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Winning the Long War in Ukraine Requires Gas Geoeconomics

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Executive Summary:

- *Gas geoeconomics is an essential prerequisite for victory in Ukraine, U.S. credibility in Asia, and should be one of Washington's top national security priorities.*
- *Russia's invasion of Ukraine credibly reflects reveals a desire to re-establish Moscow-centric imperium through force of arms, potentially along the approximate territorial parameters of the mid-19th Century Russian Empire in Europe.*
- *Rolling back the Kremlin's existing war of conquest and deterring future depredations will require a level of NATO defense-industrial mobilization not seen since the 1980s. Present sanctions efforts, even if deepened, cannot compensate for NATO's undersized munitions stockpiles and insufficient ability to recapitalize forces and potentially, timely replace combat losses—three elements critical for deterrence.*
- *Energy insecurity will over time corrode the economic and political foundations needed to sustain this urgent defense-industrial mobilization. Russia recognizes the seams and is intensifying its unprecedented efforts dating from early 2021 to use gas as an instrument to coerce and destabilize prime customers in Western Europe. Unless Europe adopts proactive, war footing gas security policies, "General Time" will be on Russia's side.*
- *EU/NATO member states can build in resilience through Gas Geoeconomics policies. These would facilitate physical supply fungibility via expanded pipeline linkages within Europe and increased seaborne LNG supplies. Gas Geoeconomics would also aim to reform markets where needed and reset the investment environment by clearly communicating to the global gas value chain that gas has a 25-year forward time horizon on the Continent given its scale, superior emissions profile, capacity to yield hydrogen, and ability to facilitate wind and solar expansion.*
- *Public capital investments in Gas Geoeconomics by NATO member states approximating the roughly $25 billion in military assistance pledged to Ukraine thus far would powerfully accelerate gas supply diversification efforts and would likely unlock a substantially larger amount of private capital.*

> ***"For too long we ignored the revanchist rhetoric of the 'Russian World' and now that world has come to us in armoured personnel carriers***."—Sergei Medvedev, 2017, *The Return of the Russian Leviathan*[i]

> ***"…if we don't get the gas turbine, then we won't get any more gas, and then we won't be able to provide any support for Ukraine at all, because we'll be busy with popular uprisings"****—Annalena Baerbock, German Foreign Minister, July 2022*[ii]

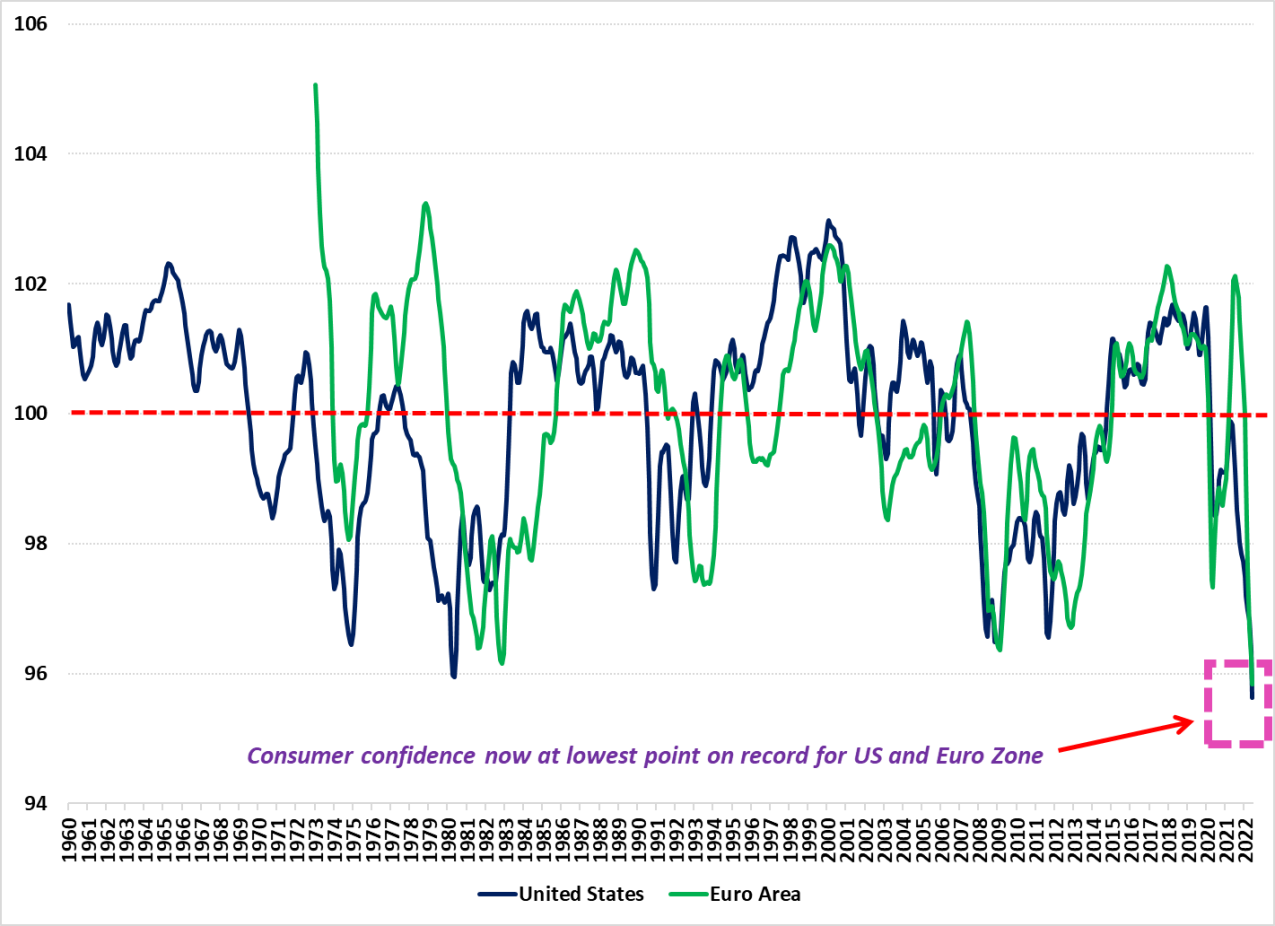
If the United States is serious about facilitating a Ukrainian victory[1], it needs to help European partners lock down their gas security. Russia had already waged war against Ukraine for 8 years when it took things to a new, bloodier level in February 2022 and the conflict could plausibly endure for multiple winters more. Europe faces an acute gas crisis in the winter of 2022 but absent much larger and faster investment in new gas sourcing and transport infrastructure, continued energy manipulation by Russia will be the Continent's plight for many winters to come.[iii] It is a high-order national security issue and one that deserves close attention in the Unted States as well, given four decades of policy aimed at preventing hostile powers from weaponizing energy resource flows against U.S. allies and partners.[iv]

