

Cold Spot Risk Assessment 2025/2026 - Autumn update

November 2025 | Ukraine

Executive Summary

This document provides an update to the Cold Spot Risk Assessment for the winter season 2025/2026 in Ukraine. The initial assessment was published in May 2025.¹

The war in Ukraine has driven displacement, and led to the destruction of housing and energy, water and transportation infrastructure. These affect both individual and societal resilience to cold weather.

This assessment identifies “cold spots” where winter-related hazards compound with high levels of exposure, susceptibility, and reduced coping capacity. These factors are dynamic, changing year by year as the conflict continues. The update takes this into account by using newly available population estimates and conflict monitoring data.

As noted in the May edition of the index, flexible and adaptive interventions are necessary to respond to potential further deterioration of the energy infrastructure and emerging localized challenges in other areas of Ukraine.

Continuous monitoring, as well as engagement with local authorities and communities can help address the evolving needs and challenges faced by affected populations during the winter season.

Image 1: Cars driving during a power outage, Kyiv, November 2024. REACH.

Key findings

- Ukraine faces a very difficult winter, amid continuing conflict and bombardment of energy infrastructure.
- All of Ukraine is at risk of long-range aerial attacks, which can destroy infrastructure and leave large numbers of civilians in need.
- The socioeconomic drivers of vulnerability have not changed since May. However, the conflict is unrelenting and displacement continues to reconfigure local demographics.
- Damage to energy infrastructure in recent months may have created new facts on the ground, requiring planning assumptions to be revised.



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Cold Spots Index 2025/2026 - overall index

The map illustrates the presence of “cold spots” across Ukraine.

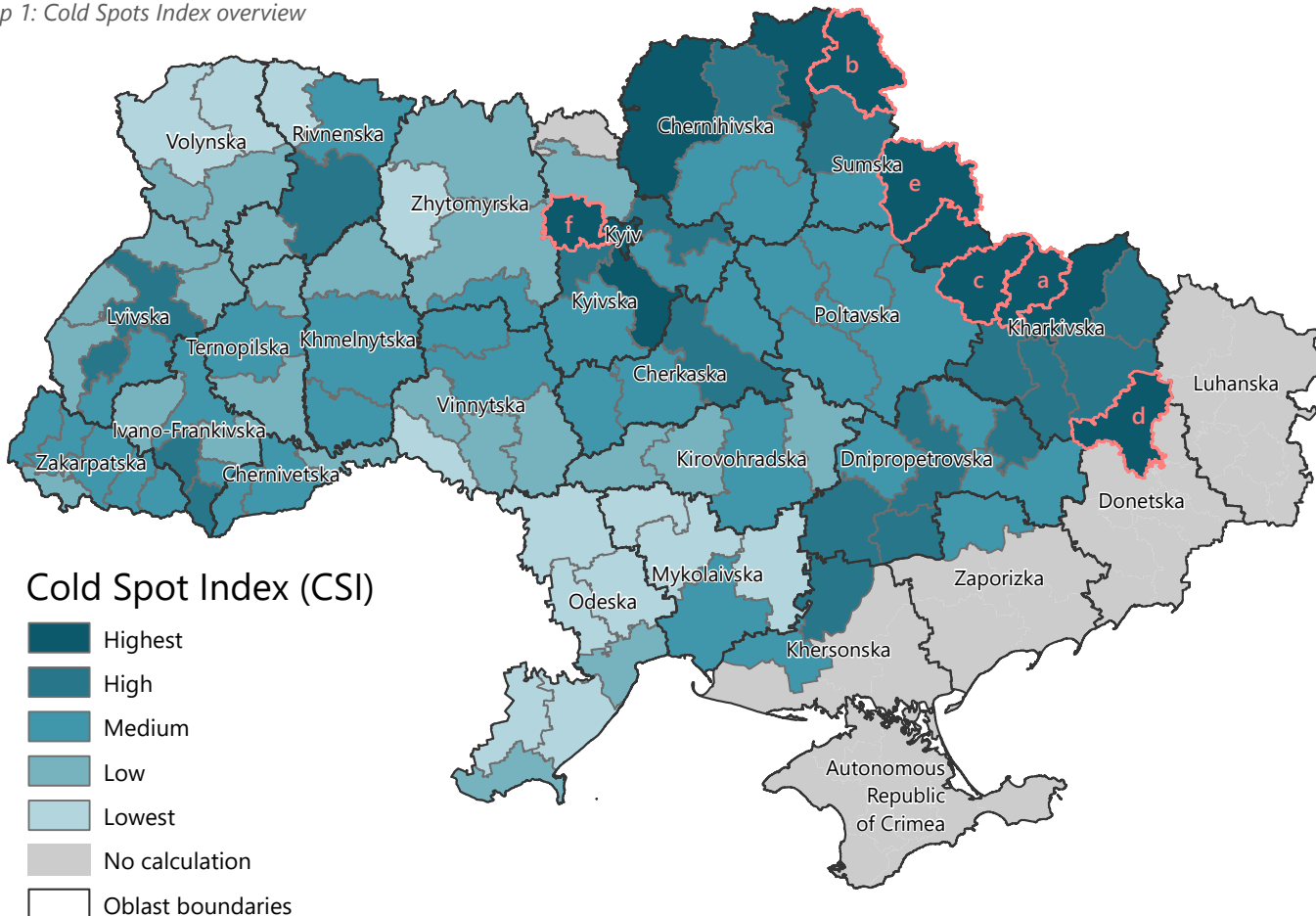
These are raions where winter conditions combine with population density, demographic vulnerability and lack of coping capabilities to indicate a high vulnerability during the heating period from October 2025 - March 2026.

