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REDUCING EUROPE'S RELIANCE ON RUSSIAN ENERGY IMPORTS: Key Strategies under Five Scenarios

by Richard L. Morningstar, András Simonyi,
Olga Khakova, and Paddy Ryan





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Atlantic Council
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Cover: Russian oil, gas, and liquefied natural gas flows have dramatically changed since Moscow's full-scale invasion of Ukraine. Photo: SHUTTERSTOCK/VladSV; Map: Rystad Energy research and analysis.

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Foreword

For two years, war in Europe has put the post-Cold War global security order through a trial. Yet, Russia's invasion of Ukraine has proven the enduring and paramount importance of Western partnership, strengthening its resolve to stand up for democratic values while undermining the received wisdom that economic interdependence with Russia would be sufficient to maintain peace, prosperity, and progress.

Despite recent turmoil in the US Congress over Ukraine funding, the transatlantic alliance has remained unified against Russian aggression in a manner that would have been unimaginable in the fraught years leading up to the war. As Ukrainians continue their valiant defense of their homeland, it is crucial that the alliance considers its next moves with the utmost prudence as the war enters a new phase. Part of this strategic planning must entail a coordinated transatlantic energy security strategy to build a permanent shield against Russian energy coercion.

Russia's status as one of the world's preeminent exporters of energy gave Moscow tremendous leverage to disrupt the international order. This situation was acute for Ukraine's allies—especially in Europe—for whom Russian fossil fuel imports comprised a vital part of their energy mix. In 2021, Russia satisfied 40 percent of the European Union's total gas demand.¹ Thanks to masterful efforts to rapidly diversify the continent's energy system led by the European Commission and in coordination with US partners, by the third quarter of 2023, Russian gas comprised only 12 percent of European Union (EU) consumption.² Despite the tremendous challenges that opposing Moscow's invasion have produced for their energy systems, Europeans have stood firm with US support against Russian aggression, although at the time of this analysis, Congress over the past six months failed to pass the next aid package. The United States and Europe have provided more than \$170 billion in military, financial, and humanitarian aid since the start of the war and there remains a chance that the US Congress will pass additional aid over the next several months.³

Nevertheless, the costs borne by European publics for supporting Ukraine have been substantial. In response to European sanctions against Russia and aid for Ukraine, the Kremlin initiated a historic blackmail campaign, cutting off gas supplies to force Europe to reverse course. As Russia throttled its energy deliveries and cut off nation after nation, some EU industrial gas prices increased by 1000 percent compared to previous decades.⁴ The price of heating and basic goods skyrocketed as well, confronting Europe's industrial competitiveness with an existential crisis. Amid profound economic challenges, European public support has bent but has not broken, courtesy of nimble economic management on the part of European policymakers and robust support from the United States. Prices are now stabilizing courtesy of energy efficiency measures, renewable energy deployment, mild weather, tempered demand from the Asian market, and the attainment of alternative supplies of natural gas. Yet, risks of deindustrialization remain in parts of Europe. Despite this challenging situation, an overwhelming majority of Europeans remain strong supporters for multilateral aid for Ukraine.

Over the last eighteen months, the authors have explored how transatlantic cooperation can help fortify the alliance on one of the most critical battlefields in Russia's war against the liberal international order—energy. The authors' work demonstrates the centrality of the transatlantic alliance to European energy security, the necessary interconnection between energy security and the green transition, and the importance of Ukraine to Europe's energy future. The project has produced three policy briefs and culminates in this report.

The authors' first brief, *Securing Alternative Gas Supplies and Addressing Critical Infrastructure Gaps in Europe*, explored in depth the primary locus of Russia's energy war on Europe: natural gas. As Russian tanks rolled across Ukraine in February 2022, gas seemed to be Europe's Achilles' heel, with Russia's dominance in the European market seemingly locked in by a lack of non-Russian import infrastructure

1 "Russia," International Energy Agency, last visited February 15, 2024, <https://www.iea.org/countries/russia>.

2 Elitsa Simeonova, "The EU Is Much Less Dependent on Russian Gas but Still Isn't Ready to Give It Up," December 31, 2023, <https://www.rferl.org/a/russia-natural-gas-european-union-dependence-ukraine-war/32754244.html>.

3 <https://www.ifw-kiel.de/topics/war-against-ukraine/ukraine-support-tracker/>

4 "A Market Mechanism to Limit Excessive Gas Price Spikes," European Council, last visited February 15, 2024, <https://www.consilium.europa.eu/en/infographics/a-market-mechanism-to-limit-excessive-gas-price-spikes/>.

and prohibitive lead times to build alternatives. In addition, a global market for liquified natural gas (LNG) that favored larger, more established buyers in Northeast Asia seemed to offer little hope to European consumers that an energy catastrophe could be avoided.

The authors' analysis, published just before the winter of 2022–2023, enumerated the available alternative suppliers, the global infrastructure required to reorient the gas trade towards Europe, and the intra-European infrastructure gaps that needed to be addressed to ensure adequate supply could flow across the continent. Critically, vigorous transatlantic cooperation would be required to do the seemingly impossible and get Europe through the winter with minimal Russian gas inflows. Ultimately, that was achieved, and Europe's gas system has survived despite historically low inflows of Russian supplies.

The authors' second brief, *Accelerating the Energy Transition to Strengthen European Energy Security: Key Barriers to Overcome*, examined how clean energy and energy efficiency can help Europe end its dependence on Russian gas once and for all. The brief provided actionable steps to remove the regulatory, infrastructure, and financing roadblocks inhibiting European decarbonization. The analysis demonstrated the critical role that the green transition can play in securing the European energy system against Russian leverage, now and well into the future.

The third brief in the series, *Transforming Ukraine into a European Energy Hub*, explored how Ukrainian reconstruction can help reinvent the country as a cleantech innovation leader and provide Europe a large alternative source of energy. By prioritizing sectors in which Ukraine holds an advantage in terms of resources, infrastructure, and human capital, transatlantic partners can rapidly affect a green

reconstruction that brings forward European energy security and the global green transition. In the authors' view, Ukraine is not part of Europe's energy problem, but an integral part of its solution. Ukraine's European integration is therefore of great importance for European energy security.

Europe's decisive leadership on securing its energy supplies is a colossal loss to Moscow's market share. But the year 2024 will provide a pivotal moment in the war in Ukraine and the isolation of Russian energy exports. Elections for the European Parliament, at the national level in several European states, and—perhaps most consequentially—in the United States are furnishing yet another test of the transatlantic alliance. In all these contests, populist forces from the fringes of the political spectrum will vie for control of government, with their political fortunes buoyed by the lingering economic fallout from Russia's energy war on the West.

The results of these elections will influence the Kremlin's next course of action in Ukraine. This year may therefore present a turning point that will set the war on a course for five distinct scenarios: a Ukrainian victory, a negotiated settlement, a frozen conflict, a protracted conflict, or—most ominously—a Russian victory. The likelihood of each scenarios' realization varies significantly.

The transatlantic alliance must do all in its power to ensure that Russian aggression is defeated and that Ukraine emerges victorious. However, policymakers must also prepare for every eventuality. Even a Ukrainian victory presents risks that Europe could return to a state of overreliance on Russian energy, allowing Russia to wield economic influence in Europe through energy supplies once more. Policymakers must be made aware of the policy pitfalls and tradeoffs that will exist even in the war's best-case scenario.

First Principles for Energy Relations with Russia and Ukraine

While the war may conclude in any number of ways, there are basic historic lessons from the energy war that cannot be forgotten. The first is that Europe can never return to a state of dependence on Russian fossil fuels, with dependence defined as a state in which Europe is reliant on Russian energy supplies to the point that it would not be able to cope with the sudden withdrawal of those supplies. The second is that Russian culpability for the lives and treasure lost in Ukraine cannot be swept away without recourse, and there must be repercussions for Russia's energy sector. The third is that US engagement in European energy and climate objectives is critical for the overall security of the transatlantic alliance.

These principles are geared toward achieving a primary objective: to protect Europe's energy security and thereby its political autonomy to defy Russian aggression without fear of reprisal. From a position of European energy security, the transatlantic alliance can also seek to deprive the Russian state of the energy revenues that sustain its war efforts in Ukraine and potentially elsewhere. To that end, the following principles must guide US and European policies regardless of the outcome of the war in Ukraine.

- 1.** Russia must never be allowed to become integral to the European energy system, as it was prior to the war. Moscow can never again comprise a significant enough share of Europe's energy mix that it can reasonably expect to enforce political goals through the threat of withholding supplies. In other words, Russia cannot be allowed energy leverage over Europe ever again. This should hold true regardless of any positive developments in Russia's political trajectory. That includes if Russia comes under the control of a liberal and pro-Western post-Vladimir Putin regime.
- 2.** Given the lessons learned regarding the inherent vulnerabilities of single-supplier commercial relations, Europe cannot replace its reliance on Russian energy with reliance on any other single supplier for critical commodities, materials, or end products, energy related or otherwise. Europe and the United States must heed these lessons when engaging with China, due to its position as a top global supplier of energy materials.
- 3.** Whatever scenario unfolds, the US-EU relationship must be the driving force in energy developments in Europe. This relationship has been the cornerstone of successful efforts to avoid defeat in Russia's energy war. After that war, the relationship must be leveraged to take on new challenges ranging from climate action to strengthening energy security, increasing competitiveness, digitization and strengthening critical supply chains in partnership with likeminded nations across the globe.
- 4.** In any scenario, transatlantic collaboration on infrastructure development and cybersecurity within the energy sector must intensify to meet the energy security and climate challenges of the future.
- 5.** Transatlantic support for Ukraine's energy sector reconstruction and its clean transformation is also vital for propelling Ukraine toward victory. Ukraine has proven that, even in times of crisis, it is a powerful energy ally to the West, rapidly integrating into the European Network of Transmission System Operators for Electricity (ENTSO-E) in the first weeks of the war and at times, becoming a net exporter of electricity to the European grid as it fights an invasion. The allies have a golden opportunity to fortify the country as a first line of defense against autocratic aggression while also building a new clean energy supply hub. Allowing this opportunity to lapse poses great dangers to the continent's economic and hard security alike—and would threaten greater transatlantic energy security and climate initiatives.
- 6.** The United States and the European Union must continue to work hand in glove to propel the global energy transition and ensure that it is a just and secure one. That starts with setting an example through their own domestic energy transitions. Collaboration between the United States and European Union on technology in particular will be vital in realizing an energy-secure decarbonization pathway in Europe and beyond. This report examines the risks and possibilities that each outcome from the war may create, in order for policymakers to be best equipped for a new era in Europe's energy development. While future strategies will differ according to whether Ukraine prevails—or if an intermediate scenario plays out—these overriding principles for engaging with the Russian and Ukrainian energy systems should guide Western policy no matter how the war concludes.

Introduction

The war in Ukraine is moving toward a critical phase. The heavy hits to the Russian economy, the country's diminished energy markets position, and the hundreds of thousands Russian troops dead and wounded have not deterred Putin's imperialistic agenda. Meanwhile, Ukrainians have continued to confront Russian aggression with the utmost bravery, bolstered by the West's military and humanitarian support.

That support, however, is being tested. New conflicts around the world are forcing the alliance to become more cognizant of the limits to its resources and of members' domestic political will. Most critically, the economic fallout from Russia's energy war on Ukraine's allies is putting pressure on electorates' will to continue that support across the West, as energy price inflation remains a persistent risk across the global energy system.

Elections in 2024 may become referenda in part on Western publics' appetites to continue to support Ukraine. Renewed efforts are needed to strengthen transatlantic energy security, maintain solidarity, and ensure that Ukraine has the support it needs to prevail.

The democratic world must take every reasonable step to ensure that Ukraine survives as a sovereign democracy with its internationally recognized territory intact. Secondly, the forces of democracy must also consider what happens next—and what happens if the war concludes with the worst-case scenario of a Russian victory. This question is particularly pertinent to future energy balances in Europe and Russia's role in global energy markets. Diversification from Russian flows is not guaranteed in perpetuity without an intentional transatlantic strategy reinforced with realistic pathways for implementation.

To better understand how the war's conclusion—or lack thereof—will impact the options available to transatlantic policymakers, this report analyzes European security across five general scenarios—Ukrainian victory, a negotiated settlement, a frozen conflict, a protracted conflict, and a Russian victory—to propose solutions for the bespoke challenges that each scenario could present. The report begins by examining the overarching implications across the scenarios for transatlantic unity and Europe's energy transition, before going sector by sector to analyze the pipeline gas, LNG, and oil sectors. The report concludes with a series of recommendations that are pertinent across the range of scenarios.