Europe's dependence on Russian gas (more than 1/3 of the *global* pipeline cross-border [?] gas trade) means that Russia's war in Ukraine is also an energy war against Europe at a scale unseen since the 1973 Arab Oil Embargo. Gazprom's pre-covid supply levels to Europe suggest it withheld approximately 30 billion cubic meters of gas, equal to about 5% of Europe's actual gas consumption in 2021 (with the figure of actual gas withheld by Russia in 2022 dramatically higher). While 5% may not sound significant at first glance, it is. The 1973-1974 Arab Oil Embargo reduced crude oil supplies by an amount equal to about 7% of global consumption and caused oil prices to rapidly quadruple—like gas prices in Europe over the past 18 months.[v]

Russia's gas supply machinations target adversary countries' leadership to create a sense of despair and promote negotiation on Russian terms.[vi] As the Kremlin's armies stall, it increasingly banks on forcing democratically-elected Western governments to confront a high-cost "Long War" that induces crisis fatigue among voters in the EU and US. There is potentially fertile ground for this strategy. Consumer confidence in both places has already dropped to historical lows—exceeding even the depths plumbed during the stagflation of the late 1970s and early 1980s (**Figure 1**).

[1] "Victory" defined as "restoration of Ukrainian territory to pre-2014 borders, expulsion of all Russian forces from said territory, and deterrence of future Russian armed aggression against Ukraine."

Figure 1: Consumer Confidence in the EU and US Are At a Historical Low Point (Normal = 100)



Source: Organization for Economic Co-operation and Development, Consumer Opinion Surveys: Confidence Indicators: Composite Indicators: OECD Indicator for the United States and Euro Zone [CSCICP03USM665S and CSCICP03EZM665S], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/CSCICP03USM665S, July 28, 2022.

Gas price spikes and physical shortages are especially pivotal when timed to coincide with decision points that lock in years of subsequent consequences and in some cases, determine the outcome of a war—for instance, "*whether or not to concretely act against buildup of an invasion force*," and now, "*whether or not to push Ukraine toward territorial concessions*" and "*whether or not to continue—or expand—supplies of heavy weaponry Kyiv would need to eject Russian invaders and restore its sovereignty*." Policymakers' visceral aversion to the potential short-term losses caused by a gas supply cutoff or a politically driven price increase expose them to manipulation, undermine their resolve to stand up to Russian revanchism in and near Europe, and, ultimately, divide and weaken the EU and NATO.

Gas provides less than 7% of Russia's federal budget revenue (as compared to more than 35% for oil and refined products) but flows through Russian-fed pipelines account for 1/3 of Europe's gas

supply and nearly 8% of Europe's primary energy use.[2] Its loss creates a cascading energy polycrisis in Europe and beyond, potentially for many quarters to come absent drastic interventions—most of which, like rationing, have major consequences. By manipulating gas deliveries, Russia can thus subject itself to bearable financial pain and in exchange, destabilize Europe in ways that left unabated, could be existential for the current political, economic, and security architecture across the Continent over the next 5 years.

This asymmetric interdependence[vii] invites coercive exploitation; a tactic that Russia has used quite frequently in the post-Soviet realm over the last three decades. They also demand a wartime mindset on the part of policymakers in both the EU and the US, given the Continent's importance to American national security. To help provide a practical policymaking roadmap forward, this Brief walks readers through (1) how gas insecurity would likely facilitate further Russian territorial conquest in Ukraine, (2) how Europe wound up in the current gas predicament, and (3) how, with sufficient political will, Europe and the United States can leverage Gas Geoeconomics to chart a more secure future.

Gas Security Especially Important as Victory in Ukraine Now Demands Industrial Mobilization

NATO transfers to Ukraine to date have consumed significant portions of many countries' pre-existing munitions and weapons stockpiles. Even the US military has deeply tapped stocks of various missiles and other systems and Army Chief of Staff Gen. James McConville recently noted "*the intent for us is, every round we send, every weapon system, it's going to be replaced. And we're already getting support on this*."[viii] Other NATO members have also transferred enough weapons from existing arsenals that replenishment needs have now become urgent. [ix]

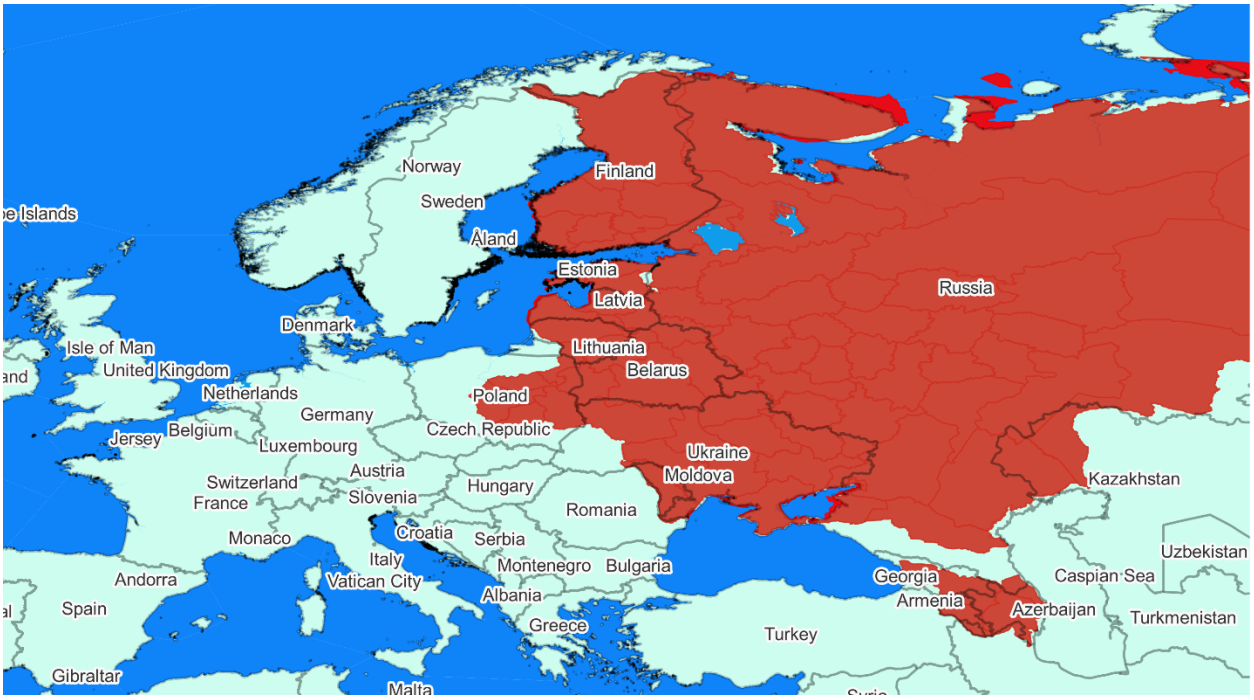
The next phases of the war will thus require a level of NATO defense-industrial mobilization not seen since the 1980s. As just one example, consider the high-precision Guided MLRS Rockets (GMLRS) rockets that Ukraine has used to destroy dozens of ammunition depots and command centers and slow Russia's offensive in Eastern Ukraine. Modern industrial war consumes munitions like these at a phenomenal rate. If each HIMARS launcher fired just 6 rockets daily (a conservative allotment), the 16 units presently in Ukrainian service could in about 6 weeks consume the US Army's *entire* planned Fiscal 2023 GMLRS procurement of less than 5,000 rockets.[x]