The highest ranks are found in the north and east of Ukraine. Since the May 2025 edition, the six highest ranking raions have remained the same. These are ringed in red on the map. However, there has been some underlying change.

Shostkynskiyi’s “score” has risen from 3.6 to 3.8. The “highest” rank has also grown in number, from six raions in May to twelve in October. This reflects the overall upwards drive in the cold spot index, with the underlying score increasing in 16 raions.

In general, the index reflects the intensity of conflict and population shifts. The higher ranking raions are generally in the north, east and south of Ukraine. However, there have been rank increases across 15 oblasts as well as Kyiv metropolitan area. Conflict in the east drives displacement, including to central and western Ukraine. Internally displaced people can be vulnerable in any part of Ukraine, due to their specific socio-economic challenges.

Map 1: Cold Spots Index overview



Highest ranking raions

a	Kharkivskiyi (4.35)	■
b	Shostkynskiyi (3.8)	▲
c	Bohodudivskiyi (3.8)	■
d	Sumskiyi (3.65)	■
e	Kramatorskyyi (3.65)	■
f	Buchanskyyi (3.60)	■

Excluded, partially-occupied raions

The analysis is not conducted in raions which are entirely under occupation.

Seven more raions are not included, as less than half of their territory is under the control of the government of Ukraine. This complicates the calculation of the index.

This does not mean they are not exposed to winter risk. On the contrary, proximity to frontline is an overarching driver of need in Ukraine.

The excluded raions are:

- Bakhmutskyyi, Pokrovskyyi and Volnovaskyyi in Donetsk
- Sievierodonetskyyi and Svativskyyi in Luhanska
- Vasylivskyyi and Polohivskyyi in Zaporizka

Methodology

This analysis is adapted from the disaster risk model established by the Inter-Agency Standing Committee (IASC) Reference Group on Risk, Early Warning and Preparedness and the European Commission. It conceptualises risk as the interplay of hazard, exposure and vulnerability, the latter comprising susceptibility and lack of coping capacities.

A geo-spatial analysis was conducted using aggregated data from various indicators to identify areas most affected by winter-related hazards and vulnerabilities. This analysis used datasets at the raion level. The analysis covered 106 raions (administrative level 2) mostly (more than 50%) under the control of the government of Ukraine as of October 2025.

Raions for which REACH could not obtain up-to-date data are marked “No calculation” on the maps. All datasets are available at the raion level. Each dimension is weighted and normalized on a scale from 0 (lowest risk) to 1 (highest risk) to rank raions accordingly.

“Cold spots” were identified based on four groups of indicators: hazard, exposure, susceptibility, and lack of coping capacity (LOCC). The scores for each indicator are categorised using Jenk’s Natural Breaks. The selected datasets for each group are:

Hazard:	frequency of cold waves, snow cover duration days per year, number of cold days per year, and number of frost days per year - averages from 2004 to 2025. ⁴ Historical data on these factors are analyzed to determine the likelihood and intensity of winter hazards on the raion level.
Exposure:	the estimated population density as of July 2025. ² Higher population density indicates more people potentially affected by winter hazards.
Susceptibility:	the percentage of the elderly (65 years and over) and young (up to 14 years) population as of July 2025, ² the percentage of internally displaced persons (IDPs) per raion as of August 2025, ³ and the percentage of people living in active collective sites as of September 2025. ⁴ These factors contribute to assessing the inherent vulnerability of the population at the raion level.
LOCC:	conflict incidents density per 100 sq km from October 2024 to October 2025, ⁸ cumulative damage to electricity and gas infrastructure from October 2024 to October 2025, ⁹ and needs from the district heating and energy sectors in capacity of equipment (MW). ¹⁰ These indicators highlight the infrastructural challenges and capacity limitations that exacerbate vulnerability.

The overall ‘Cold Spot Index’ (CSI) is calculated using the following formula:

$$CSI = Hazard\ Class * 0.35 + Exposure\ Class * 0.25 + \left(\frac{Susceptibility + LOCC}{2} \right) * 0.4$$

This formula defines Cold Spot risk as a combination of hazard (weighted 35%), exposure (weighted 25%), and vulnerability (weighted 40% and understood as a combination of susceptibility and LOCC).

A final “rank” is assigned using Jenk’s Natural Breaks. The number of raions in each rank is determined by the Jenk’s Natural Breaks algorithm.

Updated analysis

New data is available for general population estimates, IDP estimates, and conflict data.

Other indicators are left the same as in the previous calculation from May.

Limitations

Population figures are estimates. Population is highly dynamic. Ukraine has not completed a census since 2001.

