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Understanding Russian Hybrid Warfare against Europe in the energy sector and in the future ‘energy-resources-climate’ security nexus.

Abstract

To avoid escalations to full kinetic (military) wars is imperative to win the non-kinetic part of the so-called “hybrid warfare”, which use both kinetic and non-kinetic methods. The goal of the non-kinetic methods of hybrid warfare, or as others call it “grey zone” activities, or “subthreshold” tactics, is to defeat hearts and minds, as well as pockets, of adversaries, with social, political, and economic tools. This article focuses on energy as the crucial sector of the economic tools, and specifically uses an innovative approach, what the author calls the ‘energy-resources-climate security nexus’, as a new battleground for future strategic competition and hybrid warfare between Europe, Russia and other rivals.

Before the Russian invasion of Ukraine Putin engaged Europe with non-military hybrid warfare. The hybrid warfare tactics employed by Russia especially in the energy sector have posed challenges the EU and NATO, who were unprepared but two organizations showed resilience and adaptation, starting to fight back. The problem is not only the Western dependence on Russian energy but also how the green transition pushed by climate change, that could be exploited with hybrid warfare. In the future is important to increase NATO-EU cooperation to fight other rivals too, like China, that could use new hybrid threats, especially because of the energy transition.

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Introduction

As the famous Chinese military general and strategist Sun Tzu said, “to subdue the enemy without fighting is the acme of skill.” In other words, using non-military means of ‘hybrid warfare’ is better than waging only kinetic war—the conventional warfare fought with armies. By winning through non-military means, there might be no need to engage in a military conflict. The goal is then accomplished without requiring large sums of blood and treasure.

Putin’s Russia mastered this old lesson. We have seen this over the past twenty years as Russia has exerted and expanded social and political influence over Europe. In recent times, in particular, Putin has been waging a campaign to subvert Western democracies through his propaganda machine, Infowars, and disinformation campaigns.[1] Already in 2014, Russia learned how to master bot farms, spreading fake news about the invasion of Crimea. However, the infowar is only one side of Putin’s hybrid war on the West, and it may not be the most dangerous part.

For two decades, Putin has carefully and patiently cultivated Europe’s dependence on Russia’s energy. This has been an important element of Putin’s strategy in hybrid warfare. After all, energy is the driver of modern economic growth, and strong economies are fundamental for Western democracies’ stability. The failure of many Europeans to identify the threat posed by dependence on Russian energy demonstrated Europe’s sheer unpreparedness for Russia’s hybrid threats.

Europe and the NATO alliance are now facing unprecedented concurrent threats from Russian imperialism at kinetic, economic, and political levels. However, crises can be transformed into opportunities. Russia’s invasion of Ukraine has united the Alliance and its partners. This has resulted in a stronger transatlantic community than ever before, with NATO’s primary objective, the collective defense in Europe, being expanded toward new spheres of hybrid warfare.[2]

This article briefly analyses hybrid warfare, in particular its non-military elements, and Russia’s employment of it to achieve its geopolitical interests in Europe, with a focus on energy dependency and what we can call the ‘energy-resources-climate security nexus, meaning the nexus that exists between energy security, resources need, and

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green transition because of climate change. This analysis is essential to understand recent developments and avoid escalations to full kinetic (military) war, winning the non-kinetic part of the hybrid warfare, especially in this nexus. Also, the analysis is important to foresee the following decades, how post-war, post-Putin Russia could continue with hybridization of conflict, and not only Russia but also other autocracies with desires to dominate the EU sphere.

In the future, unless the Russian imperialistic state is transformed into a nation-state, able to cooperate with its neighbors and integrate into a new Eurasian security architecture, the hybrid war will come back, over and over again, in particular in the energy sector and in the technological field, which are the two areas of future transition for the international system, with climate adaptation, and technological transformation. Not only will Russia keep up with the hybridization of conflict, but the growing giant in Asia, China, will also use this strategy to win the competition with the West. This is why this analysis is important, not only to understand the past but also for policy purposes looking at the future of the EU.

