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Ukraine’s strikes on Russia’s Oil Infrastructure: An Energy Security and Geo Economic Perspective

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EXECUTIVE BRIEF & KEY FINDINGS

Ukraine’s strikes on Russian oil infrastructure are no longer isolated battlefield actions. They represent a deliberate campaign of economic attrition aimed at the energy system sustaining Russia’s war effort. By targeting refineries, storage depots, pipelines and export facilities deep inside Russian territory, Kyiv has transformed relatively inexpensive long-range drones into instruments of “kinetic sanctions” that disrupt fuel production, constrain export revenues and expose vulnerabilities across Russia’s hydrocarbon economy. The campaign illustrates a wider shift in modern warfare: critical energy infrastructure is increasingly becoming a strategic centre of gravity where military operations, energy security and geoeconomic coercion converge.

Critical energy infrastructure, in the 21st century, has evolved beyond its traditional economic function into a strategic asset underpinning a state's national resilience, geoeconomic influence, energy security and during conflicts. Although attacks on energy infrastructure are not a new feature of warfare, they have assumed heightened strategic importance in contemporary conflicts as belligerents increasingly seek to impose economic attrition, undermine fiscal capacity and degrade an adversary's war-sustaining capability.

Ukraine's sustained strikes on Russia's oil infrastructure exemplify this strategic shift, where attacks on refineries, storage facilities and other critical components of Russia's oil sector have sought to disrupt energy production, impose economic costs and challenge the resilience of one of the world's largest hydrocarbon producers.

Evolution of Ukraine's campaign against Russia's Oil Infrastructure

Ukraine has increasingly adopted asymmetric strategies to counter Russia's conventional military superiority. One of these are the sustained long-range strikes on Russia's oil infrastructure which have emerged as an integral component of Ukraine's broader war campaign, aimed at imposing/inflicting strategic and economic costs beyond the battlefield by targeting the backbone of the Russian economy.

While both belligerents have targeted critical energy infrastructure during the conflict, Russia initially dominated this domain, with Ukraine largely remaining on the receiving end of sustained attacks on its electricity generation and transmission infrastructure. Russia was the first to systematically target critical energy assets. In September 2022, it attacked Ukraine's second-largest thermal power plant, Kharkiv TEC-5, leaving much of eastern Ukraine without electricity. This was followed by one of Russia's largest missile and drone campaigns against Ukraine's energy infrastructure in October 2022, involving 84 cruise missiles and 24 suicide drones targeting 14 regions, including the capital city of Kyiv reportedly damaging nearly 30 % of Ukraine's energy infrastructure. By November 2022, almost half of Ukraine's power grid had become non-operational, leaving around 10 million Ukrainians without electricity. By mid-2024, Ukraine had retained only one-third of its pre-war electricity-generating capacity, underscoring the devastating and long-term impact of Russia's campaign against Ukraine's critical energy infrastructure.

The shift

During the initial phase of the conflict (2022–2023), Ukraine's response remained largely focused on conventional military objectives, including ammunition depots, military installations and tank engine manufacturing facilities. Ukraines attacks on Russia's oil infrastructure remained limited, with only three recorded strikes on oil facilities located near the war zone during 2022. Ukraine expanded these attacks in 2023, striking 13 Russian oil facilities, including the significant attack on the Voronezh oil depot in June 2023, but these operations remained sporadic and lacked the characteristics of a coordinated strategic campaign against Russia's energy sector.

The year 2024 marked a decisive turning point in Ukraine's strategy. Ukraine began systematically targeting Russia's oil refineries, storage depots and other critical components of its oil infrastructure deep inside Russian territory, rather than carrying out isolated attacks. Major facilities such as the Kirishinefteorgsintez (KINEF) and Ryazan refineries became repeated targets, reflecting a deliberate shift towards undermining Russia's refining capacity and disrupting its oil sector. By the end of 2024, Ukraine had successfully conducted 108 strikes on Russian oil infrastructure, of which 61 targeted oil refineries. Approximately 40 attacks resulted in major fires and extensive damage, reducing Russian refining volumes to their lowest level in twelve years, lowering Russia's seaborne petroleum trade by around 10 %, and damaging nearly 11 % of the country's total oil refining capacity. The most significant attacks were the strikes on the Tuapse oil refinery on the Black Sea coast and the Volgograd refinery in southern Russia during January-February 2024, representing Ukraine's first successful long-range strikes conducted over distances exceeding 800 kilometres.