The results should be interpreted in the context of ongoing attacks on the energy sector and damage from drone/missile attacks on residential infrastructure. The situation is highly changeable.

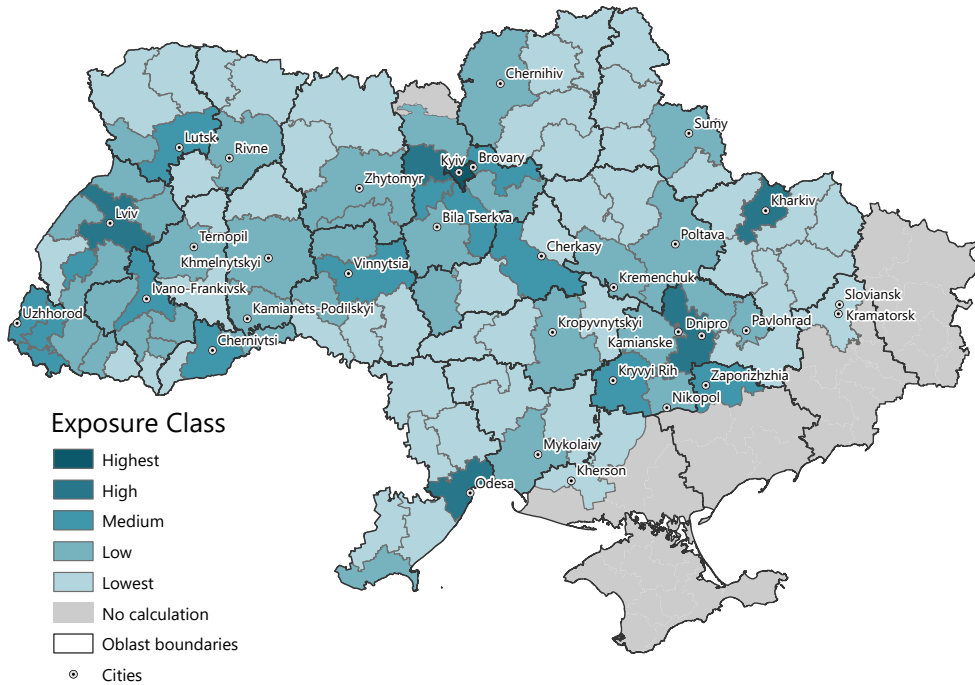
Electricity, gas and water networks are national. Localised damage can have national effects. It is not possible to fully capture this within the model used here.

Climate is becoming increasingly unpredictable, globally.

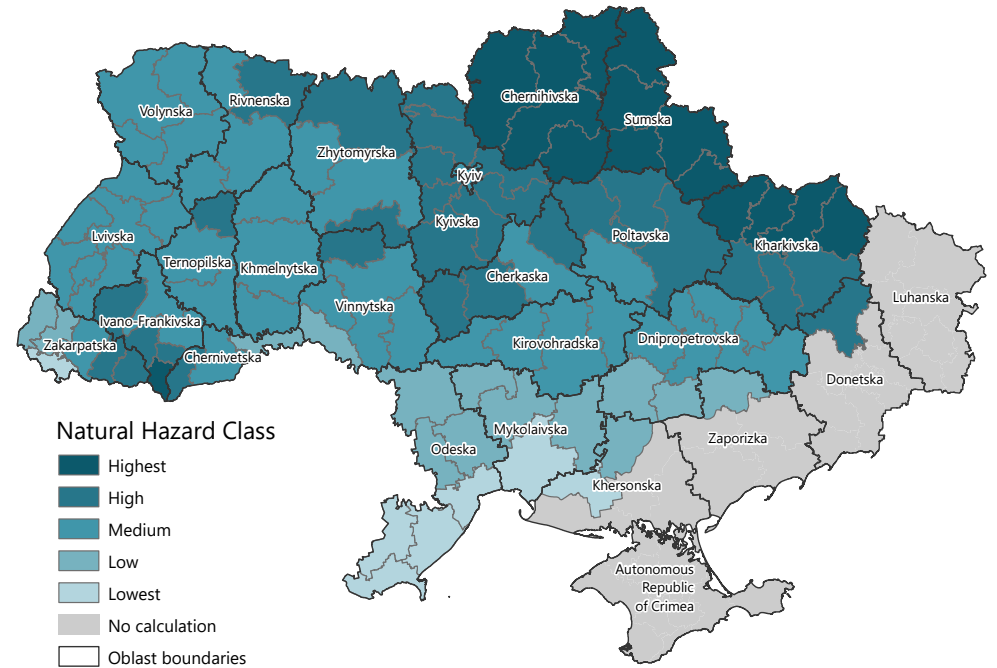
Raions are excluded from the analysis if less than half of their territory was under the control of the government of Ukraine.

Exposure, hazard, susceptibility and lack of coping capacity

Map 2: Indication of population density across Ukraine



Map 3: Natural hazard level across Ukraine per raion



Exposure

Exposure is calculated according to the population density of the raion, based on estimates from July 2025.²

Ukraine has been through population upheaval since the beginning of the full-scale invasion in February 2022.