This article starts with a short analysis of the concept of hybrid warfare, touches briefly on the geopolitical interests of the current Russian regime, explains how Russia used hybrid tools against Europe, specifically in energy, and how Europe reacted, and finally illustrates how the 'energy-resources-climate security nexus' opens new space for hybrid warfare by Russia and other rivals, as the crucial arena in which the EU and NATO need to defend themselves.

What Is Hybrid Warfare and How Russia And The West Conceptualized It

Hybrid warfare is warfare that uses both kinetic and non-kinetic means. War has always been about exploiting different means of fighting to achieve strategic goals, so hybrid warfare was not invented recently. But today, the non-military activities of hybrid warfare are becoming 'the new normal,' whether in the realm of politics, economy, society, or technology.

A 2023 Pentagon 'Joint Concept for Competing'[3] warned that adversaries aim to 'win without fighting,' seeing conflict and competition on a continuum.[4] This is the so-called 'gray zone' between peace and open conflict, different from the West, where we often see a

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binary state of either war and conflict or peace and cooperation. As former US Joint Chiefs of Staff Chairman General Joseph F. Dunford recognized, "We think of being at peace or war…our adversaries don't think that way."[5]

Hybrid warfare creates a state of permanent warfare, a constant conflict with the weaponization of everything, with subthreshold activities, meaning short of war strategies, tactics, and operations, and with a competitive behavior that does not necessarily involve lethal force.[6] The concept of hybrid warfare, therefore, has evolved in recent years from a more 'operational-level' use of military means toward a more 'strategic-level' use of non-military means below the threshold of military war.[7] As the US National Military Strategy 2022 states: "Future warfare will include advanced threats to the homeland, elements in the Gray-Zone, and protracted conflicts in contested environments."[8] The point is that, even if geographic borders and regional conflict still matter, as we have seen with the invasion of Ukraine, conflict is no longer bound by geography because new technologies and social-political changes have created novel types of warfare and nonstate actors, technological advancements, and ideological battles are redefining the rules of engagement on the global stage.[9]

Criticism has been directed toward the lack of conceptual clarity surrounding the notion of hybrid warfare[10] and also the risk of counterproductive effects with this fashionable concept.[11] Some scholars argue that using this term, and others like 'gray zone conflict,' are examples of a failure to think clearly about political, military, and strategic issues and connections.[12] Although there is a genuine need to clarify its definition, it's important to acknowledge that due to the lack of better alternatives, hybrid warfare offers valuable insights into the array of foreign policy tools at the disposal of rival actors. Therefore, even without academic agreement on the definition, origins, or even existence of a concept of 'hybrid warfare,'[13] we can say that hybrid methods emphasize the combination of hostile conventional and unconventional strategies, methods, and tactics, such as cyberattacks misinformation campaigns, sabotages, attacks to critical infrastructures, economic coercion, etc. This strategy is used to blur the lines between war and peace, attempt to impose not only costs on bodies but also sow doubt on the hearts and minds of target populations, to reach the aggressor's goals. The battlefield, therefore, is not necessarily one of physical space but also one of psychological, political, social, and economic space to win the will of resistance of a

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population. This is why, to fight hybrid warfare as a whole, it is necessary to use not only operational or tactical elements but also strategic and political ones.[14]

The concept, as a military strategy theory, was pioneered by Frank Hoffman in 2007 but was not used by academicians or policymakers until NATO adopted it in 2014 regarding Russia's annexation of Crimea and the civil war in Eastern Ukraine.[15] Since then, it has often been referred to as Russia's form of irregular methods of warfare, in particular after the Russian operations and invasion of Crimea, sometimes associated with Russian Chief of General Staff Gerasimov (*Gerasimov doctrine*) based on what the West calls 'whole of government' approach, of hard and soft power together and across different domains.[16] But much earlier than Putin's actions and Gerasimov's explanations, the Soviet Union used hybrid warfare tools, calling them *aktivnye meropriyatiya*, "active measures" from the 1950s onward, as covert and deniable political, military, or social operations aimed at subverting the West during Cold War.[17] After the Cold War, Russia used the technique of maskirovka in operations and strategy, 'masking' identity and using proxies when available, particularly for cyber attacks.[18]