Far more will be needed for Ukraine to sustain an offensive against Russian forces this fall and winter across a front line nearly as long as the distance between Berlin and Rome. Kyiv must also replace systems worn out or destroyed by the most intense land war in Europe since 1945. Years of conflict likely lie ahead, particularly if gas insecurity hamstrings NATO members' support for Ukraine and distorts leaderships' political thinking.

[2] For American readers, Europe losing Russian gas would have approximately the same impact relative to domestic demand as losing Permian basin gas production would have in the United States.

As President Volodymyr Zelensky recently told the Wall Street Journal, "*It [Russia] is a cachalot that has swallowed two regions and now says: Freeze the conflict. Then it will rest and in two or three years, it will seize two more regions and say again: Freeze the conflict. And it will keep going further and further*."[xi] Russia specifically publicizes its maximalist appetite for Ukrainian lands.[xii] Yet a map superimposing the Russian Empire's borders in 1856 over those of modern Europe suggests that if Russian forces are not halted and then ejected from Ukraine, an even larger portion of Europe—including NATO members—could face challenges to territorial integrity not seen for decades (**Figure 2**).

Figure 2: Borders of Russian Empire Circa 1856 vs. Borders of Modern Europe



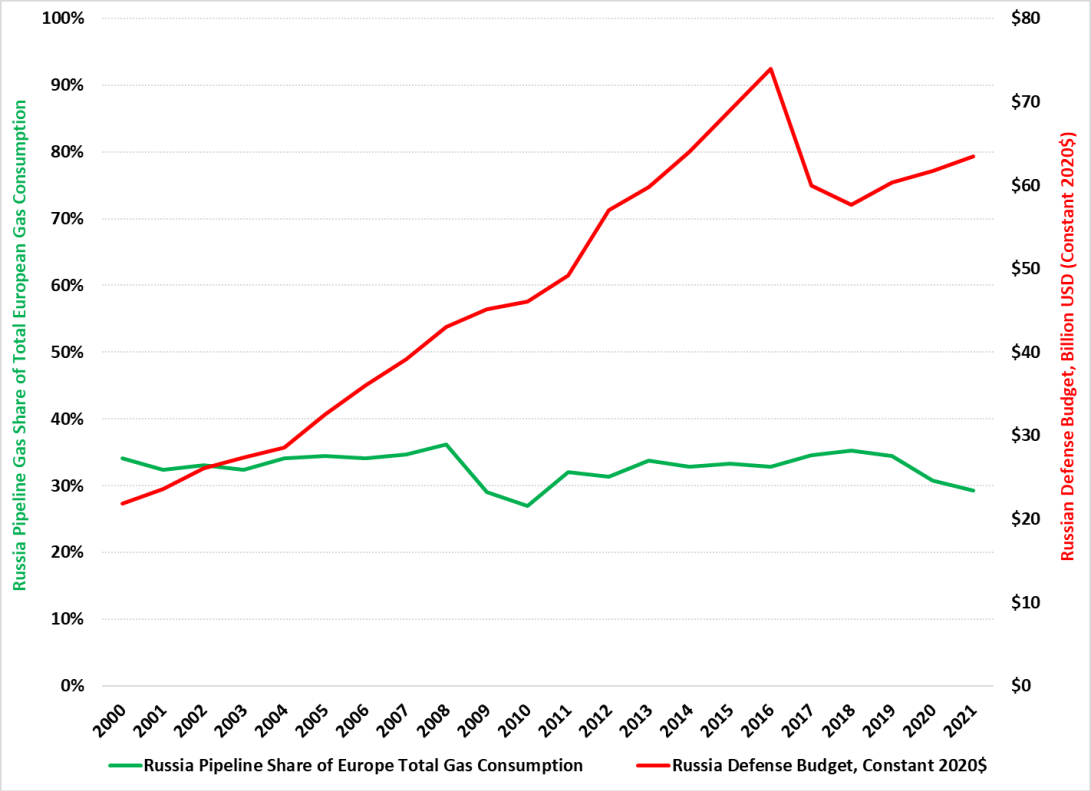
Source: GADM, Harvard University[xiii], Authors' Analysis

Accordingly, for the US and other NATO militaries to both assure their own national defense needs and ensure sufficient supplies for Ukraine to recover territory and defeat Russia, industrial scale-up will play an irreplaceable role. The economic vitality needed to underpin such mobilization and to keep it politically justifiable amidst crisis-battered voters demands abundant, affordable energy. ***Russia will thus even more aggressively wield the gas weapon to try and forestall an industrial contest that it would almost surely lose under energy market conditions that prevailed for most of the past decade. "General Time" is Russia's ally if it can derail NATO's industrial spool-up***.

How Europe Made Itself Energy Exploitable

Europe's present dependence on Russia and the exploitation it now suffers grow out of four key factors. First, policymakers in Western Europe have generally treated energy security and national security as being somehow disconnected or, as in the case of Germany, grossly miscalculated energy interdependence as a way to influence Russian foreign policy.[xiv] While Lithuania and Poland moved decisively over the past decade to reduce reliance on Russian gas, Western European buyers sought additional Russian gas via Nord Stream-2 even after Russia seized Crimea in 2014 and fueled a separatist war in eastern Ukraine that likely claimed more than 14,000 lives from 2014-2021.[xv] Nord Stream-2 only came off the table after Russia's second invasion of Ukraine in February 2022. Russia spent the past 20 years steadily investing in its war machine while much of Europe, including major gas buyers and their home governments, lived inside an "End of History" bubble where security was generally an afterthought.