As of October 2025, the higher exposure values are in Kyiv, Odeskiy, Lvivskiy, Dniprovskiy, Buchanksiy and Kharkivskiy. In general, the highest density raions are also home to the oblast city centers.

There are relatively densely populated raions even close to the frontline, in Kharkivska, Zaporizka and Odeska oblasts.

Natural Hazard

The “natural hazard” class is calculated according to the mean number of frost days, cold days, and snow days, and the frequency of coldwaves.^{5 6} The mean is calculated from 2005 to 2024. This means it is unchanged from the May edition of the index.

The northeastern regions, including Chernihivska, Sumska, Kharkivska and Donetsk oblasts, face the highest winter hazards due to their proximity to colder air masses.

Central regions like Poltavska and Kyivska also exhibit high hazard levels. There is a localised area of higher hazard around Ivano-Frankivsk and Zakarpatska, along the Carpathian mountains.

Western areas such as Zakarpatska, Lvivska, and Ivano-Frankivska experience lower hazards, moderated by the Carpathian Mountains, whilst southern regions like Odeska and Mykolaivska have relatively low risk due to the Black Sea’s influence.

Susceptibility

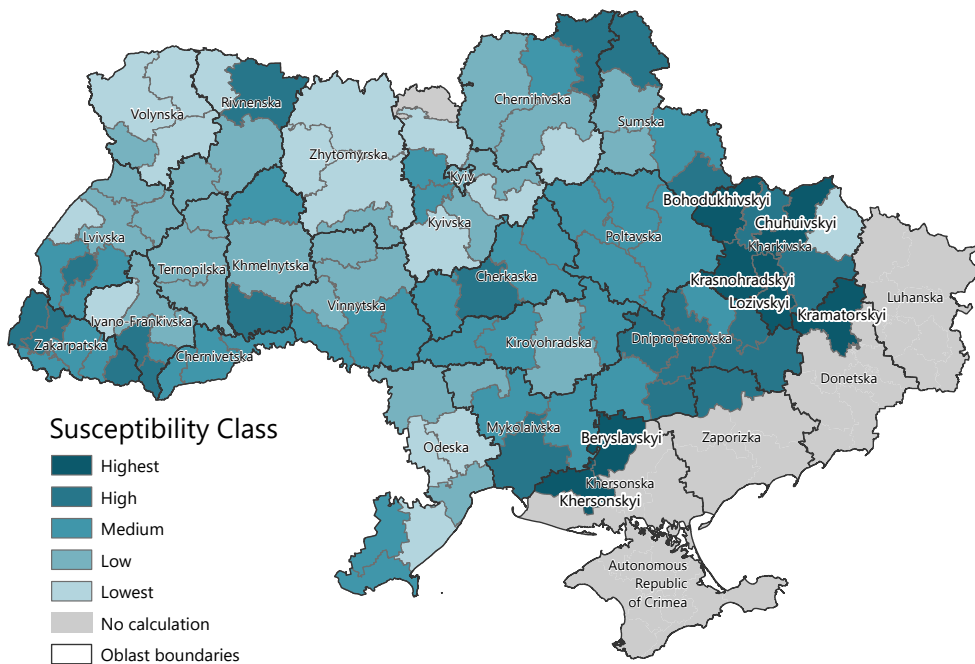
The “susceptibility class” is calculated based on the proportion of the population who are either under 14 or older than 65, as well as the proportion of the population who are IDPs, and their presence in collective sites.^{2 3 4}

The level of vulnerability to winter conditions varies across Ukraine’s oblasts. The highest-ranking raions are labelled. The highest susceptibility ranks are in Kharkivska, Donetska, and Khersonska oblasts.

However, there are prevalent “high” levels of susceptibility in Dnipropetrovska and Mykolaivska, as well as western Ukraine.

The socio-economic vulnerabilities these people may experience are heightened during the winter, when heating costs strain household finances.⁷

Map 4: Susceptibility level across Ukraine per raion



Lack of Coping Capacity

The “lack of coping capacity” class is calculated according to the intensity of conflict incidents per 100 square kilometers,⁸ records of damage to infrastructure,⁹ and reported outstanding issues in district heating systems.¹⁰ The highest-ranking raions are labelled.