One of the first interesting conceptualizations of hybrid warfare in the West came from a US Naval Institute in a 2005 article by two US military high-rank officials, one of whom, General Mattis, later became Secretary of Defense.[19] The article spoke about the "rise of hybrid wars," giving examples from the Middle East wars. It also added a new dimension—a fourth block—based on psychological or information operations aspects, in addition to the three classic wars blocks developed by General Charles Krulak: kinetic action, peacekeeping operations, and humanitarian aid.

Even before that, at the end of the last century, two Chinese colonels explained that a concept of unrestricted warfare is best translated as war "beyond limits," inclusive of the domains of politics, economics, military, culture, and diplomacy that overlap each other. In other words, to combine all war resources, among which information warfare, financial or trade warfare, and other forms of warfare.

Nevertheless, in the US and Europe—compared to Chinese thinking—military doctrine speaks more of irregular warfare than hybrid warfare, even if the two concepts are similar. The US Department of Defense, for

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example, in 2023, defined "irregular warfare" in a publication of Joint Warfighting as "a form of warfare where states and nonstate actors campaign to assure or coerce states or other groups through indirect, non-attributable, or asymmetric activities."[20]

This article, therefore, following the acronym often used in US military doctrine, DIME (Diplomacy, Information, Military, and Economic), to represent the four instruments of national power, supports the thesis of three main non-military arenas for hybrid warfare: political, social, and economic.[21] The political element of hybrid warfare is often carried on through diplomatic approaches, like the 'Wolf Warriors Diplomacy,' which Russia and China have been experimenting with for some time.[22] This strategy uses compellence to create deterrence, threatening retaliation to coerce another state into action. Instead, the social arena is engaged through disinformation campaigns, which aim to meddle in the domestic affairs of rivals and erode democracies.[23] Following what the Romans said, *divide et impera* (divide and conquer), we can say that the goal here is to divide hearts and minds and create instability. Finally, economic warfare is won through direct or indirect economic coercion, from sanctions to de-risking or decoupling in trade partnerships. But what are the specific goals of the Russian regime for which Putin decided to use hybrid warfare, and how did NATO-EU react?

Russian Geopolitical Interests And Use Of Hybrid Warfare Versus NATO-EU Reaction

Russia, with Putin as its de facto czar for almost three decades, has two main goals: (1) the restoration of *Ruski Mir*, the Russian World, which entails political, economic, and societal dominance over the periphery, Eastern Europe, South Caucasus, and Central Asia; and, (2) following the Primakov Doctrine, to return to the power balance of the past when Soviet Union was a peer superpower to the US, to create a multipolar world against what he sees as Western global domination.[24] A vital aim of the Russian regime, therefore, is to diminish the EU's geopolitical relevance by destabilizing its security architecture, in particular, weakening NATO, paralyzing international institutions such as the OSCE and UNSC, as well as weakening Europe by fostering divisions among its members and aligning with sympathetic governments. The ultimate goal is to form a *Novorossiya*, a New Russia, with a status as a global power driven by nationalistic sentiments and great power ambitions, through a long war or forever war.[25]

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Nevertheless, recognizing his inability to match NATO's conventional warfare capabilities, Putin has wanted to reach these goals with hybrid warfare for years.[26] For example, he has used kinetic tools in non-NATO countries (the invasion of Ukraine, the occupation of parts of Moldova and Georgia) and a whole set of non-kinetic tools with the rest: diplomatic means like the alliances with the other Asian autocracies (Belarus, North Korea, Iran, and China); social-info means with a propaganda divisive machine in Europe; gradual destabilization tactics, plotting sabotages, attempts of assassinations, and hostile and malign actions both in the periphery and around the world, always synchronized systematically.[27] By doing so, Putin's regime maintains its destabilization activities below the threshold of triggering NATO Article 5, actively experimenting with new alternative strategies and indirect and asymmetric threats (from the nuclear threat to economic threats toward European businesses), favoring them over conventional military strategies. Crucially, whereas the West perceives these non-military tactics as avenues for conflict prevention, Russia views them as integral components of warfare.