The implications for Europe's energy future are enormous. This report aims to understand the impacts of the war's potential outcomes on transatlantic energy security, in order to propose strategies for dealing with the unique fallout from each scenario.

Scenarios for the War's Outcome

While, in theory, there are an infinite number of possible outcomes for the war in Ukraine, the authors have—for the sake of structure—grouped their analyses into five basic scenarios. They are:

- a Ukrainian victory;
- a negotiated settlement;
- a frozen conflict;
- a protracted conflict; and
- a Russian victory.

These scenarios differ along two primary dimensions. The first is how the war's conclusion alters the relative balance of power between Moscow and Kyiv.

In the case of Russia, its relative power coming out of the war will dictate how transatlantic partners must calibrate its diplomatic approaches to Moscow. A defeated Russia may be motivated to reintegrate expeditiously into the European economy and energy system following the war, in order to rehabilitate its economy. European stakeholders will need to tread carefully between holding Russia accountable for its crimes while avoiding getting re-ensnared in a situation where Moscow holds geoeconomic leverage over Europe. The allies may also—possibly—need to consider how to support a new liberal regime in Moscow in following a virtuous path toward political modernization, which could require economic concessions. A victorious Russia, meanwhile, should be made an even greater international pariah, particularly given that it may then be emboldened to attack other sovereign nations, including those in the NATO Alliance.

In the case of Ukraine, a victorious nation can be cultivated through its reconstruction as an alternative to Russia as an energy supplier to Europe. These efforts will be intimately

tied to the level of Western support and Kyiv's efforts to reform itself as it treads a path toward European integration. Continuation of Russian aggression would degrade Ukraine's ability to reform itself and participate in a green and European future, and would rob Ukraine of the opportunity to capitalize on its energy resources. In the worst-case scenario, Ukraine may cease to exist as a sovereign nation altogether, which would lead to detrimental cascading consequences for Europe at large.

The second dimension along which the scenarios diverge is the finality of the war. The two victory scenarios assume that the war is over and unlikely to reignite. A negotiated settlement, however, might be significantly more uneasy, and could feature Russian rearmament in anticipation of a renewed assault against Ukraine and neighboring nations. In a frozen or protracted conflict, hostilities could continue at different levels of intensity.

Factoring in these dimensions, the scenarios comprise the following set of assumptions.

- **Ukrainian victory:** Ukraine has staved off the Russian invasion of its territory. The war's outcome guarantees Ukraine's survival as a sovereign, Western-leaning, and territorially intact nation. Russia, meanwhile, is a defeated nation, and the risk of it being able to reignite war is minimal. While Kyiv's path to reform and European integration may be uneven as it contends with the damage wrought by Moscow's invasion, the primary source of uncertainty in this scenario will be the trajectory of a defeated Russia, which may undergo a tectonic political transformation toward Western-friendly liberalism as a result. Europe's response to that transformation as it pertains to energy could pose risks to the continent's ambition to rid itself of its dependency on Russian imports.
- **Negotiated settlement:** The war concludes at the negotiating table. Ukraine may be forced to trade land for peace, and may need to tread more carefully in its drive to integrate with the West. In this scenario, it is likely the war may continue at a later date, presenting an obstacle to Europe's attempts to integrate Ukraine's energy system into its own, and dampening the prospects of any large-scale investments in the country. Russia's status in the West has yet to be determined. It may continue to be a pariah, or it may negotiate a new *modus vivendi* with its European neighbors. Such outcomes could muddle Europe's drive to end its dependence on Russian energy.
- **Frozen conflict:** This scenario differs from a protracted war primarily in its intensity. Official hostilities come to an end, but without an agreement that formalizes peace between

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Kyiv and Moscow. A frozen conflict could provide cover to pro-Kremlin forces in the democratic West, while placing a great burden of proof on the pro-democracy establishment to continue emergency measures and sanctions.

- **Protracted conflict:** The war continues, and possibly escalates. While there may be the occasional ceasefire to allow the respective sides to regroup, conflict becomes the new normal in Europe's east. The West must hold firm as Russia's energy war continues. Sanctions policy remains the allies' greatest nonmilitary weapon to leverage the energy war toward a favorable outcome for Ukraine.
- **Russian victory:** This is the worst-case scenario, which the West must seek to avoid at every conceivable cost. In it, Russia has imposed its will on Ukraine, and the country is dismembered. Ukraine may continue to exist as a rump state in the Russian orbit, but it is no longer a democratic or sovereign nation. The post-Cold War international order is dead, with profoundly negative impacts for many sectors—and energy in particular. Europe faces acute threats to its national security, energy supplies, and democratic order. This scenario would be a catastrophe not only for global security, but also for Europe's energy transition, given the invaluable role Ukraine could play in the continent's decarbonization and the amount of resources that will be diverted from decarbonization towards preventing future aggression from the emboldened Russia.

How to Evaluate Each Scenario

Within each scenario, the authors have evaluated the implications for transatlantic energy security, global emissions, and Europe's economy and society. Those implications will be judged according to the following metrics.

- **The volume of Russian gas production and exports subject to sanctions or other prohibitive mechanisms.** The intensity of the sanctions regime will be inversely correlated with Russia's continued brutalities in Ukraine, rela-

tive power in the conflict, and Western unity and resolve. At the highest level of sanctions, nations otherwise friendly to Russia, such as China, may be wary of investing in Russian energy projects for fear of secondary sanctions. Of note are the technology controls that will vary across the scenarios, which will determine the future cost bases of Russia's oil and LNG industries.

- **The level of Russian energy exports to Europe.** Again, Russia's actions will determine whether Europe hardens or softens its opposition to Russian energy imports. Assuming that Russian pipeline gas will continue to cost less to produce and transport than LNG supplies that require liquefaction and shipping, political factors will be critical in determining Europe's will to resist reverting to cheaper gas supplies. For the sake of simplicity, Russian gas production is assumed to be relatively static, so that the primary variable subject to analysis is the political and market demand in Europe for Russian piped and liquified natural gas.
- **Western investment in the Russian and Ukrainian energy sectors.** In the case of the former, Russian power is inversely correlated to Western investments; Russian victory will close the door to such investments, while Russian defeat may reopen the door to energy sector cooperation. For Ukraine, Western investment is determined by both the risk of renewed conflict and Kyiv's integration with Europe.
- **Impacts on European climate efforts.** A Westward orientation in Kyiv and Moscow is key to unlocking investments in decarbonization. Scenarios in which the two capitals either align with or drift far from Western influence have profound climate effects. In addition, the pace of European climate

efforts, which are now seen clearly as an investment in the continent's energy security, will have profound effects on market demand for Russian energy. The scale of Europe's fossil fuel imports could also have significant impacts on the global marketplace, accelerating or delaying global efforts to rein in emissions.

- **The impact on European energy security.** While European energy security would be at its strongest in a Ukrainian victory scenario, inversely, Russia's victory would weaken it the most, requiring Europe to prepare for a full break with Russian energy.
- **The level of volatility in European energy markets.** This metric will assess the impact of each scenario on energy prices in Europe, and how much they fluctuate. The level of volatility will have a profound impact on macroeconomic indicators such as interest rates and energy demand, and will therefore impact the viability of new energy project investments, particularly for low-carbon ventures.

Incorporating these metrics, the five potential scenarios for the war's outcome are evaluated using projections provided by Rystad Energy. These analytics are informed through rigorous market research. However, unforeseen conflicts, technical breakthroughs in decarbonization, and other black-swan events could alter these projections significantly. Nevertheless, these data serve as an invaluable baseline for beginning a forward-looking conversation on ways the allies can proactively optimize energy security and decarbonization under various energy-flow scenarios, based on the outcomes of the war.

Evaluating the Data

The numbers, graphs, and figures that appear throughout this report have been provided by Rystad Energy, an independent energy market consultancy based in Oslo, Norway. The data Rystad has provided take their industry-leading long-term energy market forecasts and adjust for key variables across five scenarios, including sanctions policy, closure of export routes, the level of energy investments and technology transfer, and the general macroeconomic outlook. The figures do not account for black swan events and other low probability, high impact outcomes. They are intended to be a base-case guide for policymakers to guide decision making on energy-related matters as they pertain to the war in Ukraine, rather than as a market forecast.

Rystad Energy's base case falls between the consensus and EU FF55 scenarios in the long-term. Consensus view is the median of scenarios not based on climate target outcome. This happens to be in line with Equinor's "Walls" scenario.^a

The data Rystad provided for this analysis comprise one set of many industry and agency forecasts, with projections for Europe's total gas demand ranging from 180 to 480 bcma by 2040.^b Rystad's forecast projects total gas demand to reach 314 bcma by 2040. Forecasts that do not shape demand based on specific energy or climate priorities all arrive above 300 bcma by 2030, with a consensus closer to 400 bcma by 2040.

a "2023 Energy Perspectives," Equinor, June 8, 2023, <https://cdn.equinor.com/files/h61q9gi9/global/6f71b58bbba6fc71aa3f9230fd0d7c80b1a2594e.pdf?2023-Equinor-Energy-Perspectives.pdf>

b Included in this range are projections from private companies including BP, Equinor, Exxon, and others, as well as from intergovernmental bodies such as the EU and IEA.

Western Unity, Energy Security, and Decarbonization

Beyond specific market implications for the piped gas, LNG, and oil sectors, the array of scenarios will all have broader implications for Europe's efforts to secure and decarbonize its energy system while maintaining unity in the face of Russian aggression and to deprive the Moscow of the energy export revenues that help fund its invasion.

Western Unity

Despite recent difficulties, the war in Ukraine has led to a remarkable show of unity among Western partners and created a renaissance for the NATO Alliance. This has manifested with particular saliency in energy, where transatlantic collaboration has been a pillar of Europe's ability to source sufficient supplies of gas, and to work through technical and financing challenges to fast-forward the energy transition.

The war's outcome could provide new challenges and opportunities for enhancing this cooperation. In the case of a Ukrainian victory, the continent's old energy divisions could reappear, as some Europeans seek to return to cheap Russian gas and forsake higher-priced LNG from North America. At the same time, Western allies will need to remain unified, as declining oil demand and the environmental, social, and governance (ESG)-induced decline of publicly traded Western supermajors increase the share of influence that autocratic petrostates—Russia being one of many—could wield within that market.

Despite recent difficulties, the war in Ukraine has led to a remarkable show of unity among Western partners.

In the other scenarios, Europe's increasing reliance on US LNG poses a different type of challenge to Western unity. Significantly higher energy prices in Europe than in the United States could contribute to a growing divide in the

level of manufacturing competitiveness in the two blocs, an issue that has become even more politically fraught in an era of industrial policy headlined by the United States' Inflation Reduction Act (IRA). In a frozen or protracted conflict, or in a Russian victory, this issue could become even more acute as Russian LNG imports are replaced by those from the United States.

In a negotiated settlement or frozen conflict, Western unity will be required to erode Russian profit margins through a price cap on oil exports. In a protracted conflict or Russian victory, escalation could require tight Western collaboration on a blockade of Russian oil. This presents a treacherous scenario for maintaining Western unity, and every effort must be made to ensure that such a monumental action is not required.

Energy Security, Decarbonization, and Global Climate Efforts

The war in Ukraine has underlined the importance of decarbonization to Europe's energy security. Europe's relative lack of domestic resources—regardless of whether it has the political will to exploit what resources it has—has situated the continent as a consistent net importer of fossil fuels. This has contributed to a growing realization that domestically produced clean energy is vital for European energy security and strategic autonomy. Europe's Green Deal is therefore a geopolitical necessity—as the Atlantic Council's previous analysis has made clear—yet market, infrastructure, and political barriers that vary across the five scenarios could impact Europe's transition to a cleaner and more secure energy system.

In the case of a Ukrainian victory, a return to normalcy—perhaps counterintuitively—creates a more benign market for Europe's clean transition. Despite the lessened urgency for decarbonization that the end of Russia's energy war would create, decreased volatility in oil and gas prices would contribute to a more stable investment framework for capital-intensive clean energy projects. This could very easily compensate for the energy transition policy foot being taken off the proverbial pedal due to a more secure geopolitical

environment. While gas price stability could lead to steady global consumption patterns, insofar as the cleaner-burning fossil fuel might continue to displace coal, that could be a climate boon. While stable oil prices could likewise keep consumption steady, the resulting stability in interest rates could still help support clean energy projects across the globe. Ukrainian victory would optimize the clean energy deployment environment across the transatlantic marketplace.

