in a communiqué on 21 November, said: “Half of Ukraine’s energy infrastructure is damaged or destroyed. This is already having knock-on effects on the health system and people’s health. Simply put, this winter will be about survival. The WHO has so far verified 703 attacks on hospitals since the war began nine months ago. This is a violation of international humanitarian law and the rules of war. Continued attacks on health and energy infrastructure mean that hundreds of hospitals and health facilities are no longer fully operational – they lack the fuel, water, and electricity to meet basic needs.”⁷. The power shortage posed a particular threat to infants placed in incubators, people undergoing intensive care with life support equipment and those requiring constant access to

4 *Enerhetychnyi front 365 Dniv Nezlamnosti*, https://ua.energy/energy_front_365.html (access: 04.05.2023 r.).

5 *Енергоатом оприлюднив інфографіку ударів РФ по об'єктах електроенергетики*, <https://kosatka.media/category/elektroenergiya/news/energoatom-oprilyudniv-infografiku-udariv-rf-po-ob-yektah-elektroenergetiki> (access: 23.05.2023 r.).

6 *Czerkasy (Ukraina) pogoda w grudniu*, <https://meteoatlas.pl/ukraina/czerkasy-67109/pogoda-w-grudniu> (access: 24.09.2023 r.).

7 *Winter in Ukraine: people's health cannot be held hostage*, <https://www.who.int/europe/news/item/21-11-2022-state-ment---winter-in-ukraine--people-s-health-cannot-be-held-hostage> (access: 21.08.2023 r.).

oxygen. Insufficient power supply prevented the operation of medical equipment such as ventilators, defibrillators, infusion pumps, dialysis machines and others. Patients in critical condition or requiring constant care were at risk of death or serious complications. Power shortages also hampered patient transport, delivery of medicines and medical supplies, and communication between medical facilities, and increased the risk of infection and disease through lack of access to clean water, sanitation, and hygiene⁸. Inadequate supply also hampered the storage and distribution of vaccines and other biological products, undermining vaccination, and infectious disease prevention programmes. Contaminated water and the inability to maintain cleanliness increased the risk of water-borne diseases such as diarrhoea, cholera, typhoid, and others⁹, and the lack of communication caused by power cuts resulted in a loss of access to patients' medical records. The destruction of elements of the electricity infrastructure also affected food storage and refrigeration, increasing the risk of food poisoning and long-term health problems related to foodborne pathogens. The lack of heating in homes during the winter prompted people to seek alternative sources of heat, such as burning wood or coal in non-designed and makeshift appliances, which was associated with an increased risk of carbon monoxide

poisoning and fires. Typically, the source of heat in Ukrainian homes is not electrical appliances, but disruptions to the electricity supply caused disruptions to heating systems based on solid, liquid, or gaseous fuels, while hypothermia is particularly dangerous for the elderly, children, and people with chronic illnesses. As a result of the full-scale invasion, the education process took place mainly online or in hybrid form. The scarcity of electricity limited the students' ability to interact with their classmates and with their teachers, which affected the quality of education and possibly the mental health of young people¹⁰. Many children did not regularly participate in school activities both physically and remotely. Schools and other educational facilities could not function properly, lighting, heating, and even basic equipment such as computers and projectors were becoming unusable. In the era of the COVID-19 pandemic, many schools in Ukraine switched to remote teaching, but without electricity after the outbreak, students were unable to use computers, tablets, or smartphones, making it impossible for them to participate in classes even remotely. Many educational materials available online without electricity meant that students were unable to access them¹¹. The destruction of electricity infrastructure, shelling, and fear of it also had an impact on mental health – increasing stress and anxiety, which in turn

8 *Wojna w Ukrainie, działania Lekarzy Bez Granic*, <https://lekarze-bez-granic.pl/ukraina/> (access: 23.07.2023 r.).

9 *Ukraina: przerwy w dostawie prądu destrukcyjnie wpływają na życie ludności cywilnej tuż przed Bożym Narodzeniem*, <https://www.amnesty.org.pl/ukraina-przerwy-w-dostawie-pradu/> (access: 23.07.2023 r.).

10 Overview of the current state of education and science in Ukraine in terms of Russian aggression (as of January 2023), Kyiv 2023.