The EU and NATO have been late, with respect to Russia, in the operationalizing of the concept and also on the strategies to deter and defend from non-kinetic elements of hybrid warfare. The EU only developed a Joint Framework on Countering Hybrid Threats in 2016. NATO stated that hybrid actions against a member of the Alliance could lead to the invocation of Article 5 of the Treaty in the same year, 2016.[28] In 2018, therefore, NATO set up counter-hybrid support teams to assist Allies in preparing for and responding to hybrid activities upon their request.[29] Nevertheless, as argued in 2019 by the head of the Hybrid Challenges and Energy Security Section of the NATO Emerging Security Challenges Division, even if plausible attempts had been made to apply both deterrence by punishment (e.g., attribution, sanctions) and by denial (e.g., enhanced resilience) to hybrid attacks, the work has just begun. We must accept that some hybrid threats cannot be deterred.[30]

It was not until June 2022 that NATO Leaders endorsed comprehensive preventive and response options to counter hybrid threats. The new NATO Strategic Concept cited hybrid warfare by Russia and China as a key concern and called on members to "invest in our ability to prepare for, deter, and defend against the coercive use of political, economic, energy, information and other hybrid tactics by

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states and nonstate actors." In 2022, NATO's Joint Intelligence and Security Division created a hybrid analysis branch to improve situational awareness.[31]

In 2023, the "Eighth progress report on the implementation of the common set of proposals endorsed by EU and NATO Councils in 2016 and 2017" highlighted how NATO and EU cooperate in the European Centre of Excellence for Countering Hybrid Threats (created in 2017 in Finland), and how cooperation between the NATO Joint Intelligence and Security Division Hybrid Analysis Branch and the EU INTCEN Hybrid Fusion Cell further developed, intending to strengthen situational awareness. So, as we can see, NATO and the EU started to increase their response to hybrid warfare attacks and their engagement in this arena even if, according to scholars, the Alliance is not yet prepared for these 'subthreshold' threats.[32] The European and American intelligence, in particular, started to worry that not enough was done to deter these types of hybrid warfare.[33]

In July 2024, at the NATO Summit in Washington, allies raised their concern about the increase of these types of hybrid attacks, from sabotage attacks to attempted assassinations, misinformation, cyber threats, etc. This is so much so that Article 13 in the Final Declaration of the Summit says:

> State and non-state actors are using increasingly aggressive hybrid actions against Allies; we will continue to prepare for, deter, defend against, and counter hybrid threats and challenges. We reiterate that hybrid operations against Allies could reach the level of an armed attack and could lead the North Atlantic Council to invoke Article 5 of the Washington Treaty.[34]

Therefore, a lot more can be done, including in the 'energy hybrid warfare' that is the topic of this article. Among the non-kinetic tools, Russia has been particularly keen in the last few years to weaponize the use of energy with all its tools of national power, given the European energy dependency from her. And it could also do so in the future, even with other powers, first of all China.