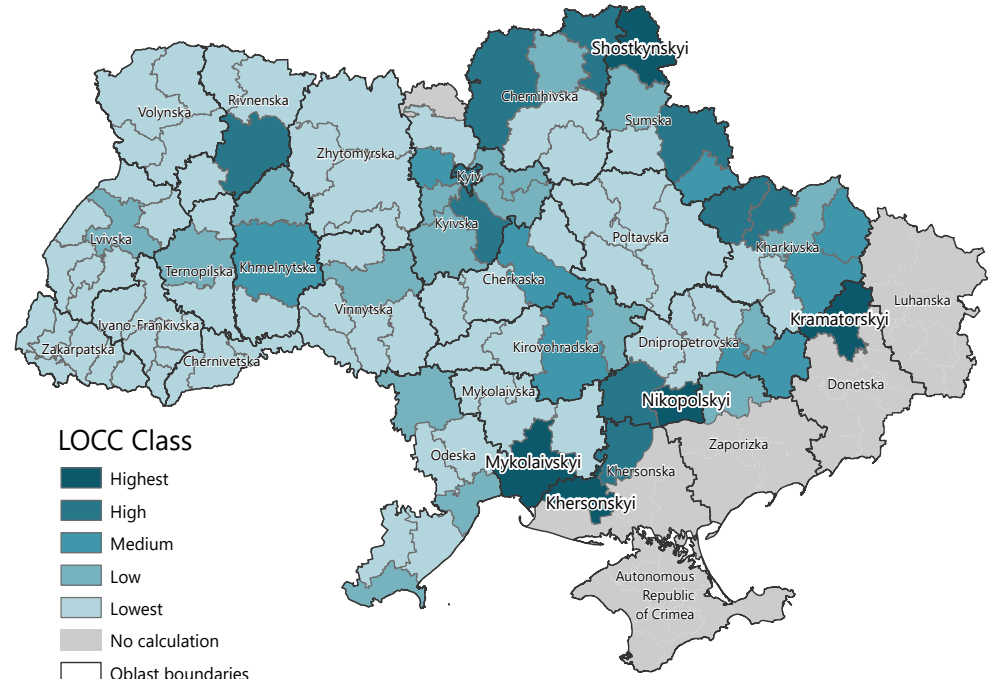
The highest values are in raions along the frontline, and Ukraine’s border with the Russian Federation. This reflects the intense concentration of conflict along the frontline.

In general, there has been limited frontline movement over the past year, although the army of the Russian Federation has advanced and the army of Ukraine has made counter-offensives.

At the same time, the conflict has been marked by long-range attacks by the Russian Federation on Ukraine’s critical energy infrastructure.¹¹ This has become more prominent in September and October 2025.¹²

There are medium and high-ranking raions throughout Ukraine, reflecting the still vulnerable state of national electricity, water, gas and heating infrastructure.

Map 5: “Lack of coping capacity” level across Ukraine per raion



Frontline raions

As of October 2025, the raions with the highest Cold Spot Index rankings are situated either along the frontline, or along Ukraine’s northern border with the Russian Federation. Data from ACLED, presented in graph 1, shows that the rate of conflict incidents per raion per quarter has been gradually increasing since 2022, and fastest at the frontline.

Some frontline raions are given relatively low overall Cold Spot Index scores, due to their relatively mild climate. However, their conflict exposure can be high. For example, Mykolaivskiy, Khersonskiy, Beryslavskiy, Kryvorizkiy and Nikopolskiy all score either “high” or “highest” in terms of lack of coping capacity. That a relatively “medium” classification can even be found along the frontline reflects the high concentration of conflict incidents near the frontline.

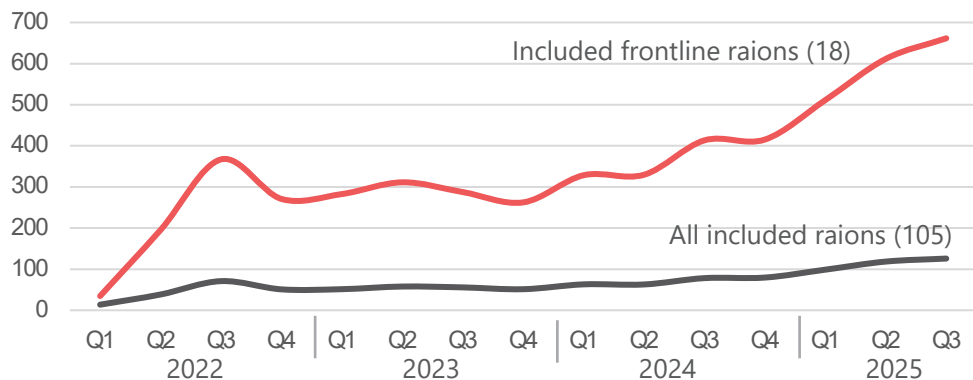
The Lack of Coping Capacity component is an important driver of overall vulnerability. It reflects the raion’s exposure to the conflict, measured as the number of conflict incidents and damage to critical infrastructure. People in these raions are vulnerable year round, though cold weather may futher strain their ability to withstand crisis.

There are large-scale attacks across Ukraine.¹³ Still, the conflict has always been most intense nearest to the frontline and border. This intensity continues to grow.