While the other scenarios create greater political urgency for the energy transition, they also present more formidable roadblocks. Anything less than a Ukrainian victory could fast-forward efforts in Europe to diversify with clean energy due to high gas prices, yet the macroeconomic volatility implied by such a scenario could complicate the investment picture. Likewise, the need for Europe to continue to import large volumes of LNG could have devastating climate knock-on effects in Asia, where high prices would increase demand for coal. Oil supply would continue to present an energy security concern for Europe. While the continent would continue its efforts to phase out Russian crude and refined products, enforcement of the price cap could lessen market volatility.

As Europe decarbonizes, it must also be aware of its reliance on Russian supply chains for cleantech. Russia maintains a strong revenue stream from exports of critical raw materials to the European Union. From March 2022 to July 2023, sales of such commodities totaled a massive €13.7 billion.⁵ Nickel, a critical raw material needed for utility-scale and electrical vehicle batteries, is one significant vulnerability. According to the European Policy Centre, Russia accounts for as much as 90 percent of European supply for some types of nickel.⁶ Copper and aluminum, the two key metals for electrification due to their use in wiring, are comparatively less vulnerable—

As Europe decarbonizes, it must also be aware of its reliance on Russian supply chains for cleantech.

Russia exports 17 and 7 percent of EU supply for the two metals, respectively—but achieving the bloc's objective of net-zero emissions by 2050 would raise demand for each metal by 35 percent, threatening to increase reliance on Europe's closest major supplier.⁷ For all these metals, there are no existing trade restrictions on Russian imports.⁸

Russia's presence is also felt in Europe's nuclear industry, a crucial enabler for a net-zero energy system. Russia controls half of the world's uranium enrichment capacity, and provided utilities in the European Union with 20 percent of their raw uranium supply and 26 percent of their enrichment services.⁹ European imports of Russian nuclear fuel and services have in fact increased since the outbreak of full-scale war.¹⁰ As the global nuclear industry moves toward cheaper and nimbler small modular reactors (SMRs), Europe must work to address the risk that SMRs could increase its reliance on Russian enrichment services. Russia accounted for all of the world's commercially available supply of the high-assay low-enriched uranium (HALEU) needed to power SMRs, until the November 2023 announcement by US-based Centrus Energy that it had produced its first batch of the fuel. Transatlantic cooperation to rapidly bring non-Russian HALEU production to commercial scale is vital to ensure that net-zero targets are achieved in a secure and resilient manner.

5 Paschal Hansens, et al., "Russia: Europe Imports €13 Billion of 'Critical' Metals in Sanctions Blindspot," Investigate Europe, October 24, 2023, <https://www.investigate-europe.eu/posts/russia-sanctions-europe-critical-raw-materials-imports#>.

6 Ibid.

7 Paul Hockenos, "How Russia's War Is Putting Green Tech Progress in Jeopardy," Yale Environment 360, June 16, 2022, <https://e360.yale.edu/features/russia-ukraine-war-metals-electric-vehicles-renewables>.

8 Ksenia Vakhrusheva, "Europe Continues to Buy Products from Russia's Dirtiest Companies," Bellona, April 19, 2023, <https://bellona.org/news/air-pollution/2023-04-europe-continues-to-buy-products-from-russias-dirtiest-companies>.

9 Dory Castillo-Peters and Frank von Hippel, "US and EU Imports of Russian Uranium and Enrichment Services Could Stop. Here's How," Bulletin of the Atomic Scientists, August 5, 2022, <https://thebulletin.org/2022/08/us-and-eu-imports-of-russian-uranium-and-enrichment-services-could-stop/>.

10 Gabriela Baczyńska, "Exclusive: EU Nuclear Agency Sees Some Russia Imports Up Again In 2023 From Before Ukraine War," Reuters, December 1, 2023, <https://www.reuters.com/world/europe/eu-nuclear-agency-sees-some-russia-imports-up-again-2023-before-ukraine-war-2023-12-01/>

The Outlook for Russian Piped Gas across Five Scenarios

Russia's energy war on Europe has been fought primarily in the realm of piped gas. There is an overwhelming case to be made that, on the energy battlefield, Russia has defeated itself.

Had Russia not decided to embark on a full-scale invasion of Ukraine in February 2022, Russia's market share in Europe would have likely grown.¹¹ Proximity to European consumers, minimal ESG-aligned investments in Russia, and the Kremlin's subsidies enabled Russia to outcompete and gain a massive share of the European market prior to its invasion of Ukraine. Russia invested in gaining geostrategic leverage over Europe—an investment that, at the moment, must be written up as a loss. In a scenario where the war had not happened, it is eminently plausible that many coal-reliant states in Central Europe would have continued to embrace Russian gas delivered through Ukraine and the southern TurkStream pipeline as a cheaper—and supposedly cleaner—alternative to lignite. Germany seemed to embrace this as a policy in its endeavor to increase Russian pipeline supplies through the Baltic Sea via Nord Stream 2 as it staked a claim for climate leadership under its *Energiewende* policy. Despite formidable advantages—from ready-made transport infrastructure and a low-cost curve to the belief among many in Europe that energy trade would integrate Russia into Europe's economy and, with it, its values and norms—Russia has thrown away a sterling economic opportunity in pursuit of an unprovoked war.

Now, given Moscow's decision to initiate its full-scale invasion of Ukraine, each scenario for the war's outcome produces its own base case for how the Europe-Russia pipeline gas relationship will evolve.

The case of a Ukrainian victory produces the highest likelihood that Europe could return to something like the status quo should Russian defeat spell the end of the Putin regime.

Should major European importers revert to their antebellum belief that energy trade is the best way to ensure good behavior from Moscow, pipeline gas flows could increase sharply beginning at the end of this decade, and could surpass 2019's mark by 2034.¹² According to Rystad's analysis, a benign geopolitical environment on the European continent, and the price relief that would come with it, could eliminate Europe's desire to phase out Russian imports by 2027—that could even result, conceivably, in Nord Stream 1 and possibly Nord Stream 2 reopening, although this would still be unlikely given the scale of investment that repairs would require. While renewal of Russian gas transit through Ukraine may not occur (the agreement for which is due to expire at the end of 2024), it is possible that an ad hoc arrangement—along with continued flows via TurkStream, the southern route for Russian gas via Turkey—could undercut higher-cost LNG flows and return Russia's market share to near its pre-war level by the late 2030s. However, available pipeline capacity and victorious Ukraine do not automatically equate to resumed flows in areas where political opposition to returned reliance on Russia sources will prevail. Moreover, the competitiveness of Russian gas could be compromised by new EU regulations requiring lower-emission production and methane capture, which Russia is far from compliance with. In any case, sanctions on Russian piped gas are unlikely to either materialize or remain in place in such scenarios, and Europe would need to create explicit policies toward Russian gas, either at the national or at the EU level, to limit flows.¹³

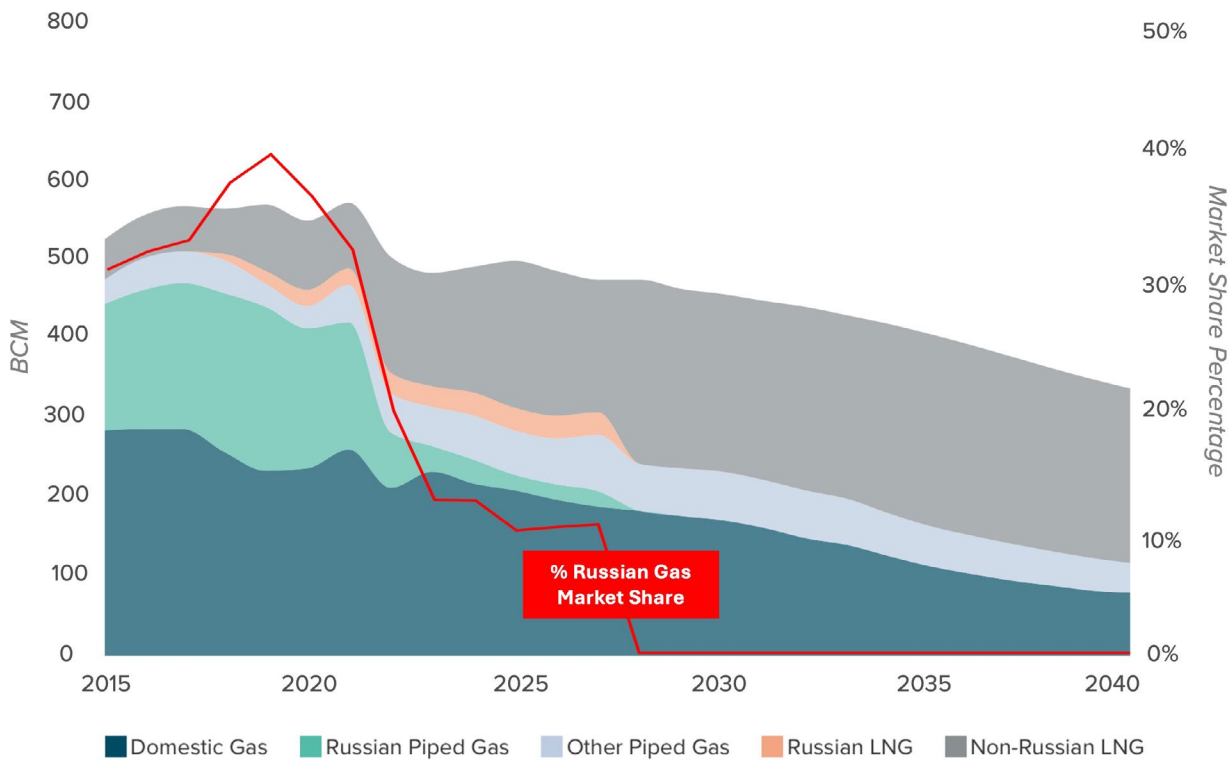
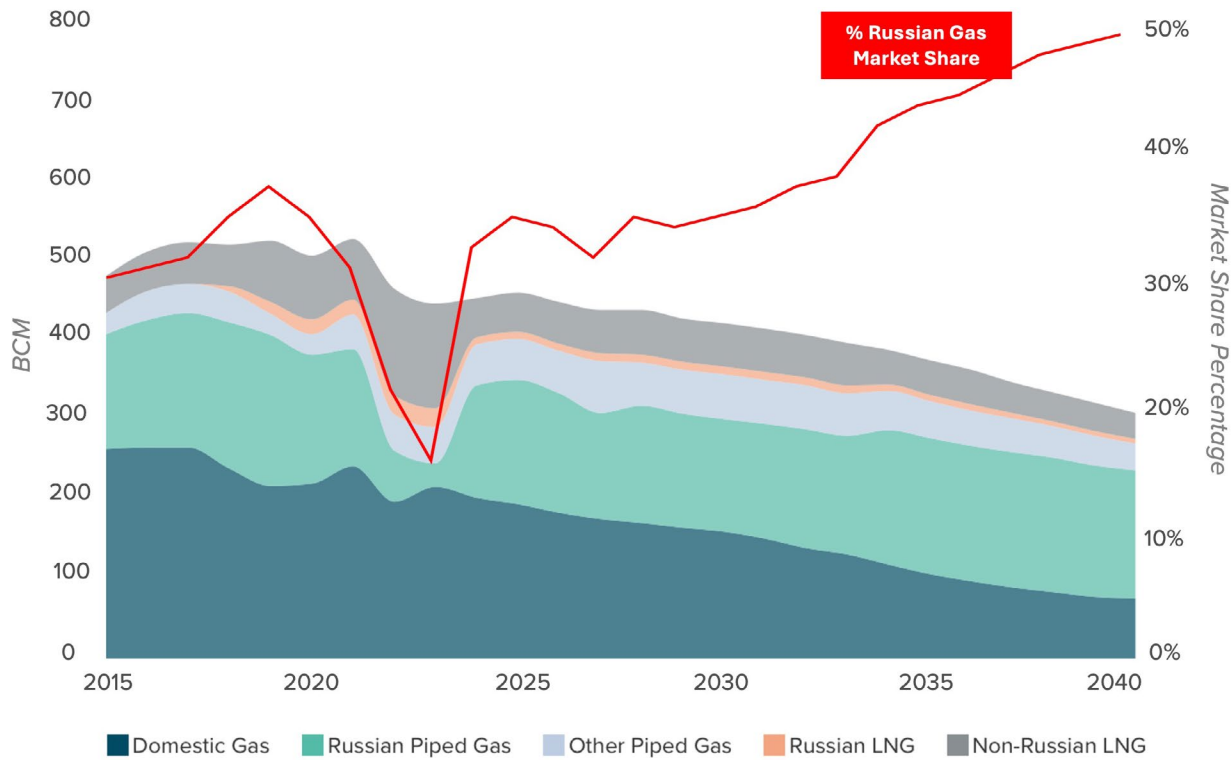
A negotiated settlement produces a more complicated outlook for Russia's pipeline gas exports to Europe. While a peace accord may be conducive to an agreement to extend the Ukrainian transit of Russian gas, the fear of leaving Ukraine isolated again could also spell the end of any European route that bypasses the vulnerable state. The exception, of course, would be TurkStream, which today continues to operate at normal levels. In this scenario, TurkStream could even con-

¹¹ Information provided to authors by Rystad Energy, 2024.