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How Russia Used Hybrid Tools Against Europe In Its Energy Dependency

Even if the definition of "energy security" is contextual and dynamic, we can say that energy security focuses primarily on the security of supply aspect, that is energy availability and affordable prices.[35] However, energy security is not based only on market reliability, with the diversification of resources and countries of import, and price affordability, with market prices under control. Increasingly, energy security depends on infrastructure security against attacks or natural disasters, protected energy stores, and competition on energy sources, including their weaponization.[36] Since the Industrial Revolution, energy has been at the center of competition and geopolitics, with energy politics becoming increasingly important for national security. However, only recently have NATO and the EU decided to deal with energy security.[37]

Both NATO and the EU understood the risk of hybrid warfare for the energy dependence from Russia quite late. In its 2010 Strategic Concept, NATO emphasized that Allies had to "develop the capacity to contribute to energy security, including protection of critical energy infrastructure and transit areas and lines."[38] Nevertheless, the Alliance underlined the importance of not being vulnerable to political or coercive manipulation of energy only at the Brussels Summit in 2018.[39] The EU understood the strategic importance of energy security and the risk of energy dependence from Russia even later, practically only after the invasion of Ukraine, even if energy security had been a target of hybrid warfare by Russia against Europe for many years. Putin had employed a variety of hybrid tactics aimed at the energy infrastructure, policies, and supplies of NATO and EU members, including leveraging political and economic power, disinformation campaigns, and using supply disruptions against EU members much before the invasion of Ukraine.[40]

Already in 2006, for example, one year after the Orange Revolution that brought a pro-Western government into power in Ukraine, Russia cut off gas supplies to Ukrainian territory for a few days, with effects seen for the first time also in EU countries. In January 2009, the Russian supply disruption again affected twenty European countries with major drops in gas supply.[41] Moreover, Russia wielded its economic influence and political ties to further its energy agenda in countries like Germany, where Russia used commercial and political

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connections to push forward the controversial Nord Stream II pipeline project. Russia has also been implicated in cyber attacks targeting energy companies in Germany and other EU countries.[42]

Therefore, the hybrid warfare from Russia has employed a mix of weaponization of energy supplies, with diplomatic-political war, info-cyberwar, and economic war, using all the tools of national power called DIME (Diplomacy, Information, Military, Economy). This has been increasingly present since the invasion of Ukraine. Just as an example, in February 2024, the annual report of Italian intelligence to the Parliament explained how Moscow tried to hinder Italian-European initiatives for energy diversification and the introduction of the price cap on Russian gas with propaganda for the general public.[43] This propaganda made specific unfavorable claims about the trend in energy prices. Also, digital offensives against national strategic objectives—particularly to digital infrastructure and service supply chains of IT, energy, transport, and the public institutional sector—highlight an ever-increasing use of hostile actions characterized by high intensity.

Hybrid warfare in the energy sector has also been done in non-EU countries. First of all, Ukraine, with the disruption of energy supply as mentioned much before the invasion, is continuing obviously after that. Also, other countries that Russia considers to be in its sphere of influence, like Georgia and Moldova, have received attacks in the energy sector, even if Moldova was able to liberate itself from Russian energy dependence after the invasion of Ukraine and, in this way, avoid further hybrid attacks in that area.[44]

Looking at the Russian hybrid warfare in the prelude to the invasion of Ukraine, Russia often used supply restrictions as leverage to fulfill its objectives, manipulating oil and natural gas exports to Europe. The EU total gas demand was around 400 billion cubic meters (bcm) per year before the war, with only about 10 percent of it covered by domestic production. In 2021, the EU imported more than 40 percent of its total gas consumption, 27 percent of its oil, and 46 percent of its coal from Russia, but in 2011, energy represented 77 percent of EU imports from Russia, mainly through Ukraine, demonstrating the scale of the EU's dependency on the country.[45] Russia's weaponization of energy involved underdelivering gas in 2021, squeezing Europe's supply by making it dependent on payment in rubles, cutting several countries off, and closing the Yamal and Nord Stream 1 pipeline unilaterally. In September 2021, Putin escalated his tactics by completely halting the

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flow of gas through the Nord Stream 1, a critical pipeline to Germany and the rest of Europe that bypassed Ukraine, in retaliation for sanctions against Russia and Europe's support of Ukraine. Halting the gas forced the closure of a variety of industries, so in some way, hybrid warfare was working well for Putin. Two days after the German suspension of Nord Stream 2, Russia invaded Ukraine. In September, both Nord Stream 1 and 2 suffered explosions, which the EU considered sabotaging its energy infrastructures. Since then, Russia occupied around 20 percent of Ukraine's territory, mostly rich in natural resources like gas, coal, iron, and lithium.