Figure 3: Russia Invested for 20 Years in Its War Machine While Europe Largely Failed to Diversify Its Gas Supplies



Source: BP Yearbook of World Energy 2021, SIPRI, Author's Analysis

Second, many European countries also throttled back on infrastructure investments that would have bolstered their import options, increased storage capacity, and enhanced their ability to shuttle supplies in response to disruptions. Data from the European Union's Projects of Common Interest (PCI) list of "*key cross border infrastructure projects that link the energy systems of EU*

countries" show that in 2013, 108 discrete gas infrastructure items made the list, declining to 103 projects in 2015, 72 projects in 2017, 41 projects in 2019, and only 20 projects in 2021 with (initial)[xvi] stipulation of no more funding available to natural gas infrastructure after completion of those projects.[xvii]

Third, geological and regulatory factors reduced European gas production. Between 2010 and 2020, the Netherlands sharply reduced gas production due to seismic activity at the Groningen Field, losing approximately 55 BCM/yr, according to BP data. During that same time the UK—now Europe's second-largest producer after Norway—lost about 18 BCM/yr, largely to natural decline and reduced investment. Adjusting for the 2020 pandemic disruptions to gas demand, this combined amount approximates the increase in imports from Russia over that timeframe. Also, new potential sources of natural gas, particularly in shale formations, have not been realized due to either geological and regulatory factors as well as anti-shale campaigns, including those likely sponsored by Russia.[xviii]

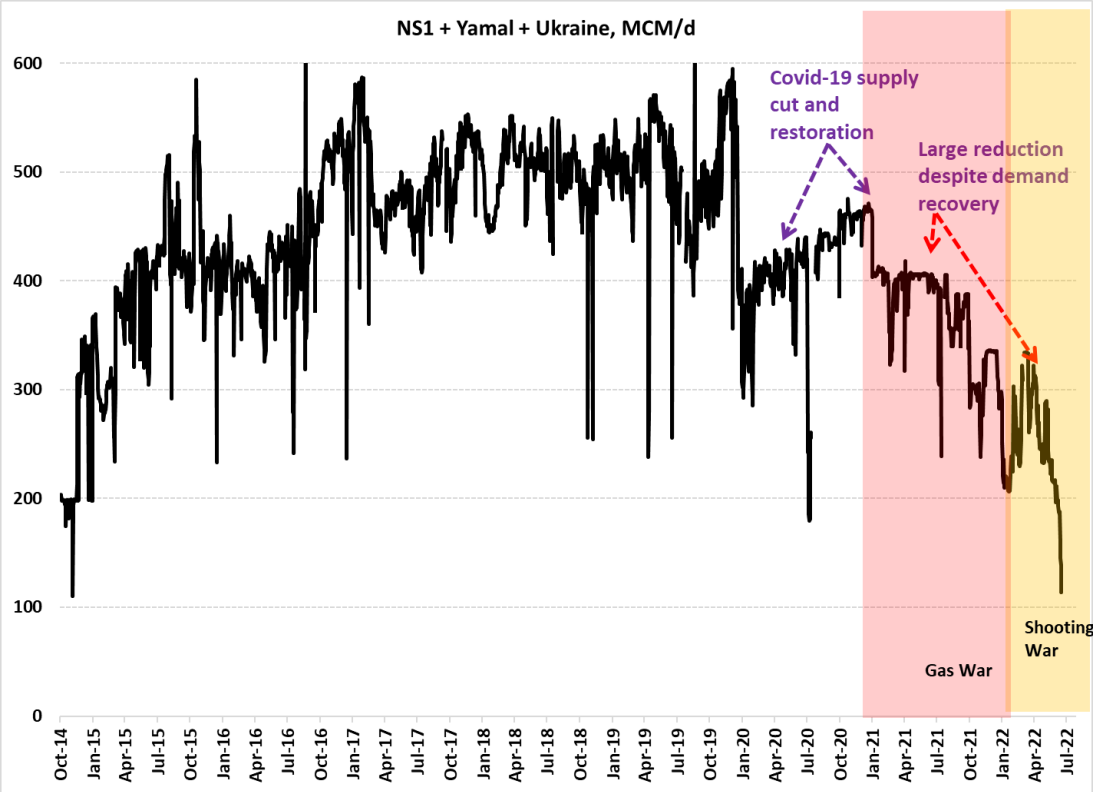
Fourth, Europe's approach to energy transition intensified the impact of geological headwinds. Since 2000, European firms have closed down coal and nuclear power stations that the authors estimates could have generated as much electricity as about 130 billion cubic meters/year of gas—more than half of current Russian supplies to European customers. The shutdowns and increased reliance on intermittent wind and solar power—backed increasingly by natural gas (as phaseout of coal and nuclear backup has continued)—accelerated over the last 10 years. This trend, coupled with lack of concern about dependency, increased Russia's share of European gas supplies from 24% in 2010 to about 40% by the end of 2020.[xix]

On some level, the lack of concern could be understood, as gas flowed to Western Europe despite serious stressors including the Cold War's last decade, Soviet collapse, Russia's wild 1990s, 8 years of prior war in Ukraine, sanctions against Russia, and a global pandemic. But there was ample writing on the wall from Gazprom's 30-year history of weaponizing gas flows against former Soviet republics, including instances in the winters of 2006 and 2009 that briefly but materially disrupted gas flows to Western Europe. [xx] Multiple Russian leaderships had been willing to weaponize gas supplies when they calculated that the asymmetry of interests between Moscow and a gas customer justified doing so.

They likely showed restraint vis-a-vis Western European customers (1) because those high-volume, premium-priced markets paid for Gazprom's massive fields in Siberia, continent-spanning pipelines, and other expensive fixed assets and (2) for years Western European leaders had generally tolerated open malign Russian activities on Europe's periphery and more covert/deniable ones within the heart of Europe. The state of affairs endured until the Putin regime set its sights on conquest of Ukraine and launched a pre-emptive strike through Gazprom's pipelines. As the Atlantic Council's Alan Riley recently put it, nearly 5 decades of gas relations based on mutual interests were "*abandoned by the Russian state and Gazprom last year in the interest of winning a war against Ukraine*."[xxi]

In fact, Russia's war first came to Europe via pipelines, not battalion tactical groups. Natural gas prices rocketed as Gazprom chose to withhold supplies from January 2021 onwards despite a clear demand call, and by late fall were about twice as high as the previous historical apogee attained during the 2008 commodity price spike. In hindsight, Gazprom's "inaction" was in fact an action unto itself and one that roughly coincided with the deployment of approximately 50,000 additional troops along the Russia-Ukraine border.[xxii]

Figure 4: Russian Pipeline Gas Supplies to Europe, Million Cubic Meters/Day



Source: ENTSOG, Authors' Analysis

Europe now faces a set of decisions whose strategic importance is at least on par with—and perhaps exceeds—policies developed in the wake of the 1973 Arab Oil Embargo. Political and commercial leaderships across the continent face a fundamental set of choices that boil down to (1) capitulate or (2) embrace gas geoeconomics to neutralize Russian pipeline coercion. The simplest form of "capitulation" would entail accepting Russian conquests in Ukraine. Doing so might relieve gas price pain in the moment but would leave European buyers linked to a lowest-cost supplier ready and able to manipulate them through irregular gas deliveries, underpricing competing gas resources, and generally using gas as an instrument of reflexive control.[xxiii]