11 *Russia's war in Ukraine threatens students daily and forces teachers to improvise*, <https://theconversation.com/russias-war-in-ukraine-threatens-students-daily-and-forces-teachers-to-improvise-196773> (access: 08.08.2023 r.).

affected students' ability to learn. Where children could reach educational facilities they had to move to them in the dark and school rooms were not heated. The energy shortage was also a handicap for teachers, who found it difficult to prepare and deliver lessons, as well as to communicate with pupils and parents. Russian military actions targeting Ukraine's energy infrastructure are part of a military and political strategy aimed at undermining Ukraine's sovereignty and territorial integrity, fomenting anti-government sentiment, and breaking the morale of the Ukrainian people. The Russian attacks have had parallel negative consequences for the economic, social, and humanitarian situation in Ukraine¹². The electricity shortage caused by the hostilities has also affected the economy and thus the standard of living of the Ukrainian people. Most households in 2022 had expenditures that could not meet their basic consumer needs¹³. Electricity blackouts were a factor generating a change in market conditions, leading to an increase in the prices of goods and services and unemployment. In particular, the prices of food, fuel, medicines, and other consumer products increased significantly. Data from the National Bank of Ukraine shows that in March 2023, inflation was 21.3%

year-on-year¹⁴. Ukraine has registered 5.3 million IDPs and up to 8 million Ukrainians who have left the country as of January 2023¹⁵. As early as November 2022, the director of Ukraine's largest private energy company DTEK, Maksim Timchenko, suggested: "People should consider leaving the country to reduce the demand on the power grid. Even if it is only for three or four months"¹⁶. What impact the attacks on Ukraine's electricity infrastructure have had on migration is difficult to assess exactly, as there are no clear statistics on this. Nevertheless, many people have left their homes and family to escape the effects of lack of electricity, heating, basic services, and armed conflict. Head of the Norwegian Refugee Council Jan Egeland predicting the exodus of the Ukrainian population said: "Right now, all over the country, people are facing a grim choice: flee or freeze"¹⁷. During the peak of the raids in December and January, Ukraine's electricity deficit increased by as much as 30%. The entire society, administration, industry, and business were obliged to reduce energy consumption. In Kiev, supermarkets and shopping malls abandoned street lighting and reduced shop window lighting. In Lviv region, lighting of building facades and operation of fountains was banned. During the curfew, street

12 *Rosyjska bezsilność – piętnaście ataków na ukraińską infrastrukturę energetyczną*, <https://www.osw.waw.pl/pl/publikacje/analizy/2023-03-10/rosyjska-bezilnosc-pietnascie-atakow-na-ukrainska-infrastruktura> (access: 03.06.2023 r.).

13 *World Food Programme, Multisectoral Needs Assessment (MSNA) 2022: Food Security Findings*. March 2023.

14 National Bank of Ukraine, *Inflation Report April 2023*, Kyiv 2023.

15 *Ukraine Emergency Situation Report #17*, <https://www.unfpa.org/resources/ukraine-emergency-situation-report-17-15-march-2023> (access: 18.09.2023 r.).

16 *Ukraine: la multiplication des attaques russes menace de plus en plus le système énergétique*, <https://www.rfi.fr/fr/europe/20221120-ukraine-la-multiplication-des-attaques-russes-menace-de-plus-en-plus-le-syst%C3%A8me-%C3%A9nerg%C3%A9tique> (access: 23.07.2023 r.).

17 *Ukraine: People cut off from aid face extreme suffering as winter conditions worsen*, <https://www.nrc.no/news/2022/november/ukraine-people-cut-off-from-aid-face-extreme-suffering-as-winter-conditions-worsen/> (access: 26.08.2023 r.).

lighting was switched off, except for road and critical infrastructure. The illumination of advertisements, signs, shops, and offices after working hours was also banned. In the Crooked Horn, Poltava and Ternopil regions, entrepreneurs violating the energy-saving regime were fined by law enforcement¹⁸. The prospect of power outages in winter has led to the prioritisation of energy supply to critical sectors and facilities. Ukraine's main efforts were directed at ensuring energy supply to hospitals and health facilities. Another area prioritised was the provision of power to critical city services. The provision of electricity to ensure the proper operation of water and sewerage services was crucial for public health and to avoid environmental disasters¹⁹. The Ukrainian authorities also focused their energies on ensuring power supply for telecommunication services and the operation of financial institutions. Lack of energy hampered rescue operations when critically needed – lack of water in the water supply made firefighting ineffective and lack of access to light made it difficult to reach those trapped under tumours. The lack of electricity has also affected the environment, especially in terms of waste generation and the release of pollutants into the environment. Damage to municipal facilities or lack of energy supply has resulted in the discharge of raw, untreated sewage containing bacteria, viruses and dangerous substances into soils, surface water and groundwater, the effects of which will be felt by society for decades.

18 *Totalna ekonomiiia svitla v Ukraini: yaki zakhody vzhyyvaiut po oblastiakh*, https://antikor.com.ua/articles/584580-totalnaja_ekonomija_sveta_v_ukraine_kakie_mery_predprinimajut_po_oblastjam (access: 23.04.2023 r.).