¹² Ibid.

¹³ Ibid.

Figure 1. Projections of Russian Gas's Market Share in Europe



Had Russia not invaded Ukraine, its gas market share in Europe would have gone up due to the low cost of its supply (top graph). However, the invasion has spurred wholesale diversification efforts in Europe and eroded Russia's commanding position in the European marketplace (bottom graph).

SOURCE: Rystad Energy research and analysis

tinue to operate past the European Union's 2027 target to end reliance on Russian gas, due to the opaque nature of Turkish gas transit and the complexity of EU-Turkey relations. In this scenario, pipeline gas imports would remain roughly at current volumes, levelling out at 30 billion cubic meters per year (bcma) by the 2030s. This would represent a slight increase from the estimated 28.3 billion cubic meters (bcm) that flowed to Europe in 2023, but would be merely a fraction of the 155 bcm that Europe imported via pipeline in 2021.¹⁴

The frozen and protracted conflict scenarios would create roughly identical market conditions for Russian pipeline gas. Either scenario would destroy any possibility for Kyiv and Moscow to extend their transit agreement past its expiry at the end of 2024. That would likely compel Russia to reroute its exports through Turkey, where it has largely avoided the wrath of sanctions makers. According to Rystad, that could result in a 5-bcma increase in flows through that southern route from 2025 onward—including past Europe's 2027 target to end gas dependency on Russia. In these scenarios, total flows to Europe could be expected to hover around 20 bcma, all transiting through Turkey.¹⁵

A Russian victory changes the situation dramatically. Moscow could be subject to a punitive embargo, made possible by the alternatives that Europe and its partners abroad have been able to source in the intervening years of war. In such a scenario, the European Union would hold firm to its ambitions to halt all imports of Russia's piped gas into the bloc, cutting off flows from Moscow's last entrepot into Europe—TurkStream—by the end of 2027.¹⁶

However unlikely, the chance of Europe's fragmentation over Russian gas flows is possible in **all of these scenarios**, and this breakage increases with the length of the war. In any scenario, the European Union itself must hold firm in the face of member-state fracture and stake its claim as the primary actor in any future energy relationship with Russia in order to minimize the damage that Russia could pose to European unity.

14 "Russian Pipeline Gas Exports to Europe Down 56% in 2023—Reuters Calculations," Reuters, January 2, 2024, <https://www.reuters.com/business/energy/russian-pipeline-gas-exports-europe-down-56-2023-reuters-calculations-2024-01-02/>; "A 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas," International Energy Agency, last visited February 15, 2024, <https://www.iea.org/reports/a-10-point-plan-to-reduce-the-european-unions-reliance-on-russian-natural-gas>.

15 Information provided to authors by Rystad Energy, 2024.

16 Ibid.

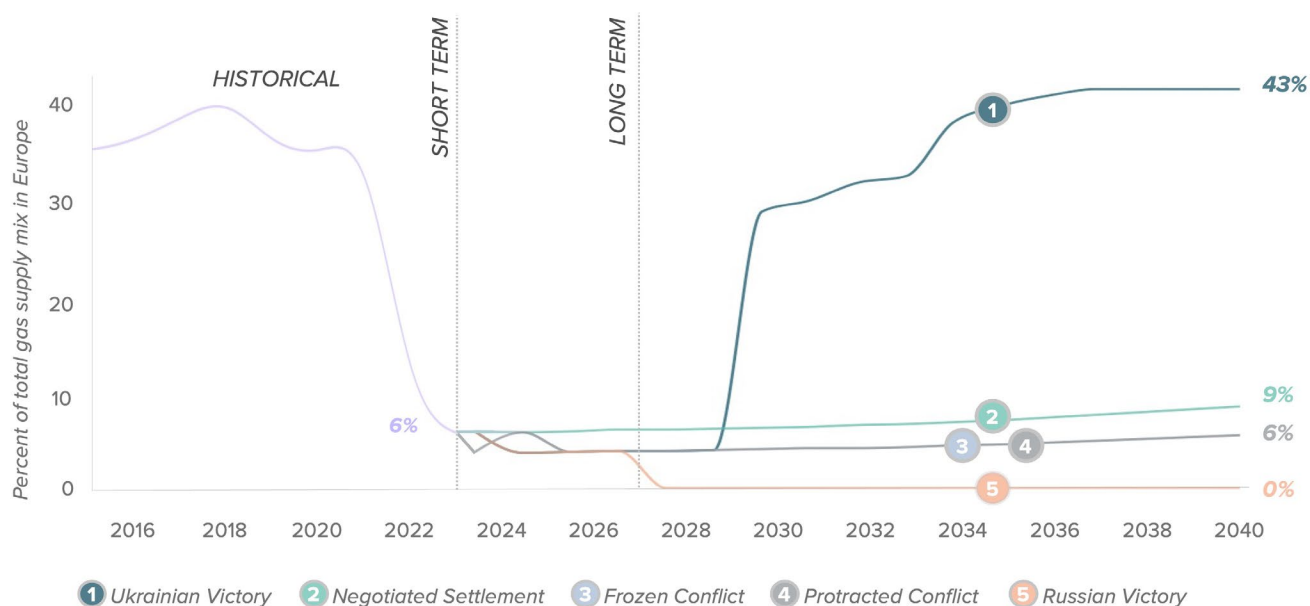
Table 1. Scenarios for Russian Pipeline Gas Routes to Europe

Scenarios	Piped gas flow	Description	Renewal of Ukraine transit agreement	Imports through Nord Stream (from 2030)	TurkStream active	EU stops all Russian imports from 2027	Max potential market share
A Ukrainian victory	Business as usual pre-war	<ul style="list-style-type: none"> Import of Russian gas is resumed at pre-war levels Reopening of imports through Nord Stream 1 and possibly 2 Russian gas past 2030 only limited by market share cap or demand and supply balances vs. other contracted supply sources to Europe 		Yes	Yes		43%
A negotiated settlement	About 30 bcma	<ul style="list-style-type: none"> Continued imports through TurkStream past 2027 despite EU target of ending reliance on Russian gas Assuming that negotiated settlement leads to Ukraine Transit agreement renewal at the end of 2024 	Yes		Yes		9%
A frozen conflict	About 20 bcma	<ul style="list-style-type: none"> Imports through Ukrainian transit expected to continue until end of 2024 with expiration of agreement TurkStream flows increased by 5 bcma to compensate for reduced capacity from the Ukrainian Transit 			Yes		6%
A protracted conflict		<ul style="list-style-type: none"> Continued imports through TurkStream past 2027 despite EU target of ending reliance on Russian gas 					
A Russian victory	Complete embargo	<ul style="list-style-type: none"> All imported piped gas flows from Russia to Europe stopped Imports through Ukrainian Transit expected to continue until end of 2024 with expiration of agreement Imports through TurkStream expected to continue until 2027 as EU has committed to end reliance on Russian gas by this year 			Yes, until 2027	Yes	4%

¹NOTE: Based on highest energy market share of Russian pipeline imports to Europe observed since the year 2000.

SOURCE: Rystad Energy research and analysis

Figure 2. Russian Piped Gas in European Supply Mix
Historical flows and assessments across five scenarios



In all scenarios besides a Ukrainian victory, European demand for Russian gas remains muted.

SOURCE: Rystad Energy research and analysis

Table 2. Scenarios for Russian Pipeline Gas Exports to Europe

Scenario	Piped gas flow	European reliance* (share of gas supply mix)		Russian gas stranded* (vs pre-war expectations) bcma		Russian gas revenue lost* (vs pre-war expectations) USD	
		Short term (2024-2027)	Longer term (2028-2040)	Short term (2024-2027)	Longer term (2028-2040)	Short term (2024-2027)	Longer term (2028-2040)
A Ukrainian victory	Business as usual pre-war	4%	33%	151	24	40	8
A negotiated settlement	About 30 bcma	6%	7%	144	120	38	47
A frozen conflict	About 20 bcma	5%	5%	149	130	39	50
A protracted conflict		4%	5%	151	130	40	50
A Russian victory	No gas	4%	0%	151	148	40	57

*NOTE: Average in period

SOURCE: Rystad Energy research and analysis

The Outlook for Russian LNG across Five Scenarios

LNG imports have provided a lifeline to Europe amid Russia's energy war, increasing by 65 percent year on year in 2022 to partially compensate for the loss of Russian pipeline gas supplies.¹⁷ By the same token, LNG has also provided Russia an alternative route to sabotage the European energy system.

While Russian LNG exports to Europe totaled 16 bcm in 2021, as the continent rapidly expanded its capacity to import the super-chilled gas, Russia's exports to the EU grew to 18.5 bcm in 2022 and 24 bcm in 2023.¹⁸ Russia is Europe's number-three supplier of liquified natural gas after the United States and Qatar, and Europe in turn purchases half of Russia's total LNG exports. Although many EU and member-state officials have called for an import ban, little action on this front has materialized. European purchases of Russian LNG provide the Kremlin with a lucrative revenue stream in the high-priced market for shipped gas. Sales in 2023 alone brought in more than €10 billion for the Russian war machine.¹⁹

Transitioning toward the more lucrative market for LNG has been a feature of Russia's long-term energy policy since at least 2013, when private companies including Novatek were authorized to export the liquid fuel. Between 2017 and 2022, Russia increased its liquefaction capacity by a factor of three, allowing its gas sector greater exposure to international markets.²⁰ Since then, the war and the uncertain future of European pipeline exports have hastened Russia's ambitions for a pipeline-to-LNG transition. Projects currently under con-

struction would again triple Russia's export capacity, this time to 100 million metric tons per year.²¹ That would be roughly equivalent to 140 bcma—about 90 percent of Russia's pipeline supplies to Europe in 2021. However, US sanctions have sought to halt this expansion, specifically those targeting Russia's Arctic LNG-2 project. Fearing sanctions, minority shareholders have reduced their involvement, with Japan's Matsui withdrawing workers and France's TotalEnergies placing the third and last train on hold. As a result, Novatek, the Russian company that is the majority owner of the project, has had to declare force majeure for the project's 4.3 million tons worth of LNG supply contracts. The company has, however, increased its reliance on lower-quality Chinese technology suppliers—even with the help of sanctions-evading American financiers—to bring the project to completion.²² The Russian LNG complex as a whole is dealing with similar challenges from the withdrawal of Western knowhow.

Table 3. Past and Planned Russian LNG Capacity Prior to the War

Year	Russian LNG capacity
2017	11 million metric tons per year
2022	33 million metric tons per year
After completion of Ust-Luga, Arctic LNG 2, etc.	100 million metric tons per year (planned)

SOURCE: Rudnik, "Unfulfilled Ambitions"; Griffin, "Russian LNG Plans Need Extra Gas Resources for 34 Mil Mt/Year Output Boost."

17 "Europe Was the Main Destination for U.S. LNG Exports in 2022," US Energy Information Administration, December 21, 2023, <https://www.eia.gov/todayinenergy/detail.php?id=61105>.

18 Ana Maria Jaller-Makarewicz, "EU Turns Blind Eye to 21% of Russian LNG Flowing Through Its Terminals," Institute for Energy Economics and Financial Analysis, November 29, 2023, <https://ieefa.org/resources/eu-turns-blind-eye-21-russian-lng-flowing-through-its-terminals>; 24 bcm figure provided to authors by Rystad Energy, 2024.

19 Jorge Liboreiro, "EU Purchases of Russian LNG up 40% Compared to Pre-war Levels, New Study Finds" Euronews, August 30, 2023, <https://www.euronews.com/my-europe/2023/08/30/eu-purchases-of-russian-lng-up-40-compared-to-pre-war-levels-new-study-finds>; Ana Maria Jaller-Makarewicz, "EU Turns a Blind Eye to 21% of Russian LNG Flowing Through Its Terminals", Institute for Energy Economics and Financial Analysis, November 29, 2023, <https://ieefa.org/resources/eu-turns-blind-eye-21-russian-lng-flowing-through-its-terminals>.