Ukraine further intensified its campaign during 2025, significantly expanding both the scale and geographical reach of its long-range strikes. In 2025, Ukraine conducted an unprecedented 658 deep strikes, defined as attacks carried out more than 100 kilometres inside Russian territory, almost double the 335 deep strikes undertaken between 2021 and 2024 combined. The intensity of these operations was reflected in repeated drone attacks against major oil facilities, including multiple strikes on the Ryazan refinery, a key supplier to Moscow. The overall damage to Russia's refining sector during 2025 was estimated at USD 13.5 billion, highlighting the growing effectiveness of Ukraine's deep-strike campaign.

The campaign reached an unprecedented level during 2026. In the first quarter alone, Ukraine carried out 194 attacks on Russian oil refineries, eleven times the number recorded during the corresponding period in 2025 and with the current pace it is estimated that Ukraine is on track to execute 800 deep strikes in 2026. Beyond the increase in the frequency of the attacks, their severity and impact has also intensified. By July 2026, Ukraine had targeted Russia's eleven largest oil refineries, including Kirishi, Ryazan (offline since 15 May. 2026), Kstovo (struck on 2 July, 2026 and operating at less than half its capacity), Yaroslavl, Volgograd, Perm, Moscow (expected to remain offline through the end of the year), and Novokuibyshevsk, among others. Ukraine's recent strike targeting the Omsk refinery, 2500 km away is of particular significance demonstrating the amplified intensity, scale and the augmented range of Ukrainian Drones. According to Ukraine's General Staff, these sustained attacks have affected nearly 42 % of Russia's total oil refining capacity, reflecting an unprecedented scale and intensity of Ukraine's campaign against Russia's critical oil infrastructure and highlights the transformation of Ukraine's campaign from sporadic attacks against Russian oil facilities near the frontline to sustained long-range strikes targeting critical energy infrastructure

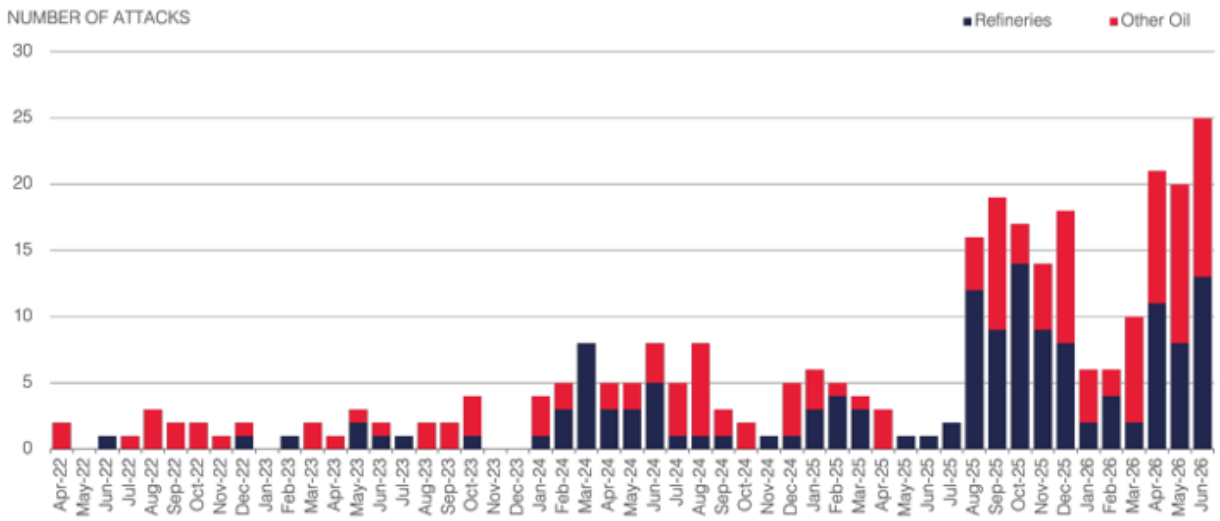

Fig.1 (Source: Henderson and Economou, 2026)