A more insidious form of "capitulation" may already be unfolding. While the EU Parliament included gas in its recent green taxonomy, powerful interest groups including the Institutional

Investors Group on Climate Change (IIGCC), whose members manage about 50 trillion Euros' worth of financial assets, are voicing strong opposition.[xxiv] This risks stifling supply diversification because the high upfront costs of LNG liquefaction facilities, floating storage and regasification vessels, pipelines, and other assets needed to break Russia's chokehold mean project sponsors need confidence that molecules from their facility will be needed for at least 20-25 years forward. Deterring gas diversification could in turn trap the EU in a multi-year vortex of much greater coal and oil use as consumers scramble to fill the energy deficit. This would reverse Europe's emissions reduction progress and likely also force de-industrialization as chronic energy insufficiency/price volatility erode competitiveness.[xxv] Such a path would reduce European states' comprehensive national power, undermine their ability to deter Russia, and also reduce their competitiveness vis-à-vis China.

Enter gas geoeconomics, this Brief's emphasis. It would harness market forces to increase gas market fungibility through infrastructure enhancements and market liberalization and support the critical economic and national security objective of hardening Europe against further Russian energy coercion. Gas Geoeconomics offers a viable, rapidly implementable path to protect the energy and economic security so foundation to the "*cohesion, firmness, and vigor*" Europe needs to deter—and if necessary—fight off Russian aggression.[xxvi]

How to Fix Things: Gas Geoeconomics Can End Europe's Gas Exploitability

Gas geoeconomics emphasizes neutralizing the coercive potential of Russian pipeline gas supplies to Europe by increasing supply diversity and competition. It is ultimately indifferent to the source of Europe's gas molecules, so long as they come through enough channels to reduce any single supplier's ability to coerce consumers. Whether the gas comes from Mozambique, Norway, Qatar, or the U.S., shifting European gas supplies away from dependency on Russian-controlled pipeline supplies will neuter the Kremlin's ability to coerce European gas consumers.[xxvii]

Europe consumes approximately 200 billion cubic meters annually of Russian gas, the replacement of which should be the pacing objective of gas geoeconomics efforts.[xxviii] Russia has itself already voluntarily chosen to displace approximately 75 BCM/yr of gas supply from the European marketplace (~30 BCM during 2021 with continuing and deeper cuts now via the Ukraine and Yamal Pipeline systems and nearly 45 BCM/yr via Nord Stream-1 interruptions). Accordingly, over time and with investment trunk pipeline corridors that originally hauled Russian gas—Yamal, Ukraine routes, OPAL, and NEL, among others—can be reversed and repurposed as high-volume channels for moving gas from other sources throughout Europe.

Five key items to resolve will be:

(1) maximizing the potential of existing LNG terminals in the Iberian Peninsula that are underutilized but stranded from other European markets by insufficient pipeline linkages,

(2) finding ways to bring more LNG into Northern Europe (especially Germany) and the Balkans,

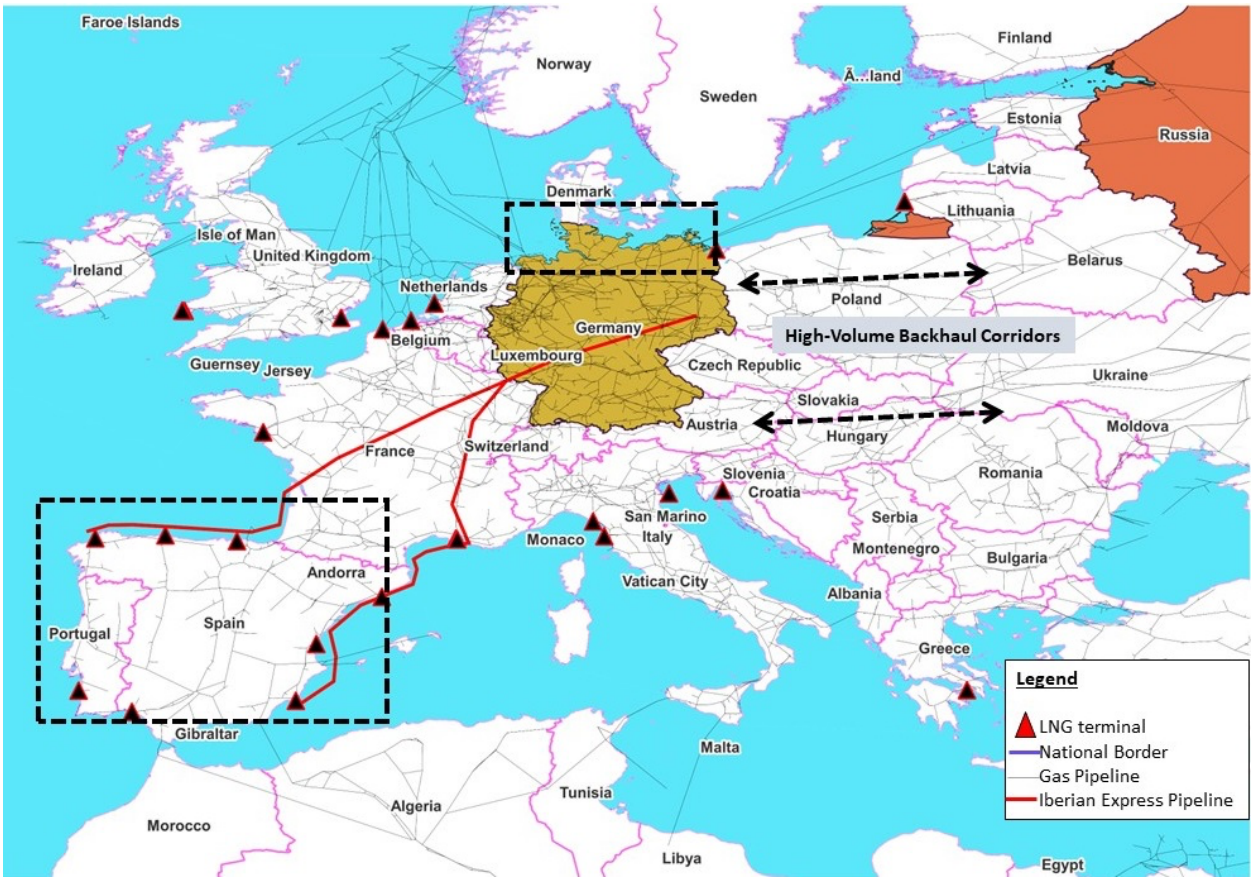
(3) expanding interconnectors between markets to facilitate shuttling of supplies,

(4) promoting greater market liberalization, including a slow and systematic liberalization of gas storage to reflect market principles rather than regulatory targets set by diktat,

and (5) reforming EU and US policy to assure project developers and sponsors that gas has a long-term future, including by supporting decarbonization goals through displacing coal globally and thereby encourage investment in the full gas value chain worldwide.