19 *Важлива інформація щодо якості води*, <https://vodokanal.kiev.ua/news/vazhлива-%D1%96nformacz%D1%96ya-shhodo-yakost%D1%96-vodi/> (access: 24.08.2023 r.).

Summary

Russian attacks on Ukraine's electricity infrastructure have caused serious social, economic and humanitarian consequences. Disruptions in electricity supply, worsened the living conditions of millions of Ukrainians, reduced the level of medical and educational services, and the lack of heating in winter prompted victims of the aggression to seek alternative sources of heat, with an increased risk of accidents and fires. The lack of electricity had a major impact on the economy which translated into an impoverished society. The consequences of energy supply disruptions were also one of the important causes of internal and external migration. These attacks were part of Russia's extensive military and political campaign to undermine Ukraine's sovereignty and territorial integrity, stir up anti-government sentiment and fracture the morale of the Ukrainian people.

Bibliography

Davaite v zhe pislia viiny: stan enerhetychnoi infrastruktury Ukrainy ta maibutnie haluzi, <https://delo.ua/energetics/davaite-vze-pislya-viini-stan-energeticnoyi-infrastrukturi-ukrayini-ta-maibutnje-galuzi-404840>.

Enerhetychnyi front 365 Dniv Nezlamnosti, https://ua.energy/energy_front_365.html.

Multisectoral Needs Assessment (MSNA) 2022: Food Security Findings. March 2023.

National Bank of Ukraine, *Inflation Report April 2023*, Kyiv 2023.

- Overview of the current state of education and science in Ukraine in terms of Russian aggression (as of January 2023)*, Kyiv 2023.
- People cut off from aid face extreme suffering as winter conditions worsen*, <https://www.nrc.no/news/2022/november/ukraine-people-cut-off-from-aid-face-extreme-suffering-as-winter-conditions-worsen>.
- Putin, drink in hand, blames Ukraine for Russia's bombing of its energy infrastructure: "Who started it?"*, <https://www.businessinsider.com/putin-drink-in-hand-blames-ukraine-for-russia-bombing-infrastructure-2022-12?r=US&IR=T>.
- Rosyjska bezsilność – piętnaście ataków na ukraińską infrastrukturę energetyczną*, <https://www.osw.waw.pl/pl/publikacje/analizy/2023-03-10/rosyjska-bezsilnosc-pietnascie-atakow-na-ukrainska-infrastruktura>.
- Russia's war in Ukraine threatens students daily and forces teachers to improvise*, <https://theconversation.com/russias-war-in-ukraine-threatens-students-daily-and-forces-teachers-to-improvise-196773>.
- Totalna ekonomiiia svitla v Ukraini: yaki zakhody vzhyvaiut' po oblastiakh*, https://antikor.com.ua/articles/584580-totalnaja_ekonomija_sveta_v_ukraine_kakie_mery_predprinimajut_po_oblastjam.
- Ukraina całkowicie odłączyła się od systemów energetycznych Rosji i Białorusi*, <https://www.ukrinform.pl/rubric-economy/3411390-ukraina-cakowicie-odacza-sie-od-systemow-energetycznych-rosji-i-biaorusi.html>).
- Ukraina: przerwy w dostawie prądu destrukcyjnie wpływają na życie ludności cywilnej tuż przed Bożym Narodzeniem*, <https://www.amnesty.org.pl/ukraina-przerwy-w-dostawie-pradu>.
- Ukraine Emergency Situation Report #17*, <https://www.unfpa.org/resources/ukraine-emergency-situation-report-17-15-march-2023>.
- Ukraine: la multiplication des attaques russes menace de plus en plus le système énergétique*, <https://www.rfi.fr/europe/20221120-ukraine-la-multiplication-des-attaques-russes-menace-de-plus-en-plus-le-syst%C3%A8me-%C3%A9nerg%C3%A9tique>).
- Winter in Ukraine: people's health cannot be held hostage*, <https://www.who.int/europe/news/item/21-11-2022-statement--winter-in-ukraine--people-s-health-cannot-be-held-hostage>.
- Wojna w Ukrainie, działania Lekarzy Bez Granic*, <https://lekarze-bez-granic.pl/ukraina>.
- Важлива інформація щодо якості води*, <https://vodokanal.kiev.ua/news/vazhliva-%D1%96nformacz%D1%96ya-shhodo-yakost%D1%96-vodi>.
- Енергоатом оприлюднив інфографіку ударів рф по об'єктах електроенергетики*, <https://kosatka.media/category/elektroenergiya/news/energoatom-oprilyudniv-infografiku-udariv-rf-po-ob-yektah-elektroenergetiki>.

About the Author

Piotr Anklewicz, combining technical education, professional work, and scientific activity, tries to define the contribution of energy transformation to ensuring the security of local communities.