Improved Efficacy of Ukrainian strikes

This evolution of Ukrainian attacks deep inside Russian territory, including assets located over 1,200 kilometres away reflects a deliberate move towards targeting the economic foundations sustaining Russia's war effort. The expansion of this campaign was closely linked to Ukraine's growing reliance on cost-effective indigenous drone capabilities., Beginning in 2023, Ukraine accelerated the development of its domestic long-range strike programme, and by 2024, it had begun deploying domestically produced drones such as the Liutyi and FP-1 coinciding with intensification of attacks on Russian oil infrastructure which enabled sustained strikes at scale. The cost-effectiveness and scalability of these systems significantly enhanced Ukraine's ability to sustain attacks against Russian energy assets. The FP-1 drone, costing approximately USD 55,000, has a range of up to 1,200 kilometres and a 120 kg warhead, accounting for a significant proportion of Ukraine's long-range strikes and confirmed target hits. Similarly, the Liutyi drone, costing approximately USD 200,000, provides a range of nearly 2,000 kilometres with a 75 kg warhead, offering a lower-cost alternative to conventional cruise missiles. Ukraine further expanded production capacity, increasing FP-1 output from 30 drones per day to 200 drones per day by December 2025, while Liutyi production reached approximately 1,000 units per month. Though the military effectiveness of Ukraine's drone campaign is not discussed here, these developments are important for understanding the sustainability and scale of strikes against Russia's oil infrastructure. The combination of indigenous production, cost efficiency and increased availability enabled Ukraine to repeatedly target

critical energy assets, reinforcing the role of energy infrastructure attacks as an instrument of economic and resource warfare.

Impact on Russian Energy Infrastructure

The sustained targeting of Russia's oil infrastructure such as oil refineries, storage depots and fuel logistics has extended the effects of the conflict beyond the battlefield and have undermined the availability, reliability and resilience of Russia's downstream oil sector. As the intensity of the attacks reached unprecedented levels in June 2026 , nearly one-third of Russia's refining capacity was offline simultaneously, highlighting the scale and persistence of disruptions to the country's energy system. The repeated targeting of Russia's refining sector has significantly reduced the country's refining capacity and fuel production. By mid-2026, approximately 42 % of Russia's total refinery capacity had been disabled.

Table 1: The Russian refining system and the impact of Ukraine's drone attacks

Refinery	Capacity (kbpd)	Owner	Location	Most Recent Attack
Slavyansk	90	ECO Group	Krasnodar, S. Russia	26-Jan
Orsk	120	Forte Invest	Orenburg, S. Russia	29-Apr
Salavat	200	Gazprom	Bashkortostan, Russia	
Omsk	428	Gazprom Neft	Omsk, Central Russia	06-Jul
Moscow	220	Gazprom Neft	Moscow	18-Jun
Kaluga	24	KalugaNeft NPZ	Moscow	
Ilsky	132	KNGK	S. Russia	02-Jun
Volgograd	314	Lukoil	Volgograd, S. Russia	29-May
Ukhta	73	Lukoil	NW Russia, near St Petersburg	12-Feb
NORSI	341	Lukoil	East of Moscow	20-May
Perm	262	Lukoil	Perm, Urals Region	07-May
Yaisky	60	Neftechimservis	Kemerovo, E. Siberia	
Mariisky	34	New Stream	East of Moscow	
Saratov	135	Rosneft	Saratov, S. Russia	31-May
Kuibyshev	135	Rosneft	Saratov, S. Russia	09-Jun
Novokuibyshev	164	Rosneft	Saratov, S. Russia	18-Apr
Ryazan	342	Rosneft	Ryazan, S of Moscow	15-May
Ufa	150	Rosneft	Bashkortostan, Russia	
Novoil (Novo-Ufimsky)	143	Rosneft	Bashkortostan, Russia	25-Jun
Ufaneftekhim	190	Rosneft	Bashkortostan, Russia	25-Jun
Achinsk	150	Rosneft	Krasnoyarsk, E. Russia	
Tuapse	240	Rosneft	Black Sea coast, S. Russia	27-May
Komsomolsk	160	Rosneft	Khabarovsk, F.E. Russia	
Syzran	178	Rosneft	Moscow	21-May
Angarsk	204	Rosneft	Irkutsk, E. Siberia	
Yanos (Yaroslavl)	300	Slavneft	Yaroslav, NE of Moscow	12-May
Afipsky	120	SAFMAR	Krasnodar	11-Jun
Antipinsky (Tyumen)	180	Socar Energ	Tyumen, West Siberia	20-Jun
Kirishi	420	Surgutneftegaz	St. Petersburg, NW Russia	05-May
Ust Luga	140	Novatek	St. Petersburg, NW Russia	27-Mar
Taneco	341	Tatneft	Tatarstan, Russia	11-Jun
Taif	160	Tatneft	Tatarstan, Russia	11-Jun
Novoshakhtinsky	100	Yug Energo	Rostov, S. of Moscow	
Pervy Zavod	20		Kaluga, SW of Moscow	
Total	**6270**			