These can all be considered actions directly or indirectly related to hybrid warfare on energy resources. Furthermore, using energy resources by state-owned enterprises like Gazprom and others developed in Russia's foreign policy maneuver for several years. These assets were integral components within Russia's hybrid strategy toolkit, enabling the Putin regime to exert greater influence over neighboring states' internal affairs, having business relationships with European states, and effectively driving wedges between Western nations. Moreover, the intricate web of connections between these enterprises, political figures, high-ranking civil servants (former German chancellor Schroeder was a famous one), and individuals with ties to organized crime created opaque and convoluted circumstances in the last decades of European energy dependency on Russia, constraining the effectiveness of response measures from the West.

After the war began, the situation started to change as the EU decided to decouple from Russia, at least at the energy level. However, the EU's policy response was marked at the beginning by disjointed national actions, primarily focused on providing consumer subsidies. While aimed at achieving short-term goals, this approach risked compromising the effectiveness of outcomes, underscoring EU deficiency in a common strategy and revealing a critical gap in the EU's ability to have anticipatory resilience. It is important to understand this and not repeat what happened in the future, on other occasions, in the weaponization of energy resources by rivals.

The EU Commission, quickly after the invasion, though, released the *REPowerEU* plan, outlining measures to drastically reduce Russian oil and gas imports and reach complete independence from Russian fossil fuels before the end of the decade. The EU Commission also launched the EU Energy Platform to help members secure their energy supply

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and phase out dependence on Russia in a coordinated manner through demand aggregation and joint purchasing of natural gas. Nevertheless, if Western energy cuts and sanctions have significantly impacted Russia's economy, Russia has mitigated some of this harm by turning to China, India, Iran, and other allies. Furthermore, while European governments imposed sanctions on oil, they didn't do the same for natural gas, relying on voluntary phaseout of Russian imports by 2027. In 2021, the EU imported 150 bcm of natural gas from Russia, while in 2022, only 80 bcm, and in 2023, 43 bcm.[46] A tenth of the Russian gas formerly shipped by pipeline to the EU has been replaced by Liquefied Natural Gas (LNG) delivered to EU ports.[47] The rise in LNG has pushed the share of Russian gas in EU supply to around 15 percent after pipeline imports from Gazprom had plunged since the war to 8.7 percent from 37 percent of EU gas supply. The EU recently proposed sanctions on Russia's LNG sector, which would hit a quarter of Russia's LNG revenues and increase its LNG diversification from places such as the US and Qatar.[48]

Nevertheless, the EU transition from pipeline gas to LNG imports comes with a notable environmental cost, given the energy needed for gasification, shipping, and re-liquefaction of the fuel. This, therefore, plays against the energy transition goals of the EU, as the key elements in the REPower EU plan are diversifying supplies, reducing demand, and ramping up the production of green energy. Replacing Russian fossil fuel imports with other sources could still be a way to allow rivals to weaponize gas. Russia's significance also as a supplier of materials for clean energy technologies, such as copper, nickel, and platinum metals, could still adversely impact the trajectory of the independence of the energy transition for the EU (even if some scholars argue that Russia may be one of the primary holders of stranded geopolitical assets after the energy transition).[49] We call this the "energy-resources-climate security nexus."