Even before many of these initiatives actually move molecules, they will already aid consumers by pushing down forward gas price curves as traders price in expectation of coming supplies.

Figure 5: Key Gas Geoeconomics Investment Corridors in Europe

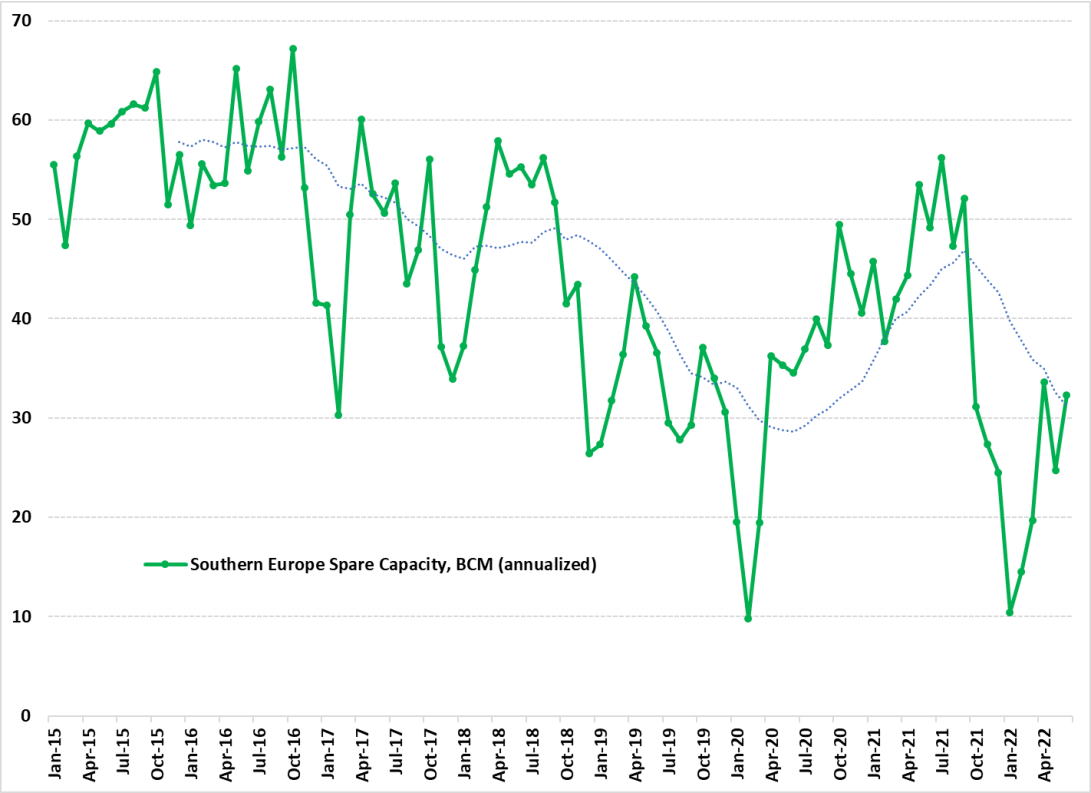


Source: SciGRID_gas, https://www.gas.scigrid.de/downloads.html; GADM (Database of Global Administrative Areas), https://gadm.org/data.html; Marine Regions, https://marineregions.org/downloads.php.

Corridor 1: Iberian Express Pipeline

Spain and Portugal offer long coastlines exposed to the open Atlantic, are relatively distant from Russian naval power (unlike the Baltic and Black Seas), and have installed LNG terminal capacity far exceeding local demand. They also lack high-volume trunk gas pipelines connecting them to the rest of Europe. Data from CEDIGAZ covering most of the past decade suggest that collectively, LNG terminals in Southern Europe (primarily Portugal and Spain) could take in 30-40 BCM more gas than they actually handle each year. Adding the previously mothballed El Musel facility along the Bay of Biscay coast would add another 8 BCM/yr to the total.[xxix]

Figure 6: LNG Terminals in Southern Europe Are Structurally Underutilized



Source: CEDIGAZ, Authors' Analysis

As we pointed out in 2018, the Iberian route offers low-hanging fruit for increasing secure gas supplies to Europe. Unlike in 2018, Europe now faces a gas security challenge under conditions of wartime intensity. The EU—perhaps with US support—should thus urgently fund an "Iberian Express Pipeline" to link the Iberian Peninsula's gas import facilities more tightly with the remainder of Europe. Coastal Spain's mountainous topography would be very challenging to lay pipelines through and it may make the most sense to run much of the route offshore, with a landing in France that would then allow the line to be extended inland and interconnect with trunk lines in France and especially, Germany.

Such pipelines normally entail a formidable planning and construction timetable. For instance, the subsea 1,224km Nord Stream-1 project required approximately 6 years to plan, build, and bring into full service.[xxx] An Iberian Express would likely encompass loosely similar physical dimensions, with the northern segment running for 800km subsea and an additional 750km overland to reach the German border and the southern segment 950km subsea and a further 700km overland.[xxxi] But there is a precedent for building major pipelines faster under wartime conditions. During WWII, submarine attacks badly disrupted tanker shipments of oil from Texas to the Northeast. In response, a public-private partnership constructed the two pipelines of approximately 2,000km length each—the "Big Inch" that carried crude oil and the "Little Big Inch that carried refined products. Each line was planned and constructed in less than 2 years.

While the Big Inch projects were built nearly 80 years ago, the historical analogy remains relevant to the contemporary gas security challenge Europe now faces. American Secretary of the Interior Harold Ickes remarked in 1940 that "*building of a crude pipeline from Texas to the East might not be economically sound but in the event of an emergency it might be absolutely necessary*."[xxxii] Then the Nazi war machine rapidly turned the optional into a strategic necessity for America's oil industry in the early 1940s, just as Russian revanchist actions in 2022 now do for European gas consumers.

While we do not yet know the full extent of long-term benefits an Iberian Express project might bring, the Big Inch experience suggests at least two. To start, it helped the Allies win the war. As historian Keith Miller put it "*Without the prodigious delivery of oil from the U.S., this global war, quite frankly, could never have been won*."[xxxiii] While the energy pathways to victory are somewhat different today, the broad concept of energy abundance underpinning successful containment and defeat of a foe still holds fast today. In addition, the pipeline corridors established eight decades ago through decisive, rapid action by a public-private partnership remain in service today to the benefit of American consumers and industry. European officials should draw inspiration from the Big Inch initiative's success.