Fig.2 (Source: Henderson and Economou, 2026)

Russian refinery throughput, which had remained between 4.4 and 5.2 million barrels per day (mb/d) between 2021 and early 2026, declined sharply over a three-month period from 4.6 mb/d in March 2026 to 3.7 mb/d in June 2026, the lowest level recorded in over two decades (Fig.3). The decline in throughput demonstrates that Ukraine's strikes have affected not merely individual refineries but the operational continuity of Russia's downstream oil industry.

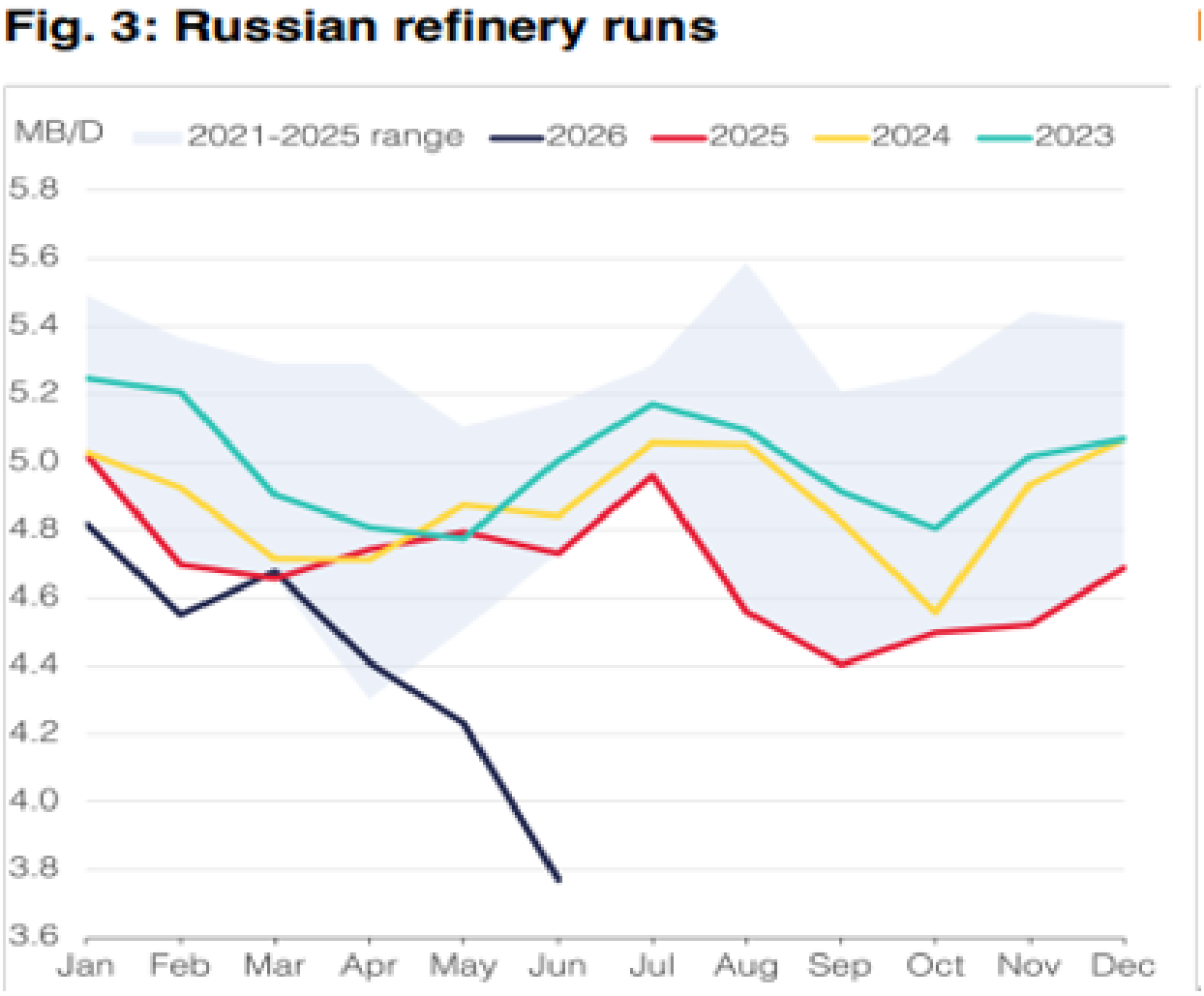

Fig.3 (Source: Henderson and Economou, 2026)