20 Filip Rudnik, "Unfulfilled Ambitions: Russia's LNG Sector in the Grip of Sanctions," Centre for Eastern Studies, June 5, 2023, <https://www.osw.waw.pl/en/publikacje/osw-commentary/2023-06-05/unfulfilled-ambitions-russias-lng-sector-grip-sanctions>.

21 Rosemary Griffin, "Russian LNG Plans Need Extra Gas Resources for 34 Mil Mt/Year Output Boost," S&P Global Commodity Insights, March 7, 2023, <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/lng/030723-russian-lng-plans-need-extra-gas-resources-for-34-mil-mt-year-output-boost>.

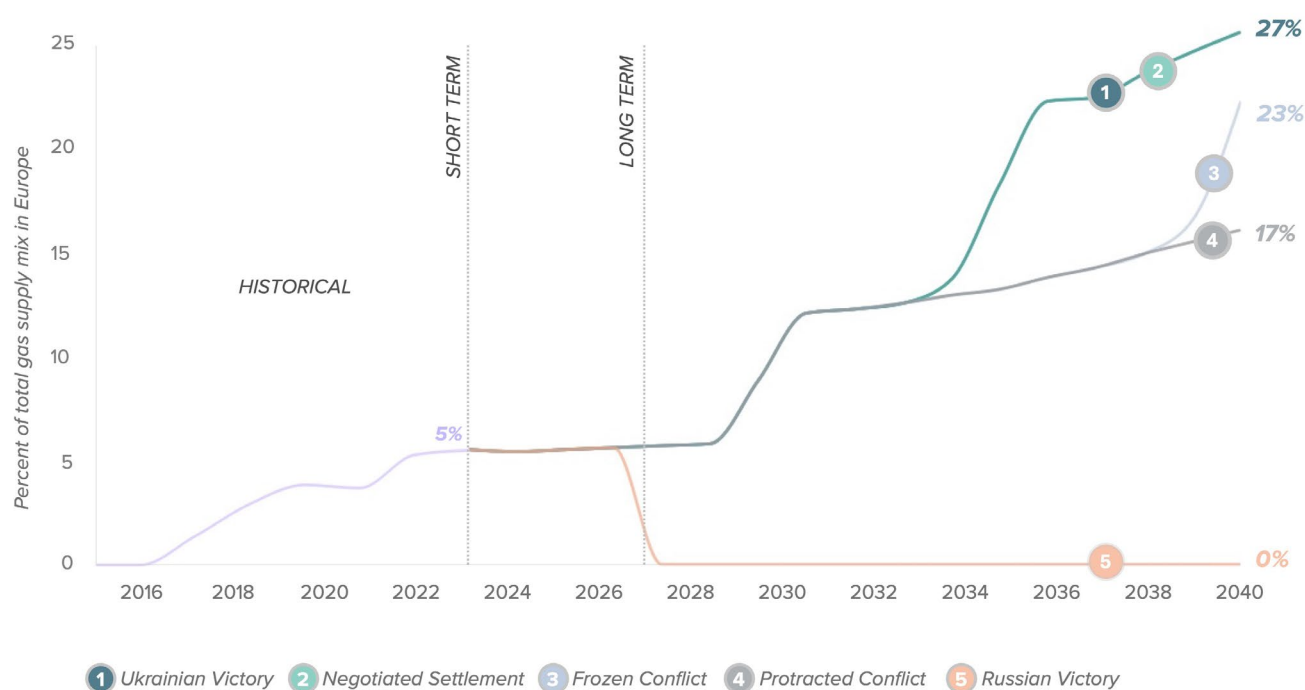
22 David Sheppard, Chris Campbell, and Peter Andringa "Inside the Brazen Arctic Trip Supplying Putin's Flagship Energy Scheme," *Financial Times*, March 1, 2024, <https://ig.ft.com/russia-sanctions/>; "The Russian Arctic LNG 2 Project Targeted by U.S. Sanctions," Reuters, December 26, 2023, <https://www.reuters.com/markets/commodities/russian-arctic-lng-2-project-targeted-by-us-sanctions-2023-12-26/>; "Russia's Arctic LNG 2 Last Line Is TotalEnergies CEO Says," Reuters, February 8, 2024, <https://www.reuters.com/business/energy/russias-arctic-lng-2-last-line-is-hold-totalenergies-ceo-says-2024-02-08/>; "Russia: U.S. Sanctions against Arctic LNG 2 Undermine Global Energy Security," Reuters, December 27, 2023, <https://www.reuters.com/markets/commodities/russia-us-sanctions-against-arctic-lng-2-undermine-global-energy-security-2023-12-27/>

Table 4. Scenarios for Russian LNG Flows

Scenarios	LNG flows	Description of import flows	Western sanctions	Non-Western technology	Domestic technology	European imports
A Ukrainian victory	Business as usual	<ul style="list-style-type: none"> • Normalization in 2028, all projects under development will be completed by 2030 • New capacity on stream from 2032 onward • Capacity build out according to pre-war expectations, but with delayed timing • No limits on European imports 				Yes
A negotiated settlement	Technology part of settlement	<ul style="list-style-type: none"> • Sanctions on LNG removed • Business as usual 				Yes
A frozen conflict	Non-Western technology only	<ul style="list-style-type: none"> • No sanction removal • LNG capacity developed together with non-Western stakeholders • Follows business as usual for new capacity additions, but with a five-year lag • Technology assumed to be less efficient with a 20 percent higher cost base 	Yes	Yes		
A protracted conflict	Domestic technology only	<ul style="list-style-type: none"> • No sanction removal • LNG capacity developed together with domestic technology • Follows business as usual for new capacity additions, but with an 8-year lag • Technology assumed to be less efficient with a 25 percent higher cost base 	Yes		Yes	
A Russian victory	Complete embargo	<ul style="list-style-type: none"> • Only currently producing liquefaction capacity • European import embargo 	Yes			

SOURCE: Rystad Energy research and analysis

Figure 3. Russian LNG as Part of European Gas Mix (%)
Historical flows and assessments across five scenarios



SOURCE: Rystad Energy research and analysis

Stemming the tide of Russian LNG to Europe is primarily an imperative of economic sanctions. The overall risks to European energy security are rather muted. In all scenarios, according to analysis by Rystad Energy, the share of Europe's supply mix comprising Russian LNG is not expected to surpass 7 percent by 2040—roughly its level today. Meanwhile, restrictions on access to Western technology—on which Russia's LNG industry relies—are expected to result in declines in Russia's global exports through the end of this decade in all scenarios.

The future of that technology control regime is crucial for degrading Russia's efforts to modernize and grow its LNG sector. Consequently, the impact on Russia's ability to profit off its LNG complex differs significantly across the scenarios.

In a Ukrainian victory, a removal of Western sanctions could allow for a normalization of technology relations between Russian and Western investors and technical experts. This could enable Russia to complete its current roster of LNG projects, albeit with slight delays courtesy of existing restrictions on Western technologies. Russia's in-progress LNG projects would be completed by 2030, with new capacity

additions from 2032 onward in excess of 100 million metric tons (mmt).

In a negotiated settlement, a similar scenario may play out. It is conceivable that access to Western technologies could be part of the international peace framework. In such a case, Europe may be content with placing limits on its piped gas imports from Russia and leave LNG untargeted. After all, the impact on Russia's share of that market would be minimally affected, per Rystad's analysis.

A frozen or protracted conflict introduces more significant limits on the technologies at Russia's disposal. In both scenarios, European LNG sanctions could be imposed in addition to the current technological restrictions, which would remain in place.

In a frozen conflict, the veneer of peace could allow non-Western technological partners—namely China—to step in and help Russia develop its LNG capacity. In such a scenario, according to Rystad, Russia could be able to proceed with its new capacity additions, but with a five-year lag and greater inefficiencies, not reaching 100 mmt until 2035. However, its replacement technologies would be inferior, and

Russia's new LNG export capacity would be saddled with reduced efficiency and a 20 percent higher cost base.²³

A protracted conflict results in the same restrictions on Western technologies but creates a more fraught environment for new partners to assist Russia's LNG sector, due to risks of secondary sanctions. In such a scenario, Russia is forced to rely solely on its domestic repository of technology, resulting in an eight-year lag for its planned capacity additions, delaying the 100-mmt milestone to 2038. In this scenario, Russia's LNG complex becomes even less efficient, and with a 25 percent higher cost base.²⁴

A Russian victory creates a maximalist scenario for Western sanctions. In addition to a full embargo on the part of allied countries, an international price cap—much like that placed on oil—could also be implemented. In a vicious cycle for Russia's LNG sector, the strongest possible restrictions on technology cripple the industry. Russia's best-laid plans to triple its export capacity implode as the economically quarantined state fails to attract foreign partners—even China may

be hesitant to step in for fear of secondary sanctions from a West unified in the face of Russian victory and the threat to the NATO Alliance it would pose.

Across every scenario, Russian LNG ultimately plays a muted role in Europe's energy security, while contributing significantly to Russia's ability to fund its war in Ukraine. Transatlantic policymakers must leverage Western technological dominance in the sector to undermine Russia's ability to turn a profit and transition away from Europe's pipelines as its primary gas-export outlet. Allied nations should set up support mechanisms to entice Western firms to leave Russia, if they have not already. That should include creating a legal framework that shields them from liabilities stemming from leaving Russia, including protecting companies from the "voluntary donations" that Russia demands of firms that seek to exit the country.²⁵ But even pipeline and liquified gas sales combined pale in their importance to the Russian treasury when compared to the crown jewel of the Russian economy: oil.

Table 5. Scenarios for Russian LNG Exports

Scenario	LNG flows	Global reliance on Russian LNG (share of LNG supply mix*)		Russian gas stranded* (vs pre-war expectations)		Russian gas stranded* (vs pre-war expectations) bcma	
		Short term (2024-2027)	Longer term (2028-2040)	Short term (2024-2027)	Longer term (2028-2040)	Short term (2024-2027)	Longer term (2028-2040)
A Ukrainian victory	Business as usual	6%	7%	19	19	5	7
A negotiated settlement	Technology part of settlement	6%	7%	19	19	5	7
A frozen conflict	Non-Western technology only	6%	6%	19	34	5	13
A protracted conflict	Domestic technology only	6%	6%	19	36	5	14
A Russian victory	Complete embargo	6%	3%	19	58	5	23

*NOTE: Average in period

SOURCE: Rystad Energy research and analysis

23 Information provided to authors by Rystad Energy, 2024.

24 *ibid.*

25 Polina Ivanova and Anastasia Stognei, "Western groups leaving Russia face obligatory donation to Moscow," *Financial Times*, March 27, 2023, <https://www.ft.com/content/77368014-1397-4a08-901d-1f996e66d627>.

The Outlook for Russian Oil across Five Scenarios

Russian oil presents an even more complicated picture than gas for European and global energy security. Before it invaded Ukraine, Russia was the top exporter of oil to world markets as late as December 2021, a year in which the Kremlin made nearly three times as much revenue from oil exports as from gas sales.²⁶ Also in 2021, Europe had a significant level of reliance on Russian crude oil and refined products, which together comprised one-third of its imports. Since the European Union's ban on seaborne imports of Russian oil, the bloc's imports have fallen nearly 90 percent.²⁷

In all scenarios, Russia's share of the global oil market is expected to fall due to structural declines in Russian export and production levels. Analysis from Rystad forecasts that Russian oil production will decrease from 10.6 mbpd to 6.5 in 2040, while domestic demand remains steady. To maximize its export revenues amid this terminal production decline, Russia is likely to prioritize the export of value-added products rather than crude oil. Indeed, Russia has invested \$11 billion in modernizing its refinery complex.²⁸

Sanctioning Russian oil is simultaneously a crucial matter for European energy security and for depriving the Kremlin of funds to wage war. A Group of Seven (G7) price cap has sought to keep Russian oil flowing to stabilize the market while also reducing the Kremlin's export revenues. Cutting off Russian oil through Europe would be fraught. Eastward flows of oil along pipelines still comprise a significant export route for Russia. Russia's westward exports to the landlocked nations of Central Europe along the Druzhba pipeline are currently exempt from Western sanctions.²⁹ By prioritizing sanctions on the lion's share of Russia's exports that are transported via tanker—both in the form of an EU embargo and an international price cap enforced through the insurance industry—the West has sought to keep Russian oil flowing to non-European markets at a discount. This strategy was

designed to blunt Russian revenues, but without overly restricting its oil in order to maintain market stability.

While the market for oil is far more global and liquid than it is for gas, the fact that the majority of Russian export volumes are transported through European pipelines and ports highlights the impact that Western policies could have on the global market.³⁰ The price cap has sought to thread the needle between blunting Moscow's most crucial revenue stream on the one hand and keeping the energy sector's benchmark market stable on the other. These efforts were tested across five scenarios.