Corridor 2: LNG Supplies to Germany and Other Areas

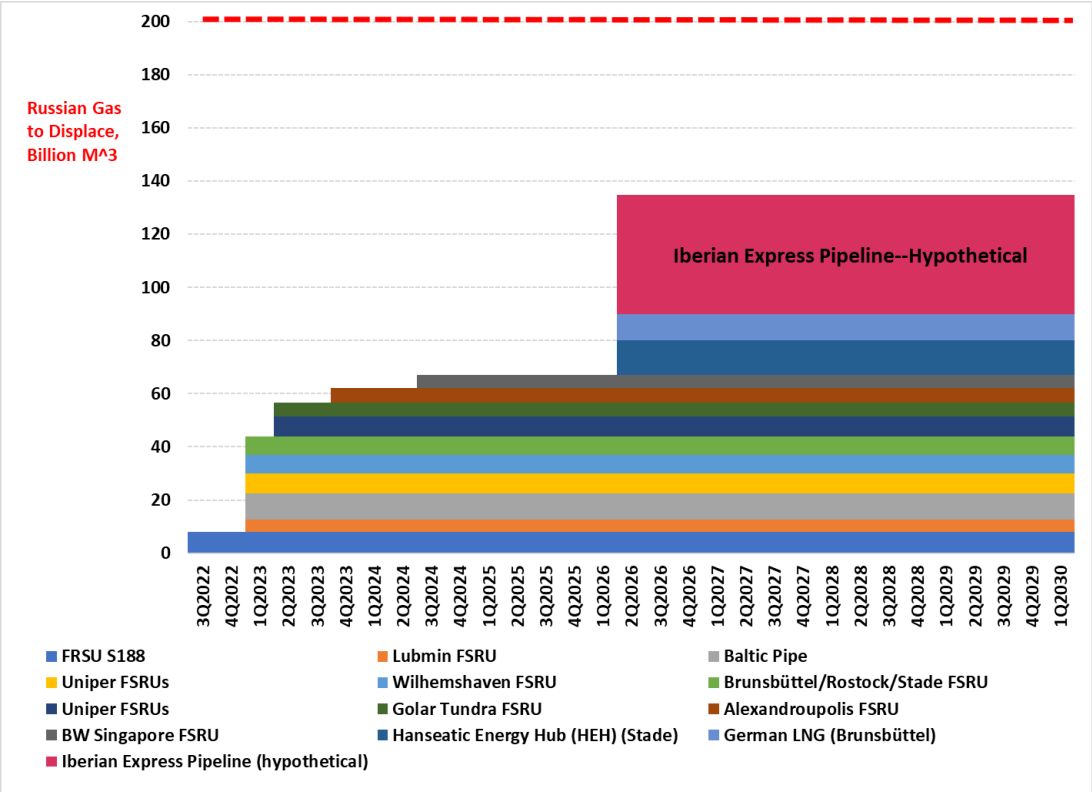
Germany already appears to have formally adopted a gas geoeconomics policy. Its largest gas importers, RWE and Uniper, have moved rapidly in recent months, chartering 4 floating regasification and storage vessels (FRSUs) with private developer Deutsche Regas chartering a fifth destined for the port of Lubmin (where the Nord Stream-2 pipeline had been slated to bring gas ashore).[xxxiv] RWE and Uniper's public communications on the charters both frame their actions as being performed "*on behalf of the German government*" while the German LNG terminal being built onshore at Brunsbuettel will be 50% owned by Kreditanstalt für Wiederaufbau (KfW), Germany's state-owned development bank.[xxxv]The first three vessels to enter service could handle nearly 20 BCM/yr of gas imports and particularly in the Lubmin area, the outbound pipelines that had been built to handle 55 BCM/yr of incoming gas from NS-2 suggest the area could be scaled into a much bigger FSRU LNG import hub.

The Netherlands and Italy are also moving. Exmar and GasUnie announced on March 18, 2022, that they had reached a five-year charter agreement to station the FSRU S188 near the port of Eemshaven in Groningen province. The barge-based FSRU S188 can regasify 8 BCM/year of gas. The project serves as a useful proof of concept and the area may be able to dramatically scale up inbound gas volumes because the Groningen gas field produced 50 BCM/yr only a decade ago versus contemporary levels of less than 5 BCM/year.[xxxvi] This suggests enough outbound pipeline capacity exists to in theory support several more FSRU units in the area. For Italy, meanwhile, state-controlled Snam has in recent months acquired 3 FSRU vessels that by late 2024 could supply approximately 20% of Italy's gas annual gas needs.[xxxvii]

The actual LNG projects discussed above plus the hypothetical Iberian Express Pipeline would likely collectively be able to displace about 120 BCM/yr of Russian gas supplies by the mid to late 2020s. Accordingly, while the German government's budding public-private partnership is a difference maker, a wide gap remains if Europe is to throw off the shackles of Russian gas. If an Iberian Express Pipeline did not materialize, the volumes needed would widen to more than 100 BCM/yr even in the mid-2020s.

Even at the current more frenetic post-Ukraine invasion diversification pace, Europe will likely still struggle to eliminate dependence on Russian gas by 2030 despite accounting for efficiency improvements, substitution by other energy sources on the margins, and an acceptance of some degree of more limited imports from Russia. That arithmetic reality foreshadows three broad futures. Either Europe destroys gas demand by effectively de-industrializing and accepting energy (and financial) poverty, it accepts a Russian veto over its strategic decisionmaking, or it adopts a truly wartime mindset in its quest to bolster gas security.

Figure 7: Despite Multiple Actual and Potential Gas Import Diversification Projects, Europe Will Struggle to End Use of Russian Gas Before 2030



Source: Gastrade, RWE, Uniper, Upstream Online, Author's Analysis

Some of the gap shown in **Figure 7** (above) can be filled through improving gas use efficiency and substituting other sources of energy for gas. The European Commission has in fact proposed increasing the EU's Energy Efficiency Target for reduction in energy consumption by 2020 relative to baseline projections made in 2020 from 9% to 13%.[xxxviii] The European Parliament's four-largest political groups suggest even higher benchmark reduction of 14.5% by 2030.[xxxix]

But the impacts will be limited given the sheer scale of gas use, political resistance from the bloc's most industrialized members, and the fact that turning over industrial and home heating infrastructure often takes many years, if not decades. To boot, broader European moves toward hydrogen will likely still require significant natural gas inputs (methane = a solo carbon atom carrying 4 hydrogen atoms). This means "gas for gas" replacement of Russian supplies and seaborne LNG is the most viable path to do so given that it is secure and fungible and that with the right signals to producers, scalable in ways that many renewable sources may not be given looking minerals and materials supply crunches.[xl] Accelerating carbon capture utilization and storage initiatives could help with the initiative while keeping decarbonization plans alive.