The disruption of refining operations has also translated into a significant decline in the production of refined petroleum products. Russia's total refinery output averaged approximately 5.4 mb/d prior to the war before gradually declining to 4.7 mb/d in 2025 and further to 3.8 mb/d by June 2026. Among the major refined products, gasoline production declined by 25 %, jet fuel by 23 % and diesel by 20 %. The reduction in domestic fuel production has strained fuel availability across Russia, contributing to widespread shortages, rising retail prices and the introduction of fuel rationing in several regions. The severity of the crisis is reflected in reports that nearly 50 million Russians, i.e., nearly 32 % of the country's population was affected, with 56 of Russia's 89 regions experiencing fuel shortages and 18 regions imposing restrictions on retail fuel sales. Severe shortages were reported in Crimea, where authorities declared a state of emergency, as well as in Moscow and St Petersburg. Although Russian authorities initially attributed the shortages to panic buying, President Vladimir Putin later acknowledged that repeated Ukrainian strikes on energy infrastructure had contributed significantly to the crisis. The severity of the domestic fuel crisis compelled Russia, one of the world's largest exporters of refined petroleum products to import gasoline, including 60,000 metric tonnes from India, to alleviate shortages in its domestic market.

The consequences of these attacks have also extended to Russia's export-oriented energy sector. Due to tightened domestic fuel supplies, Russia extended its ban on gasoline exports until the end of July 2026 and its jet fuel export ban until November, while also considering restrictions on diesel exports. Consequently, exports of Russian refined petroleum products fell below 2 million barrels per day, with diesel exports declining to nearly one-third of their levels in

January 2026 as against the beginning of the year. As Russia increasingly diverted crude oil directly to export markets instead of processing it domestically due to repeated attacks constraining domestic refining capacity. While exports of refined petroleum products declined by approximately 700,000 barrels per day between January and June 2026, crude oil exports increased by around 900,000 barrels per day over the same period. However, Ukraine's expanding campaign against Russia's export infrastructure including oil terminals, pumping stations, pipelines, Black Sea and Baltic Sea ports, as well as vessels linked to Russia's shadow fleet has begun to exert increasing pressure on Russia's ability to sustain even these raw crude exports.

Geoeconomic Impact

The geoeconomic significance of Ukraine's campaign lies not merely in the destruction of energy infrastructure but in the strategic selection of the infrastructure viz., various components of Russia's energy sector, oil refineries, which have emerged as the targets/ principal focus of Ukrainian strikes. Ukraine has systematically expanded its campaign beyond attacks on individual refineries to target the broader oil value chain, including upstream production facilities, storage depots, oil platforms in the Caspian Sea, export terminals at Novorossiysk, the Druzhba pipeline and other critical infrastructure supporting Russia's oil production, refining and exports since 2024.

Ukraine's focus on the oil sector is strategically significant because hydrocarbons remain the backbone of the Russian economy and a critical source of state revenue. Oil and petroleum products account for approximately 20-25 % of Russia's federal budget revenues, despite their declining share following Western sanctions, Among Russia's energy exports, crude oil exports are valued at approximately USD 124 billion, while refined petroleum products account for around USD 45 billion. Although crude exports generate higher overall export volumes, refined petroleum products occupy a particularly important position within Russia's hydrocarbon economy, owing to their significantly higher value addition and export earnings.

The emphasis on targeting refineries reflects their strategic position within Russia's hydrocarbon value chain, that convert crude oil into high-value petroleum products such as gasoline, diesel, jet fuel and other fuels essential for domestic consumption, military logistics and international export markets. Consequently, these attacks have imposed costs that extend well beyond physical infrastructure damage by disrupting fuel chains and constraining Russia's capacity to generate revenue from higher-value petroleum products. Ukrainian strikes on Russian refineries have reportedly caused direct economic losses estimated at over 60 billion roubles (approximately USD 714 million), in addition to disrupting fuel supplies, critical for Russia's military operations.