In the case of a Ukrainian victory, a return to the status quo—with exports along western and eastern pipelines and ports operating at historical norms—is conceivable. **A negotiated settlement or frozen conflict,** however, could finally put to an end Russia's exports along the Druzhba pipeline by creating the political will to end the inland states' exemption from the EU embargo. This would put at risk 15–20 percent of Russia's oil exports, assuming that Russia's other three export routes—its eastern pipelines and both its eastern and western ports—continued to operate as normal.

A protracted conflict could put at risk 60–65 percent of volumes, while **Russian victory** could put 80–85 percent of volumes at risk. This would occur in the event that—in addition to the halting of Druzhba—Western nations also blockade Russia's ports. Hypothetically, in both scenarios, this could involve Russia's ports in the west and, in the case of Russian victory, those in the east as well. This action would, however, require a significant decision to escalate on the part of Western policymakers, and remains a thoroughly hypothetical and risky possibility.

Each scenario for the war's outcome represents some restriction of Russia's oil-export routes due to Western sanctions.

26 "Oil Market and Russian Supply," International Energy Agency, last visited February 15, 2024, <https://www.iea.org/reports/russian-supplies-to-global-energy-markets/oil-market-and-russian-supply-2#>; "Russia's Oil and Gas Revenue Windfall," Reuters, January 21, 2022, <https://www.reuters.com/markets/europe/russias-oil-gas-revenue-windfall-2022-01-21/>.

27 "EU Imports of Energy Products—Latest Developments," Eurostat, last visited February 15, 2024, https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_recent_developments&oldid=554503

28 Information provided to authors by Rystad Energy, 2024.

29 "The EU's Sixth Package of Sanctions against Russia," European Parliament, July 1, 2022, https://www.europarl.europa.eu/doceo/document/E-9-2022-002408_EN.html.

30 Information provided to authors by Rystad Energy, 2024.

In a **Ukrainian victory scenario**, Russia's export capacity of 6.9 million barrels per day (mbpd) would remain roughly the same. In the case of a **negotiated settlement or frozen conflict**, export capacity could decline to 5.6 mbpd, while in a **protracted conflict**, it could decline to 1.9 mbpd. In the case of a **Russian victory**, export capacity could decline to a miniscule 0.8 mbpd due to possible interruptions of Russia's four primary export routes.³¹

With this in mind, Western leverage must be brought to bear in terms of both demand and provisioning technology. The reorientation of Russia's oil exports toward Asia has brought

the country's oil complex to markets that jealously guard their domestic refining industries and would prefer to import crude oil rather than refined products. Europe itself only imports 2.6 percent of its refined oil product consumption, and implementing measures to ensure that Europe refrains from purchasing Russia's refined products will help ensure that Russia's transition to exporting refined products comes to very little.³² In addition, staying unified on blocking Western technologies and investments from reaching Russia's oil complex will be critical for preventing Russian oil export revenues from making their way to the battlefield in the case of a protracted conflict.

Table 6. Scenarios for Oil Sanctions

Scenarios	Share of oil export at risk	Description	Export through western pipelines	Export through eastern pipelines	Export through western ports	Export through eastern ports
A Ukrainian victory	Business as usual	<ul style="list-style-type: none"> Returns to historical export volumes with export through all pipelines and ports 	Yes	Yes	Yes	Yes
A negotiated settlement	15-20% of export volumes at risk	<ul style="list-style-type: none"> Business as usual for exports through ESPO to China Export through eastern ports continues as usual 		Yes	Yes	Yes
A frozen conflict		<ul style="list-style-type: none"> Export through western ports (Black Sea and Baltic ports) continue as usual Druzhba volumes goes to zero 				
A protracted conflict*	60-65% of export volumes at risk	<ul style="list-style-type: none"> Business as usual for exports through ESPO to China Export through eastern ports continues as usual Druzhba volumes to zero Export through western ports blocked (Black Sea and Baltic ports) 		Yes		Yes
A Russian victory*	80-85% of export volumes at risk	<ul style="list-style-type: none"> Only internal consumption and pipeline exports to China All pipeline exports to Europe stopped Export block at both eastern and western ports 		Yes		

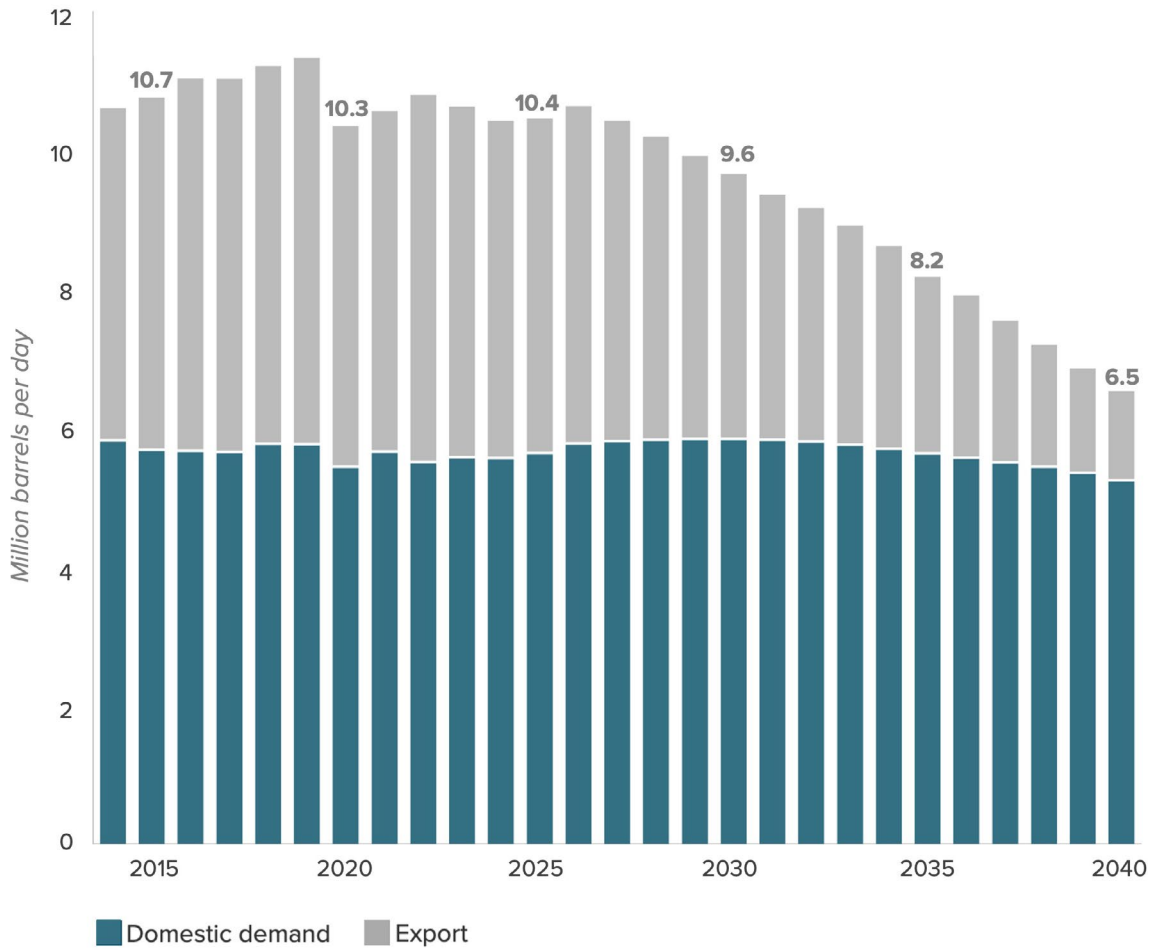
*NOTE: A protracted conflict or Russian victory would require a severe response, including potentially blocking Russian ports or through a coordinated global refusal to purchase Russian oil.

SOURCE: Rystad Energy research and analysis

31 Ibid.

32 "Europe," International Energy Agency, last visited February 15, 2024, <https://www.iea.org/regions/europe/oil>.

Figure 4. Russian Crude and Condensate Production, Export, and Domestic Demand



Crude and condensate export levels from Russia are expected to decrease by 2040 with reduced production and stable levels of domestic demand.

SOURCE: Rystad Energy research and analysis

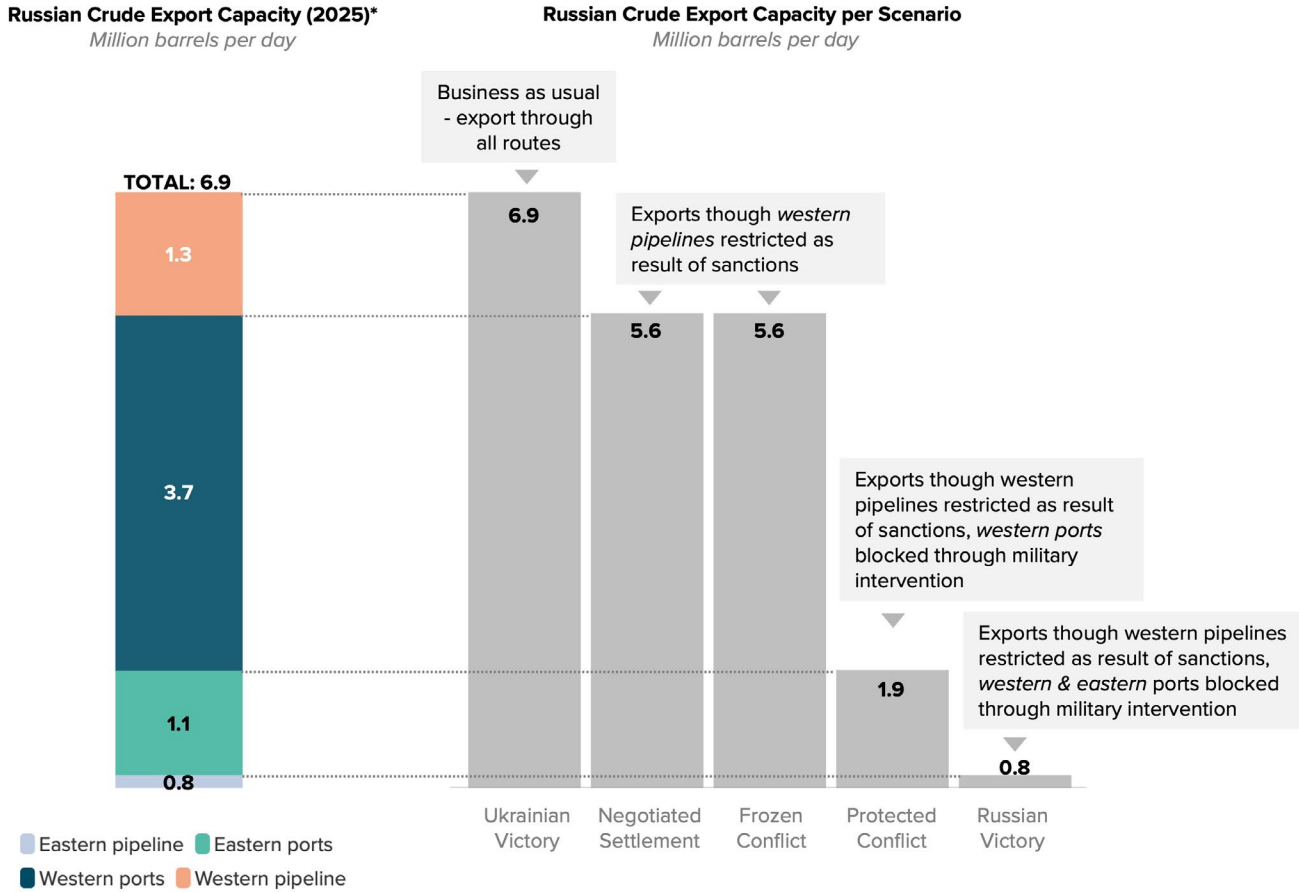
Figure 5. Russian Oil Export Volumes through Pipelines and Ports



*Additional capacity of approx. 100 kbbbl/d through the CPC pipeline where the Russian crude is blended with Kazakh oil, Capacity for Russian crude is for Ust-Luga and Novorossiysk as ~200 kbbbl/d of Kazakh crude is exported through these ports. Capacity from Sakahlin not included.