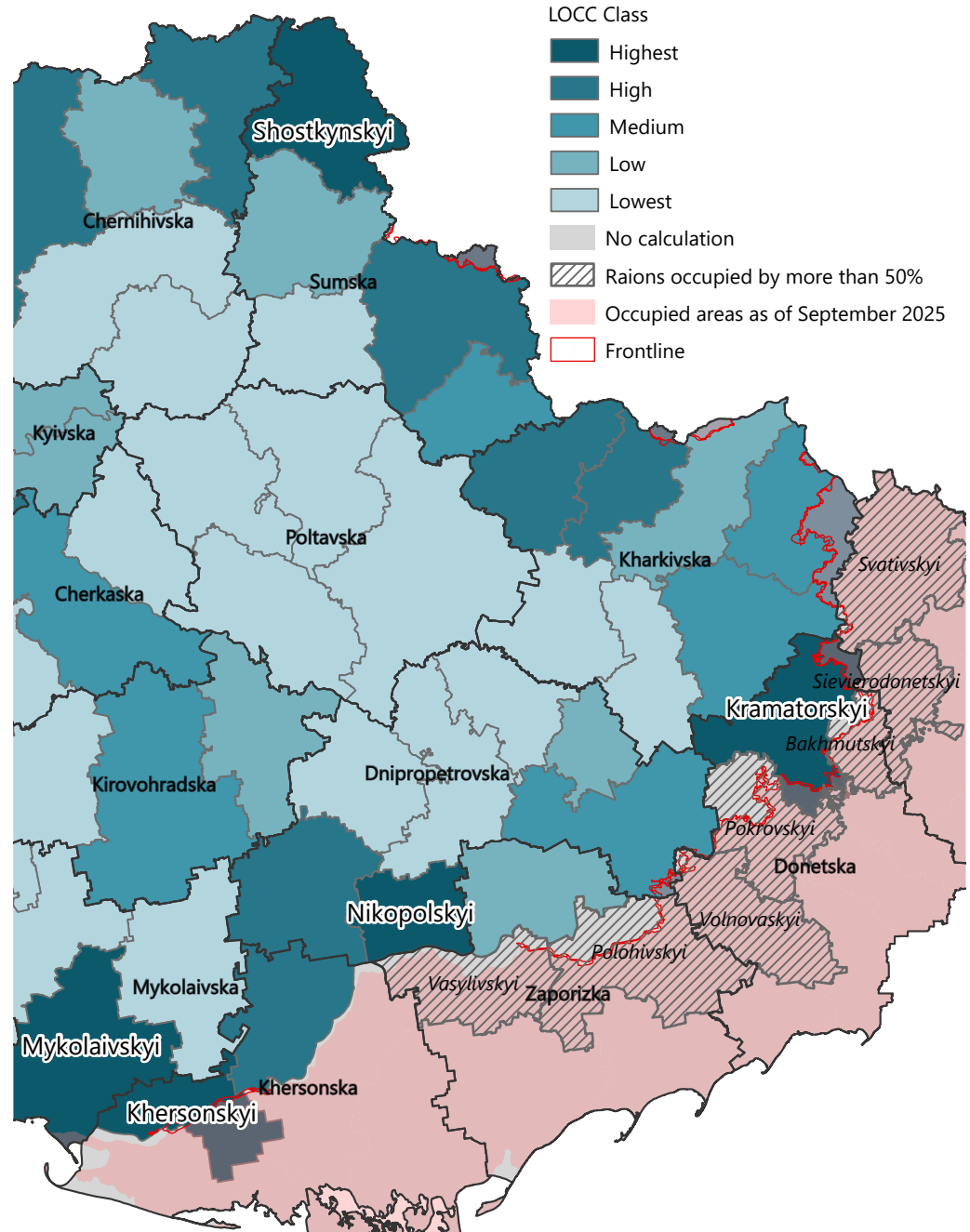
In May, the Institute for the Study of War noted that advances by the armed forces of the Russian Federation had “significantly slowed”, whilst “long-range strikes against Ukraine” had “intensified”.¹⁴ By September, the ISW was assessing that Russia favours a “war of attrition”, by continuing to target Ukraine’s energy network and other critical infrastructure whilst “indefinitely maintaining the theater-wide initiative”.¹⁵

As noted in May, the United Nations Human Rights Council referred to “widespread and systematic” drone attacks targeting civilians in Khersonska. These mean “residents take risks every time they go outside”.¹⁶ This severely affects coping capacity. In June, the United Nations Human Rights Monitoring Mission for Ukraine published further research evidencing this practice across the frontline.¹⁷

Graph 1: average number of “explosion/remote violence” or “battle” incidents per raion, ACLED



Map 6: “Lack of coping capacity” level per frontline raion



Infrastructure challenges

The May edition of the Cold Spots Index highlighted challenges posed by damage to critical infrastructure. The situation since then has become still more concerning.

Official messaging ahead of the 2025/26 “heating season” indicated that Ukraine’s electricity grid would be able to handle winter demand without the need for scheduled blackouts.^{18 19} However, the statements also acknowledged that this assessment was contingent on the infrastructure not being damaged further.

Military analysts, United Nations reports, and statements by politicians all indicate that energy infrastructure is being targeted as of September 2025.^{20 21 22 23}

In October, the mayor of Kharkiv stated that he anticipated that “the coming winter will be the hardest for Kharkiv in all years of the war”.²⁴ The United Nations Human Rights Monitoring Mission in Ukraine noted that there was an increase in attacks on energy infrastructure from August to September 2025.²⁵

At the start of October 2025, Odesa suffered a large power outage following a severe storm.²⁶ The same week, Chernihivska introduced a schedule after energy facilities were struck.²⁷ Attacks were sustained over a week, and other oblasts faced outages too.^{28 29}

On the 10th October, the army of the Russian Federation launched a nationwide air assault, which struck energy infrastructure. There were electricity and water outages.³⁰ In the following days, “emergency” outages and demand-management procedures were put in place by electricity companies in different parts of Ukraine.³¹

As of the 13th October, the true scale of the consequences is only beginning to be understood. Planning assumptions may need to be revised to reflect the new reality.