Discussion

The strategic rationale behind Ukraine's targeting choices is further reflected in the nature of the infrastructure it has largely avoided. Ukraine has generally refrained from systematically targeting Russia's civilian electricity infrastructure despite Russia's extensive campaign against Ukraine's electricity grid and power generation facilities, limiting such attacks to isolated incidents. As seen, Ukraine has concentrated on oil infrastructure that directly supports Russia's military and economic capacity. From Kyiv's perspective, degrading Russia's refining sector offers a more effective means of weakening its war-sustaining capability while avoiding a reciprocal campaign against civilian electricity networks.

Ukraine also increasingly views these strikes as an instrument of economic warfare operating alongside Western sanctions. While sanctions imposed by the United States and the European Union have constrained segments of Russia's energy sector, Russia has continued exporting crude oil by offering discounted supplies to major Asian importers, particularly China and India, while production in the Arctic and Far East has remained comparatively resilient. Against this backdrop, Ukraine has sought to complement these measures through what has increasingly been

described as kinetic sanctions to the physical disruption of Russia's oil refining capacity. Unlike financial and trade sanctions, which can often be circumvented through alternative markets and trade networks, sustained attacks on refineries directly reduce Russia's ability to produce and export higher-value petroleum products, thereby imposing tangible economic costs on its hydrocarbon economy.

Ukraine has also sought to justify these attacks within the framework of International Humanitarian Law (IHL). Article 52 of the 1977 Additional Protocol I to the Geneva Conventions, to which both Russia and Ukraine are parties, defines military objectives as objects which, by their nature, location, purpose or use, make an effective contribution to military action and whose destruction offers a definite military advantage. Although oil infrastructure is generally regarded as civilian infrastructure, its integration with modern military operations has led Ukraine to argue that refineries producing fuel for military vehicles, aircraft and naval assets constitute legitimate military objectives. As Yoram Dinstein observes, petroleum infrastructure occupies a unique position in modern warfare because the production, transportation and refining of fuel are indispensable to sustaining military operations. Reflecting this interpretation, Ukraine's Permanent Representative to the United Nations has argued that Russian refineries supplying fuel to military forces constitute lawful military targets. This rationale has been cited in relation to Ukrainian attacks on facilities such as the Ryazan, Samara and Poltavskaya refineries, as well as the 400-kilometre Koltsevoy pipeline, among others.

Taken together, Ukraine's sustained targeting of Russia's oil refineries reflects a carefully calibrated geoeconomic strategy rather than a campaign of indiscriminate infrastructure destruction. Ukraine has sought to weaken the economic foundations of Russia's war effort by targeting the refining segment of Russia's hydrocarbon value chain, disrupting fuel production, constraining export earnings and increasing the fiscal costs of sustaining prolonged conflict. In doing so, attacks on oil infrastructure have evolved beyond tactical military operations into an important instrument of economic and resource warfare,

Conclusion

Ukraine's sustained campaign against Russia's oil infrastructure demonstrates the growing strategic significance of critical energy infrastructure in contemporary conflicts. The evolution of Ukraine's strategy, from sporadic attacks near the frontline to sustained long-range strikes on Russia's oil sector is reflective of a deliberate strategic shift towards targeting the economic foundations of Russia's war effort.

The campaign has generated significant implications for Russia's energy security by disrupting refining capacity, constraining domestic fuel availability and exposing vulnerabilities within its critical energy infrastructure. At the same time, Ukraine's emphasis on oil refineries underscores their geoeconomic importance within Russia's hydrocarbon value chain. By targeting infrastructure responsible for producing higher-value petroleum products essential for domestic consumption, military logistics and export markets, Ukraine has sought to impose economic costs and weaken Russia's war-sustaining capacity. Complementing the pressure created by Western sanctions, these strikes have increasingly emerged as a form of 'kinetic sanctions' aimed at physically constraining Russia's energy economy.

Lastly, the Russia-Ukraine conflict illustrates how critical energy infrastructure has become a strategic centre of gravity in contemporary warfare. As energy systems become increasingly intertwined with national resilience, economic security and military capability, attacks on critical energy infrastructure are likely to remain an increasingly important instrument of strategic competition, economic coercion and geoeconomic statecraft in future conflicts.

The views expressed are those of the authors and do not represent the views of CNAWS.

Image Source: ChatGPT