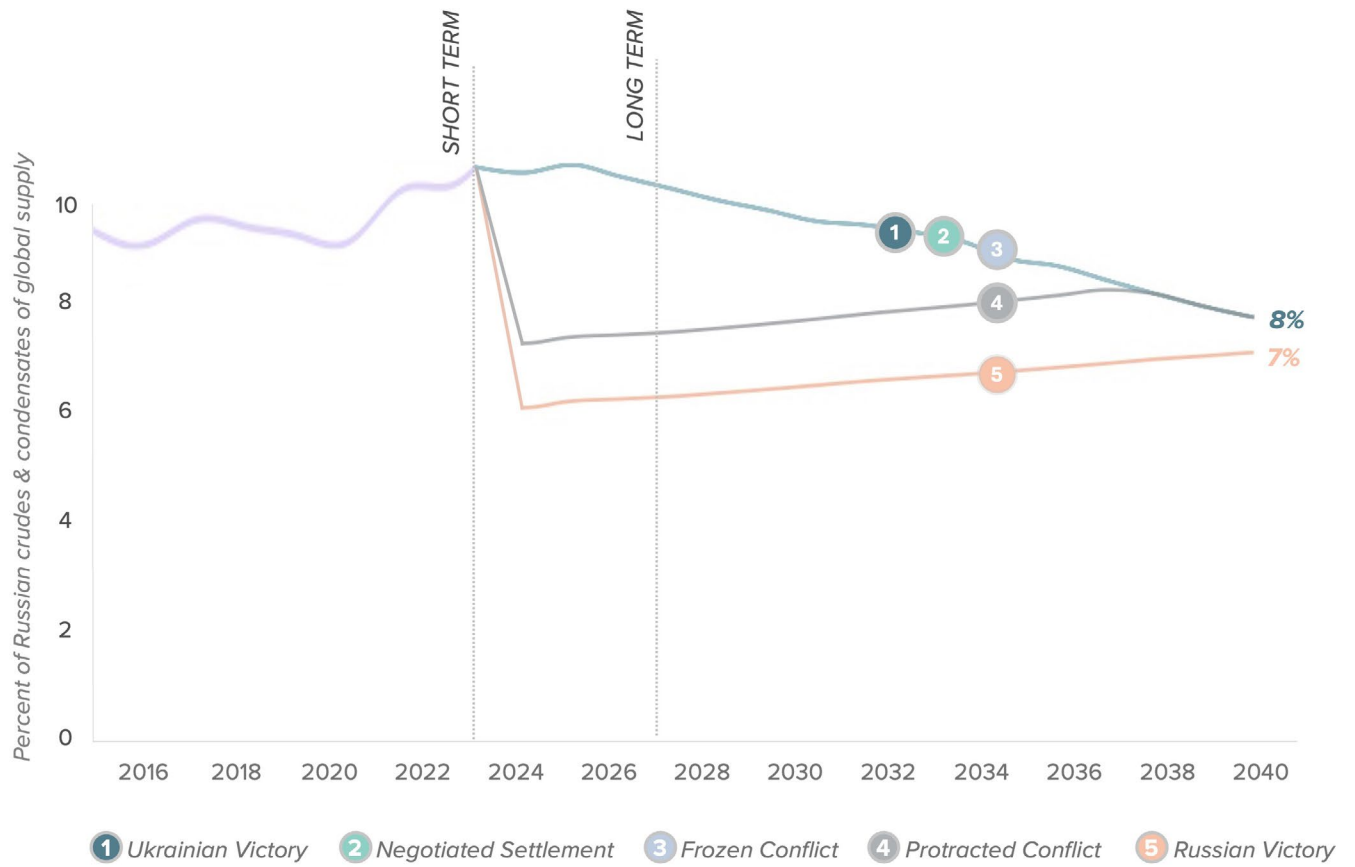
SOURCE: Rystad Energy research and analysis

Figures 6. Russian Crude Export Capacity



Russia has an export capacity of 6.9 mbpd, but in each scenario the routes for those exports are subject to some restriction.
 SOURCE: Rystad Energy research and analysis

Figure 7. Russian Supply in Global Crude and Condensate Supply Mix
Historical flows and assessments across five scenarios



Russian share of global crude and condensate supply is expected to decrease across all scenarios..

SOURCE: Rystad Energy research and analysis

Recommendations

Each scenario demands a bespoke response from the West to safeguard European energy security while also working toward a favorable outcome for Kyiv. That requires finding a middle ground between using energy policy to degrade the Kremlin's warfighting ability and economic influence, while also providing European consumers with reliable and competitively priced energy supplies to ensure their continued willingness to support Ukraine.

In the case of a Russian victory, Europe should enact a complete embargo on pipeline gas and LNG imports from Russia. That would be necessary to send a strong message that does not legitimize Russia's ill-gotten gains from the war, and that signals to Russia that only by restoring Ukraine's independence and territorial integrity can normal energy and economic relations with the West resume. That scenario would require a redoubling of Europe's current efforts to secure alternative sources and routes, while working to accelerate the outcomes of the Green Deal to reduce dependence on natural gas writ large. Both objectives require extensive transatlantic collaboration to fortify Europe's energy system against this "shock therapy." Europe and the United States must also work diligently to improve cyber and kinetic defenses to ensure that Russian sabotage cannot force Europe into accepting Russian pipeline flows once again. In other words, transatlantic allies should continue efforts already under way to secure Europe's energy system in hopes of a Ukrainian victory, but in preparation for a worst-case outcome. From such a position of strength, Europe and the United States should impose secondary sanctions and tighter export controls on foreign LNG developers operating in Russia to degrade Moscow's ability to finance its war. In this and all other scenarios, transatlantic partners should also work to strengthen the existing G7 oil price cap enforcement and progressively lowering the price at which Russia can sell oil on Western-insured vessels. This includes improving transparency of Russia's ghost fleet, creating barriers or additional costs related to expanding Russia's fleet, and sanctioning all entities that assist Russian price cap evasion.³³

The unresolved scenarios of a protracted or frozen conflict suggest a more calibrated response in the realm of pipeline gas. A delayed sense of finality to the war may seem to buy Europe more time to plan for a future without Russian fossil fuel imports—including past its 2027 target to end Russian energy dependency as outlined in its REPowerEU plan. However, Europe must resist any scenario that allows Russia to continue to reap the profits of pipeline trade to fund its aggression against Ukraine. Central European states must be prepared for the end of Ukrainian transit, and that means increasing clean energy and electrification in the region, while also expanding the options to import LNG and later hydrogen. Much of this region is landlocked, and new and strengthened interconnections must be deployed to allow piped gas from the sea, from Norway, and from elsewhere in Africa and Asia to flow into the region's interior. At some point, Europe must also address the fact that TurkStream is allowing Russian gas an inconspicuous entryway into Europe. To defend this soft underbelly of its energy system, Europe and its partners must find ways to ensure that the continent's southeastern states have their energy infrastructure upgraded to reduce their dependence on flows that offer Moscow an economic lifeline to fund its war.

A negotiated settlement creates a more favorable position for Europe. It can continue to import Russian pipeline gas while ensuring that a portion of the proceeds go to Ukraine or to Turkey, another key—albeit complex—ally for Europe. In such a scenario, Europe must hold fast to closing the Yamal and Nord Stream pipelines as possible routes for Russian energy. It must then seek to transition away from TurkStream imports to further cut off the flows of cash that Russia could use to rearm. Afterward, Ukrainian transit must be addressed—in doing so, Europe and the transatlantic alliance must invest heavily in the country's potential as an alternative source of gas, hydrogen, nuclear, and renewable energy to Europe. Only in that way can allies ensure that European energy security is not advanced at the financial expense of a Ukraine that will need to be rearmed against a possible renewed Russian assault. In this scenario, investments in Ukraine's decarbonized sector will be critical for both Europe's energy security and Ukraine's overall security.

33 Agathe Demarais, "How Russia Evaded the Oil Price Cap", *Foreign Policy*, October 26, 2023, <https://foreignpolicy.com/2023/10/26/russia-oil-price-cap-sanctions-evasion-ukraine-war-shipping-tankers-us-eu-g7-india-china/>; Richard Vanderford, "U.S. Sanctions Shipping Companies for Allegedly Evading Russia Oil Price Cap", *The Wall Street Journal*, November 16, 2023, <https://www.wsj.com/articles/u-s-sanctions-shipping-companies-for-allegedly-evading-russia-oil-price-cap-20c32434>.

Ukrainian victory—by far the preferred scenario—creates the easiest situation for Europe. However, the favorable resolution to the war may eliminate the perception among European publics that the continent must rid its energy system of undue Russian influence. After all, Russian pipeline gas is much cheaper than the LNG Europe has imported to replace it, and the supply chain is far less exposed to the volatility of the global marketplace, particularly when gas is traded on a spot basis rather than on long-term contracts. Insofar as Russian defeat could also light the spark of regime change in Russia, the normalization of energy relations with Europe could be an enticing carrot for European policymakers to incentivize good behavior from Moscow, both in terms of Russia's liberal-democratic development and for eliminating the possibility that Russia may seek vengeance for its humiliating defeat at the hands of Ukraine. In any case, Europe must have alternative suppliers available, and cannot rely on even a liberal Russia to such an extent that Moscow can wield political influence through gas supplies.

While many in Europe will want to return fully to the energy status quo with a reformed Russia, this urge must be tempered. Europe cannot forget the lessons of the failed *Wandel durch Handel* policy with Russia, and it cannot allow itself to become vulnerable to Russian economic leverage ever again, no matter how liberal the government in Moscow.³⁴ Trade can certainly happen, but it must be on the basis of Europe having many suppliers—of gas and other sources of energy—rather than a single dominant supplier. Europe can only return to “normal” energy relations with Russia if it recognizes that a system featuring overwhelming Russian dominance was not a symbiotic relationship whatsoever.

Providing Certainty to the Gas Market

The variety of scenarios creates an enormous amount of uncertainty for market participants, ranging from energy suppliers to investors and end consumers. Separately from the war, market forecasts range quite substantially—by a factor of nearly three—for Europe's long-term demand for gas as its energy transition accelerates. Key forecasts from industry and analysts for Europe's total gas demand range from 180

to 480 bcma by 2040. Forecasts that do not shape demand based on specific energy or climate priorities all arrive above 300 bcma by 2030, with a consensus closer to 400 bcma by 2040.³⁵

European gas demand is therefore expected to decline between 2021 and 2040, by a level roughly equal to the 155 bcma that Russia used to provide the content via pipeline. While this seems to be a rather convenient forecast, Europe still needs new sources of supply to replace declining domestic production in the Netherlands and Norway, and to substitute for coal. Yet uncertainty regarding the pace of Europe's demand trajectory has made investors hesitant about committing to new projects.

In addition to the general uncertainty surrounding gas's role in Europe's energy transition, questions remain over the longevity of Europe's punitive regime toward Russian imports. Market actors wonder whether the war's conclusion will reopen the floodgates for Russian pipeline imports to Europe, destroying any potential returns for investors who heed the call of supply diversification.

In order to ensure security of supply, Europe must provide greater certainty for market participants regarding both the role of gas in its energy transition and its willingness to engage with the Russian gas sector in the future. It can do so in a number of ways.

First, it must work to de-risk new projects. This means more than just signaling the long-term nature of non-Russian gas's role in Europe's energy transition, which many policymakers, including Ditte Juul Jorgensen, the European Commission's director-general for energy, have made clear.³⁶ Gas remains an important replacement for higher-emission coal, whose usage increased in 2022 as the withdrawal of Russian gas created more demand for it as a generator of electricity.³⁷ Persistently high fossil gas prices could risk making the dirtiest fossil fuel more competitive than gas to 2025, warn officials from the International Energy Agency. The European Commission's new 2040 climate target recognizes the important role gas will play in its objective to cut emissions by 90 percent from 1990 levels by the end of the next decade, citing its continued use in industry, buildings, and the power

34 The German language political term *Wandel durch Handel*—literally “change through trade”—refers to the belief prevalent among many policymakers, in the years after the Cold War and before the current crisis, that economic engagement with Russia's energy sector would bring Moscow into greater alignment with the West.

35 Information provided to authors by Rystad Energy, 2024.

36 “Top EU Energy Official Says US Gas Will Be Needed for Decades,” *Financial Times*, September 24, 2023, <https://www.ft.com/content/7e94bc82-c358-4a8c-b539-781d62dbc3c9>.

37 “The World's Coal Consumption Is Set to Reach a New High in 2022 as the Energy Crisis Shakes Markets,” International Energy Agency, December 16, 2022, <https://www.iea.org/news/the-world-s-coal-consumption-is-set-to-reach-a-new-high-in-2022-as-the-energy-crisis-shakes-markets>.

sector.³⁸ The plan has been criticized by environmentalists for its notable lack of a gas phaseout.³⁹

European consumers—directed by the commission—must also commit to long-term contracts with suppliers. Here, the risks associated with such long-duration agreements can be mitigated through European buyers insisting on flexible destination provisions so that supplies in excess of demand can be resold to new buyers, such as developing-world countries that are facing longer time horizons in their transitions from coal. Such a move could also help to build bridges between Europe and the Global South, particularly if best practices on low-emission gas use are shared with prospective partners.