How Energy-Resources-Climate Security Nexus Opens New Space for Hybrid Warfare With Russia and Also China

The current intersection of energy needs, market forces, geopolitical rivalries, and climate change is reshaping world energy politics amid a period of global crisis and disorder, shifting geopolitical power and, in some way, creating "new maps."[50] The global energy landscape is on the brink of transformation because of new policies and technological revolution, including digital technologies.[51] Energy security is finally

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considered a national security issue and a priority for the green energy transition. Still, energy transition has to be measured using three criteria in global competition: energy security, energy equity, and environmental sustainability, the so-called "energy trilemma."[52]

Therefore, the new competition in the energy transition creates new opportunities, but also threats and challenges, opening space for renewed hybrid warfare. The fact that the green transition could make Europe and the West more vulnerable to new hybrid warfare in the energy sector creates what we can call an energy-resources-climate security nexus. To understand this new security nexus, we need to see the Western dependence on Russian energy and how the green transition pushed by climate change can be exploited with hybrid warfare.[53]

As some scholars argue, climate change is already helping Russia and China with new tools of hybrid warfare, increasing refugees, displacing people, creating food insecurity, and other elements that are deepening tensions in Western countries.[54] Usually, the literature on climate security focuses on the climate consequences of violent conflicts, or, as other scholars show, climate change can be exploited to create information warfare, attempts to control resources, and use geoengineering technologies.[55] In this article, the concept of climate change is related to a specific nexus between energy security, energy transition, and energy hybrid warfare.

The fact of the matter is that the current green energy transition may weaken the West, first with less energy resilience and competition having to pass to green energy, and second making it more vulnerable to hybrid attacks, in particular in the new critical energy systems that have to be built, from infrastructures to the supply chain of critical minerals. This may expose the West to external attacks, not only in their infrastructures and systems but in the markets, the supply of resources, as well as in the political decisions and the needed social support. In this way, the hybrid tools of the DIME spectrum can be used to threaten the West's capacity to maintain social, political, and economic equilibrium. Just to show two simple examples of hybrid warfare used in this nexus by Russia, we can list first the Spring 2024 attacks on Ukraine's critical energy infrastructure to weaken Europe's energy supply during Europe's decoupling from Russia and starting its energy transition; and second, the climate change disinformation

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campaigns before the war, to make the energy transition less supported by societies in Europe and so continue with dependency on Russia.[56]

This energy-resources-climate security nexus risks making the continent vulnerable to both the weaponization of old fossil fuels when the transition is in process and the weaponization of new renewable energy supplies when the transition is sufficiently complete. Furthermore, the stability of these elements' value chains and supply chains could be put in danger at any moment, at least if Europe becomes dependent on foreign countries in its green energy transition like it was in the fossil fuel area. The shift toward decarbonization is expected to entail a surge in natural gas usage initially, likely to persist until and even beyond 2040 when cleaner and more scalable renewable energy technologies are projected to become more economically feasible.[57]

Against this backdrop, for example, Russian weaponization of energy toward Europe and its periphery is likely to focus on undermining emerging rivals by exploiting their specific vulnerabilities and hindering European access to diverse energy supply sources. At the same time, Russia can weaponize the new rare earth elements and critical materials together with China, given their increasing cooperation in all sectors, especially energy.[58] China's malicious hybrid and cyber operations, particularly its confrontational rhetoric and disinformation targeting the West, aim to control key technological and industrial sectors, critical infrastructure, strategic materials, and supply chains.[59] The EU must, therefore, consider how best to defend against also Chinese hybrid warfare in the future, in addition to the threats posed by Russia. Even if some scholars argue that transitioning to clean energy requires to keep trade with China and not the derisking strategies proposed by the EU Commission.[60]

Furthermore, as the global reliance on emerging technologies, including the Industrial Internet of Things, grows, the interconnectedness across the global energy supply chain improves efficiencies and scales economies but also expands possibilities of attacks, exposing operational technology to numerous security risks. The quick advancements in information and communications technologies and our increasing reliance on them create a new era of possible hybrid warfare. The widespread access to digital connectivity, the capacity to conceal involvement in attacks, and the strategic advantages of targeting critical energy infrastructure through network-