Cold Spots Index Results Table

PCODE	Raion	Oblast	Natural Hazard	Exposure	Susceptibility	LOCC	Index Score	Index Class
UA6312	Kharkivskiyi	Kharkivska	5	4	4	4	4.35	Highest
UA5910	Shostkynskiyi	Sumska	5	1	4	5	3.8	Highest
UA6302	Bohodukhivskiyi	Kharkivska	5	1	5	4	3.8	Highest
UA5908	Sumskiyi	Sumska	5	2	3	4	3.65	Highest
UA1412	Kramatorskyyi	Donetska	4	1	5	5	3.65	Highest
UA3208	Buchanskyyi	Kyivska	4	4	3	3	3.6	Highest
UA7406	Novhorod-Siverskyyi	Chernihivska	5	1	4	4	3.6	Highest
UA8000	Kyiv	Kyiv	3	5	2	4	3.5	Highest
UA7410	Chernihivskyyi	Chernihivska	5	2	2	4	3.45	Highest
UA5904	Okhtyrskyyi	Sumska	5	1	4	3	3.4	Highest
UA6314	Chuhuivskyyi	Kharkivska	5	1	5	2	3.4	Highest
UA3212	Obukhivskyyi	Kyivska	4	3	2	4	3.35	Highest
UA3214	Fastivskyyi	Kyivska	4	3	3	2	3.15	High
UA1202	Dniprovskyyi	Dnipropetrovska	3	4	4	1	3.05	High
UA6304	Iziumskyyi	Kharkivska	4	1	4	3	3.05	High
UA1208	Nikopolskyyi	Dnipropetrovska	2	2	4	5	3	High
UA2602	Verkhovynskyyi	Ivano-Frankivska	5	1	4	1	3	High
UA7108	Cherkaskyyi	Cherkaska	3	3	3	3	3	High
UA7402	Koriukivskyyi	Chernihivska	5	1	3	2	3	High
UA3206	Brovarskyyi	Kyivska	4	3	2	2	2.95	High
UA2612	Nadvirnianskyyi	Ivano-Frankivska	4	2	4	1	2.9	High
UA1206	Kryvorizkyyi	Dnipropetrovska	2	3	3	4	2.85	High
UA6306	Berestynskyyi	Kharkivska	4	1	5	1	2.85	High
UA6310	Lozivskyyi	Kharkivska	4	1	5	1	2.85	High
UA4606	Lvivskyyi	Lvivska	3	4	2	2	2.85	High
UA4602	Drohobytsskyyi	Lvivska	3	3	4	1	2.8	High
UA5902	Konotopskyyi	Sumska	5	1	2	2	2.8	High
UA6308	Kupianskyyi	Kharkivska	5	1	1	3	2.8	High
UA1212	Pavlohradskyyi	Dnipropetrovska	3	2	4	2	2.75	High



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UA5606	Rivnenskyi	Rivnenska	3	2	2	4	2.75	High
UA6502	Beryslavskyi	Khersonska	2	1	5	4	2.75	High
UA1214	Synelnykivskyi	Dnipropetrovska	3	1	4	3	2.7	Medium
UA2108	Tiachivskyi	Zakarpatska	4	2	3	1	2.7	Medium
UA2610	Kosivskyi	Ivano-Frankivska	4	2	3	1	2.7	Medium
UA5308	Poltavskyi	Poltavska	4	2	3	1	2.7	Medium
UA7106	Umanskyi	Cherkaska	4	2	3	1	2.7	Medium
UA2306	Zaporizkyi	Zaporizka	2	3	4	2	2.65	Medium
UA2106	Rakhivskyi	Zakarpatska	4	1	4	1	2.65	Medium
UA4806	Mykolaivskyi	Mykolaivska	1	2	4	5	2.65	Medium
UA5608	Sarnenskyi	Rivnenska	4	1	4	1	2.65	Medium
UA7102	Zvenyhorodskyi	Cherkaska	4	1	4	1	2.65	Medium
UA5906	Romenskyi	Sumska	5	1	2	1	2.6	Medium
UA6510	Khersonskyi	Khersonska	1	1	5	5	2.6	Medium
UA7404	Nizhynskyi	Chernihivska	5	1	2	1	2.6	Medium
UA0502	Vinnytskyi	Vinnytska	3	3	2	2	2.6	Medium
UA7306	Chernivetskyi	Chernivetska	3	3	3	1	2.6	Medium
UA1204	Kamianskyi	Dnipropetrovska	3	2	4	1	2.55	Medium
UA3504	Kropyvnytskyi	Kirovohradska	3	2	2	3	2.55	Medium
UA6802	Kamianets-Podilskyi	Khmelnytska	3	2	4	1	2.55	Medium
UA6804	Khmelnytskyi	Khmelnytska	3	2	2	3	2.55	Medium
UA0512	Khmilnytskyi	Vinnytska	4	2	2	1	2.5	Medium
UA1802	Berdychivskyi	Zhytomyrska	4	2	2	1	2.5	Medium
UA3202	Bilotserkivskyi	Kyivska	4	2	1	2	2.5	Medium
UA3204	Boryspilskyi	Kyivska	4	2	1	2	2.5	Medium
UA2104	Mukachivskyi	Zakarpatska	2	3	4	1	2.45	Medium
UA2110	Uzhhorodskyi	Zakarpatska	2	3	4	1	2.45	Medium
UA5304	Lubenskyi	Poltavska	4	1	3	1	2.45	Medium
UA5306	Myrhorodskyi	Poltavska	4	1	3	1	2.45	Medium
UA7104	Zolotoniskyi	Cherkaska	4	1	3	1	2.45	Medium
UA7302	Vyzhnytskyi	Chernivetska	4	1	3	1	2.45	Medium
UA2604	Ivano-Frankivskyi	Ivano-Frankivska	3	3	2	1	2.4	Medium