Second, Europe must also make clear that its 2027 plans to rid itself of Russian gas dependency are not subject to negotiation. One powerful way of doing so would be to suspend hydrostatic testing and maintenance on compressor stations to allow the Yamal and Nord Stream pipelines to fall into a state of disrepair, while maintaining environmental integrity, so that neither can resume deliveries after the war. While this may still allow for imports via Ukraine or TurkStream—which are present in multiple scenarios, and could be limited by EU regulation in either case—this would nevertheless place a debilitating cap on Russia's ability to dominate the European marketplace ever again. Ultimately, doing so means not only foreclosing on the possibilities for Russian pipeline reintegration, but also requiring greater transparency on where imported gas is coming from, as well as tackling the challenge posed to European energy security by Russian LNG.

In the meantime, the European Commission must also see to it that gas can flow freely across member states' borders, allowing for an open market that reduces the vulnerabilities for nations without access to the sea or to non-Russian pipelines. This means not only expanding gas-interconnection infrastructure, but also clamping down on national actions that are introducing new costs to cross-border trade. The European Commission has already taken action against Polish laws that introduce onerous regulations on buyers who intend to store gas outside of Poland.⁴⁰ The commission should also work with Germany on addressing the "neutrality charge" on foreign buyers of its gas.⁴¹ Enforcement will set a precedent for the other members states considering

such fees. A level playing field must be maintained to ensure intra-European solidarity.

Moreover, the European Union should also make sure that its implementation of the carbon border adjustment mechanism, which goes into its implementation phase in 2026, does not impose extra costs on shipping LNG into the bloc. While oil and gas are untouched in the plan's initial implementation period, it is critical that Brussels work out with its LNG supply partners how they will be taxed under the mechanism, so that costs are clarified to the greatest extent possible while the market distortion impacts are minimized.

In turn, Europe's LNG suppliers must make every effort to ensure that their exports can accord, to the highest degree possible, with Europe's climate ambitions. This includes continuing to build up the monitoring, reporting, and verification regime that is blossoming in the US gas sector and ensuring that US gas production is some of the least climate-intensive on earth. Expanding this to every stage of the LNG supply chain—including transport and consumption—will help Europe to reconcile gas with its green transition, while giving US LNG a competitive advantage over gas transported through Russia's leaky pipeline complex. The Joe Biden administration's recent move to introduce a temporary halt to LNG export permits aims to further study environmental and economic impacts of LNG exports. Such research could contribute to reducing the emissions and environmental impact of US LNG, and its role in helping Europe replace dirtier fuels from Russia. However, the United States must ensure that such delays do not threaten its reputation as a reliable, predictable supplier of energy for its allies. The United States must optimize its export capacity to provide a strong insurance policy against Europe relapsing to reliance on Russian supplies. Doing so requires advancing emissions reduction across the LNG value chain.

38 Kate Abnett, "EU Fossil Fuel Use for Energy to Drop 80% under 2040 Climate Goal—Document," Reuters, January 23, 2024, <https://www.reuters.com/business/energy/eu-fossil-fuel-use-energy-drop-80-under-2040-climate-goal-document-2024-01-23/>.

39 "Lack of Oil and Gas Phase-out in EU's Climate Targets like 'a Bike without Pedals,'" Global Witness, press release, February 6, 2024, <https://www.globalwitness.org/en/press-releases/lack-of-oil-and-gas-phase-out-in-eus-climate-targets-like-a-bike-without-pedals/>.

40 "EU Sues Poland over Restrictions to Cross-Border Trade in Natural Gas," Euractiv and Reuters, November 17, 2023, <https://www.euractiv.com/section/energy-environment/news/eu-sues-poland-over-restrictions-to-cross-border-trade-in-natural-gas/>.

41 Julia Payne, "EU Commission Looks into Germany's Natural Gas Levy," Reuters, January 26, 2024, <https://www.reuters.com/business/energy/eu-commission-looks-into-germanys-natural-gas-levy-2024-01-26/>.

Conclusion

The scenarios for the conclusion of the war in Ukraine vary widely. The general guiding principles for dealing with the Russian and Ukrainian energy sectors, however, do not. Regardless of the war's ultimate outcome, Europe can never allow itself to become dependent on Russia for energy ever again. Nor can it allow itself to become dependent on another single supplier for products and commodities in the future. Moreover, the reinvigorated US-EU energy relationship must continue its efforts to enact an energy-secure transition that is protected against cyber and kinetic sabotage. Ukraine must be engaged to the greatest extent possible, as the country's reconstruction presents an historic opportunity to create a new pillar for European energy security.

In light of these principles, there are a number of concrete steps that Europe and the transatlantic alliance can take to fortify themselves in any scenario. For one, the EU member states should finalize legislation agreed in trilogue in December 2023 that enables EU member states to individually embargo Russian energy imports of any source.⁴² For LNG specifically, Europe and the United States should implement full bans and strengthen technological export controls that can slow or halt projects currently in the works that are poised to expand Russia's export capacity threefold. Such efforts—in addition to depriving Russia of revenue and forcing it to transition to costlier and less lucrative export routes—would strengthen Europe's bargaining position across the range of scenarios, putting the continent in a favorable position to temper its reembrace of Russia in a Ukrainian victory scenario, while also preparing for an indefinite and full embargo in a worst-case scenario.

Bans will only be effective insofar as Europe can replace Russian energy sources. In that endeavor, it must ramp up efforts to diversify its energy system. That will involve an all-of-the-above approach, including removing regulatory, financing, infrastructure, and supply chain barriers to speed up the energy transition, and enlisting Ukraine's reconstruction as an opportunity to build a clean energy export powerhouse on the European continent. In addition, Europe must continue to source new supplies of oil and gas, while also enhancing the infrastructure that brings supplies to consumers throughout the continent.

Finally, Europe and the United States must also work tirelessly to expand the role of clean energy in both economies. Only through a fulsome embrace of the energy transition can the transatlantic alliance negate the malign influence of Russian energy in any scenario. In these efforts, Ukraine will be an important ally, with its substantial capacity to export clean nuclear, renewable, and hydrogen energy to fuel Europe's economic growth.

In sum, the following actions are critical to ensuring European energy security across a range of scenarios.

- Provide certainty to the market that Europe will continue to purchase gas from non-Russian suppliers, and will set strict limits on its Russian imports regardless of scenario.
- Limit Russia's access to Western LNG and oil technologies, and set limits on the amount of oil products that Europe will import from Russia in any scenario. New sources of oil and gas must be secured to ensure short-term security of supply while decarbonization measures continue to be implemented.
- Continue to decarbonize and electrify the European energy system to reduce the influence of Russian fossil fuels on the continent.
- Enhance US-EU cooperation on cleantech supply chain investments to ensure that Europe is not reliant on Russia or other authoritarian states in a decarbonized energy system.

Russia's energy war on the West has exposed the limits of its geopolitical leverage through fossil fuel exports. Europe and the transatlantic alliance have prevailed through the initial phase of this war. But the alliance cannot become complacent.

As Russia's war in Ukraine enters a pivotal next phase, the risks for European energy security continue to grow. The eventual outcome of that war will present brand-new risks. Policymakers must plan now for how they will react to the new energy world implied by the suite of five scenarios. Regardless of the scenario, the key principles of a diversified energy system, robust transatlantic cooperation, and the engagement of Ukraine cannot be forgotten. Those who forget the past, as the old saying goes, may be doomed to repeat it.

42 "EU to Give Member States Power to Block Russian Gas Imports," *Financial Times*, December 8, 2023, <https://www.ft.com/content/d6a06e26-7256-4b97-92dd-7131fb676ad8>.

About the Authors



Richard L. Morningstar is the founding chairman of the Global Energy Center and a board director at the Atlantic Council. He served as the US ambassador to the Republic of Azerbaijan from July 2012 to August 2014.

Prior to his appointment, since April 2009, he was the secretary of state's special envoy for Eurasian energy. Prior to that, Morningstar lectured at the Kennedy School of Government at Harvard and Stanford Law School.

From June 1999 to September 2001, he served as United States ambassador to the European Union. Prior to this, Morningstar served as special adviser to the president and secretary of state for Caspian basin energy diplomacy, where he was responsible for assuring maximum coordination within the executive branch and with other governments and international organizations to promote United States policies on Caspian basin energy development and transportation. From April 1995 to July 1998, he served as ambassador and special adviser to the president and secretary of state on assistance for the new independent states of the former Soviet Union, where he oversaw all US bilateral assistance and trade investment activities in the NIS. From 1993 to 1995, he served as senior vice president of the Overseas Private Investment Corporation (OPIC).

Morningstar also served as chairman of the board and chief executive officer of the Costar Corporation from 1990 to 1993 and as president and chief executive officer from 1981 to 1990. He was an attorney with Peabody and Brown (now Nixon and Peabody) in Boston from 1970 to 1981, where he became a partner in 1977.

Morningstar served as a commissioner of the National Conference of Commissioners on Uniform State Laws (1989–1993). Prior to returning to the government in 2009, he served as director of the American Councils for International Education, a trustee of the Kosovo-America Educational Foundation, and a trustee of the Eurasia Foundation. He is a member of the Council on Foreign Relations.

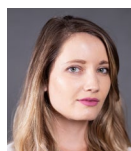
Morningstar received his BA from Harvard in 1967 and JD from Stanford Law School in 1970.



András Simonyi is a former Hungarian ambassador now living and working in Washington, DC. He was the managing director of the Center for Transatlantic Relations at SAIS Johns Hopkins University (2012-2018), presently working with the George Washington University School of Engineering and Applied Science.

Prior to moving to the United States, Simonyi was Hungary's ambassador to the US (2002-2007). He was the first Hungarian ambassador to NATO, becoming the first permanent representative of Hungary, after the country's accession to the Alliance. His prior assignments include deputy chief of mission of Hungary to the European Union (later European Commission).

Simonyi is a trained transportation economist, with a PhD in International Affairs. In his academic work he specializes in transatlantic relations, transatlantic energy, and the Nordic countries. He publishes frequently in *The Hill*, *The Huffington Post*, and other media outlets.



Olga Khakova is the deputy director for European energy security at the Atlantic Council's Global Energy Center, where she manages transatlantic energy initiatives. Before joining the Atlantic Council, Khakova

was a senior program coordinator for US Energy Association's Energy Technology and Governance Program. She helped start and coordinate the Western Balkans' Electricity Market Initiative working group, which provides technical expertise on creating better-connected electricity markets.

Khakova also worked as a program director for a leading energy non-profit in the Midwest, The Climate + Energy Project (CEP). While at CEP she co-led the conception and development of the Clean Energy Business Council, a network of businesses seeking to capitalize on renewable energy resources in Kansas and the greater Kansas City area through legislative, regulatory, and educational solutions. Khakova facilitated state-wide stakeholder engagement on energy issues, such as education and outreach on rate design dockets at the Kansas Corporation Commission. During her time at Bombardier Aerospace, Khakova organized events and developed communications strategies in Brazil, Canada, China, and the US for a distinguished human factors safety program called Safety Standdown.

Khakova has a business administration degree from Wichita State University and a professional science master's in environmental assessment from the University of Kansas. She is originally from Ukraine.



Paddy Ryan is a senior writer and editor with the UC Institute on Global Conflict and Cooperation (IGCC). Ryan works with IGCC researchers to amplify the impact of the University of California in the policy community. He is based out of the IGCC's office in Washington, DC.

Prior to joining IGCC, Ryan was the assistant director for European energy security at the Atlantic Council Global Energy Center. In addition to his work on European energy and climate policy, Ryan wrote on the geopolitics of clean energy supply chains and edited the center's blog, *EnergySource*. He has also written for the British news magazine *The Spectator*, served as Europe editor for FedNet, a Capitol Hill-based press agency, and worked as an editor for *Global Risk Insights*, a London-based political risk publication. Ryan's writing has also appeared in *Defense News*, *EnergyPost*, *The Hill*, and *Eurasianet*, and he has been quoted in *Quartz*, *Semafor*, *Axios*, *The Diplomat*, *Ars Technica*, and *Fox News*, among others.

Ryan earned a master's degree in international relations from the London School of Economics, and a bachelor's degree in history and philosophy from the University of California, Los Angeles. He is a triple national of Ireland, Mexico, and the United States.

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(202) 778-4952
www.AtlanticCouncil.org