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based operations can contribute to all of this. Also, access to and protection of new technologies able to refine and process critical materials will influence the ability of countries to achieve their goals and will make them more vulnerable in the energy transition.[61]

The recently unveiled Critical Raw Materials Act, along with prior initiatives like the European Battery Alliance and the Critical Raw Materials Alliance, signals an acknowledgment of the potential threats posed by emerging dependencies that could impede European energy security and climate objectives in the future. However, these initiatives primarily concentrate on improving green resources, neglecting the looming challenges posed by economic issues like the closure of smelters, for example, which could create problems that hinder the transition. These bottlenecks are as critical as access constraints related to key minerals, and overlooking them may precipitate a significant economic and security crisis. Therefore, there is a pressing need to overhaul the Critical Raw Materials Act into a more comprehensive "Critical Commodities and Industries Act".

As we can see today, the energy-resources-climate security nexus is evident in this energy fight between Europe and Russia together with China. Therefore, to deter and counteract Russian hybrid warfare in this nexus in the future, to ensure the resilience of the EU's energy critical infrastructure, as well as to defend from attacks in all the national DIME powers tool set, the diplomatic one, the info-cyber one, the military and the economic one, the EU will need to have a complex but clear strategy. Such a strategy must be well-resourced and well-articulated, looking past traditional military strategies to create new paradigms. In the energy sector, it is important to invest in further innovation and accelerate technological and energy revolution for a quicker and more efficient transition. Otherwise, the transition will make Europe more vulnerable to new hybrid warfare.

To conclude, the new energy-resources-climate security nexus could be the crucial complex security connection that will accompany the EU until 2050, when the EU has to become an economy with net-zero greenhouse gas emissions. Hence, it is important for the EU to develop deterrence and defense with 'whole of government' tools against hybrid warfare in these sectors but also to accelerate technology innovation to speed up the transition and, in this way, avoid new hybrid warfare in the renewable energy sector from Russia, China, and other rivals. To do that, it will be important to leverage innovation in energy, especially in

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dual-use technology, which could be an excellent asset for Europe. The EU-NATO cooperation, therefore, could become increasingly important not only for deterrence and defense in the strict sense but in the whole spectrum of hybrid warfare and technological competition.

Conclusion

Long before Russia's invasion of Ukraine, Putin initiated a campaign of hybrid warfare against Europe and the West. Despite expressing a desire for cooperation with Western powers, the Kremlin maintained significant hostility toward these nations. An analysis of the facts shows that Russia's use of hybrid warfare tactics has presented a multifaceted challenge for both NATO and the EU members, in particular in the energy sector. This article argued that to understand Russian hybrid warfare against Europe in the energy sector, we also need to tackle what can be called the 'energy-resources-climate' security nexus. The article started with a brief analysis of the concept and applications of hybrid warfare, followed by a quick exploration of the current Russian regime's geopolitical interests. It explained how Russia has employed hybrid tools against Europe by exploiting its energy dependency and illustrated how the 'energy-resources-climate' security nexus is creating new opportunities for hybrid warfare, making examples of how these tools have been and could be used by Russia and other actors in these domains.

With strategic measures and coordinated efforts, the EU can effectively combat and overcome the challenges of Russia's hybrid warfare tactics, defeat Russia in this field, and avoid an escalation to full kinetic war. Further analysis has to be done to see how the EU and NATO can face the challenges and threats from other adversaries like China. These challenges, often emerging before kinetic conflicts, are particularly prominent in areas such as the energy transition and, in the future, could be expanded to the new AI realm and into space. The energy transition to renewables will need to find ways to invest in new technologies, use renewable resources efficiently, defend the supply chain and value chain of critical materials, and, in this way, avoid vulnerability that can be exploited in new hybrid warfare. Closer cooperation between the EU and NATO in these sectors becomes fundamental, and innovation in dual-use technology could help in the transition and deter new non-kinetic warfare.

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