UA7408	Prylutskyi	Chernihivska	5	1	1	1	2.4	Medium
UA1210	Samarivskyi	Dnipropetrovska	3	2	3	1	2.35	Medium
UA2112	Khustskyi	Zakarpatska	3	2	3	1	2.35	Medium
UA4610	Stryiskyi	Lvivska	3	2	3	1	2.35	Medium
UA5302	Kremenchutskyi	Poltavska	3	2	3	1	2.35	Medium
UA6104	Ternopilskyi	Ternopilska	3	2	2	2	2.35	Medium
UA2606	Kaluskyi	Ivano-Frankivska	4	2	1	1	2.3	Low
UA3210	Vyshhorodskyi	Kyivska	4	2	1	1	2.3	Low
UA3508	Oleksandrii skyi	Kirovohrad ska	3	1	3	2	2.3	Low
UA6806	Shepetivskyi	Khmeln ytska	3	1	3	2	2.3	Low
UA6102	Kremenetskyi	Ternopilska	4	1	2	1	2.25	Low
UA0708	Lutskyi	Volynska	3	3	1	1	2.2	Low
UA5110	Odeskyi	Odeska	1	4	2	2	2.15	Low
UA0506	Zhmerynskyi	Vinnytska	3	2	2	1	2.15	Low
UA0702	Volodymyrskyi	Volynska	3	2	2	1	2.15	Low
UA2608	Kolomyiskyi	Ivano-Frankivska	3	2	2	1	2.15	Low
UA4604	Zolochivskyi	Lvivska	3	2	2	1	2.15	Low
UA4612	Sheptytskyi	Lvivska	3	2	2	1	2.15	Low
UA0504	Haisynskyi	Vinnytska	3	1	3	1	2.1	Low
UA0510	Tulchynskyi	Vinnytska	3	1	3	1	2.1	Low
UA3502	Holovanivskyi	Kirovohrad ska	3	1	3	1	2.1	Low
UA3506	Novoukrainskyi	Kirovohrad ska	3	1	3	1	2.1	Low
UA4608	Sambirskyi	Lvivska	3	1	3	1	2.1	Low
UA1806	Korosten skyi	Zhytomyrska	4	1	1	1	2.05	Low
UA3200	Chornobyl Exclusion Zone	Kyivska	4	1	1	1	2.05	Low
UA7304	Dnistrovskyi	Chernivetska	2	2	3	1	2	Low
UA1804	Zhytomyrskyi	Zhytomyrska	3	2	1	1	1.95	Low
UA4614	Yavorivskyi	Lvivska	3	2	1	1	1.95	Low
UA2102	Berehivskyi	Zakarpatska	1	3	3	1	1.9	Low
UA5604	Dubenskyi	Rivnenska	3	1	2	1	1.9	Low
UA6106	Chortkivskyi	Ternopilska	3	1	2	1	1.9	Low
UA5108	Izmailskyi	Odeska	1	2	3	2	1.85	Low

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UA0508	Mohyliv-Podilskiy	Vinnytska	2	1	3	1	1.75	Lowest
UA4802	Bashtanskyi	Mykolaivska	2	1	3	1	1.75	Lowest
UA4804	Voznesenskyi	Mykolaivska	2	1	3	1	1.75	Lowest
UA5112	Podilskiy	Odeska	2	1	2	2	1.75	Lowest
UA0704	Kamin-Kashyrskiy	Volynska	3	1	1	1	1.7	Lowest
UA0706	Kovelskyi	Volynska	3	1	1	1	1.7	Lowest
UA1808	Zviahelskyi	Zhytomyrska	3	1	1	1	1.7	Lowest
UA5602	Varaskiy	Rivnenska	3	1	1	1	1.7	Lowest
UA4808	Pervomaiskyi	Mykolaivska	2	1	2	1	1.55	Lowest
UA5106	Bolhradskiy	Odeska	1	1	3	1	1.4	Lowest
UA5102	Berezivskiy	Odeska	2	1	1	1	1.35	Lowest
UA5114	Rozdilnianskyi	Odeska	2	1	1	1	1.35	Lowest
UA5104	Bilhorod-Dnistrovskiy	Odeska	1	1	1	1	1	Lowest

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