Corridor 3: Purchase More FSRU Vessels to Expand LNG Import Capabilities

Floating regasification and storage ships (FSRUs) anchor either at a pier or offshore, accept liquefied gas from LNG tankers, regasify it, and send it ashore to consumers through pipelines running on a jetty—as is the case with the Port Qasim FSRU facility in Karachi, Pakistan, or via a subsurface pipeline attached to a fixed mooring point like the Independence FSRU in Lithuania or a turret mooring, like the Moheskhali FSRU facility in Bangladesh. The vessels themselves cost around $350 million, with an additional $100-to-$130 million' worth of infrastructure needed to move gas from ship to shore.[xli]

The total cost is about half what a fixed onshore terminal would run and has the benefit of a smaller physical footprint and quicker amortization that reduces risk to project sponsors. In addition, since FSRUs can be moved relatively easily to other locations, they may be less controversial and more acceptable for both, policy makers and the European public focused on energy transition goals. Lead times are also shorter, with newbuild vessels requiring 2.5-to-3 years. If Europe moves decisively to end Russian gas use it may need 15-20 FSRUs in coming years. The global market is presently tight and a successful gas geoeconomics strategy will require securing shipyard slots now, preferably in South Korea or possibly Japan. For 20 vessels, the price tag would likely be in the $7 billion range. That amount of money is substantial but should be viewed as the effective equivalent of a "breakup fee" to cut loose from Russia, with the added benefit that the fee can go to shipbuilders in aligned states and not to Russia.

Corridor 4: Interconnectors, Market, and Policy Reforms

Central and Eastern Europe would benefit from additional pipeline interconnections (akin to the recently built Baltic Connector between Finland and Estonia that has been operating since January 2020; the Gas Interconnector Poland-Lithuania [GIPL] that entered service in May 2022; Gas Interconnector Poland-Slovakia that began gas flows in June of 2022, as well as the new interconnector between Greece and Bulgaria that will make it possible for Romania to send gas to Moldova and Ukraine). The EU should finance similar projects at much greater scale due to their national security benefits, most importantly including set of interconnectors that could supply Ukraine in natural gas in the absence of East-West flow from Russia. The US government should also expand its financing of gas connectivity projects in Europe for national security reasons.

Investments should be coupled with conditions that facilitate market development such as 1) lifting price controls; (2) physical unbundling of gas production, storage, and transmission infrastructure; (3) the emergence of verified, market-based trading of pipeline capacity; (4) verified, nondiscriminatory third-party access by non-Russian controlled entities to gas pipelines and storage in the country; and (5) trading turnover rates at virtual transfer points or gas hubs associated with the host country's gas pipeline network.

Making U.S. help conditioned on recipient market jurisdictions implementing baseline criteria of market liberalization as diversification proceeds does not only follow the U.S.' traditional

commitment to competitive free markets, but also the EU's goals in this regard as expressed in the Third Energy Package. Also, any financial support for strategically important gas infrastructure should be "molecule indifferent"—whether the gas passing through the system comes from Norway, Qatar, the U.S., or another supplier would not matter. In fact, the primary precondition is that the system would be openly accessible to all freely tradable gas cargoes. A secondary precondition would be that projects must be connected to pipeline networks capable of enabling transnational movement of gas.

The ongoing war and events leading up to it have already driven momentous shifts in other energy markets, including Ukraine connecting to the European power grid and Ukrainian electricity exports to Europe—an effort substantially facilitated by the U.S. government.[xlii] Accelerated efforts to improve connectivity, resiliency, and reduce use of Russian gas would complement Brussels and Washington's efforts in the electric power space.

Gas Geoeconomics in Europe Would Help Contain a Global Axis of Autocracy

Europe has aggregate economic output approximately 10 times larger than Russia's and should, in theory, be able to generate enough military capacity to thwart Russian attempt to establish hegemony. Yet the macro balance obscure three harsh realities. First, European solidarity is an illusion and those in Eastern Europe with the will to confront Russia lack the industrial heft found further west. Second, the political will to translate economic and industrial heft into hard power and a credible deterrence posture can be compromised by high dependence on Russian gas. Putin now works to exploit this seam and he (or future Russian leaders) will continue doing so if the vulnerability is left unaddressed. Third, Ukraine is the first 21st century test of the West's capacity and will to defeat violent revisionism by an emerging axis of autocracy whose charter members are Russia and China.

Decisive continued application of economic warfare against Russia plus expanded and sustained arms deliveries to Kyiv over the next 12-18 months can help Ukraine restore its sovereignty and also degrade Russian military capabilities on a longer-term basis. This would make it easier to Ukraine + NATO to deter future aggression, or in a worst case, defeat the attacks much more quickly. But without decisive gas security moves, time will instead work in Russia's favor faster than sanctions will in Europe's.

What's more, gas security is a global issue—especially for the United States. Were conflict to erupt in East Asia (whether China, North Korea, or both), Russia would almost certainly seek to capitalize on the diversion of American strategic focus to the Asian contingency. Indeed, preparing for (and hopefully, deterring war in Asia already increasingly dominates thinking and spending in Washington. This makes sense because China now marshals economic power equal to all of its regional neighbors combined, making U.S. participation irreplaceable to ensure a free and open Indo-Pacific.

In fact, Russia has already started to play the same game of gas economic warfare in Asia. On June 30, Russia announced the nationalization of the Sakhalin II LNG liquefaction plant.[xliii] The

plant, which was owned in part by Shell, Mitsui and Mitsubishi, supplied 10% of Japan's LNG needs, which Russia has now declared to be an "Unfriendly State" due to Japan's support of sanctions against Russia.[xliv] Although Japan's Industry Minister Koichi Hagiuda said the decree did not mean that Japan's LNG imports will become "immediately impossible," he also noted that it would be necessary for Japan "to take all possible measures" to prepare for a possible cutoff of LNG from Russia. Russia's nationalization of the Sakhalin II LNG plant took place just days after the last cargo finished loading before Shell's 3.6 mtpa Prelude LNG plant shutdown for an extended labor dispute (after just reopening following a four-month mechanical repair) and days after a fire took the 15.0 mtpa Freeport LNG terminal in the U.S. offline indefinitely. Japan was a significant participant in all three LNG projects, and will likely have to go into the market to compete with Europe to buy LNG (and other fuels) for this winter. Russia's timing in nationalizing Japan's interest in the Sakhalin II project and threatening its LNG supply coming days after the shutdown of both Prelude and Freeport can hardly be considered a coincidence.

Yet Europe is also a key security interest and deep U.S. participation is essential to bridge significant divisions between Eastern and Western European countries over how to handle Russian revanchism. Russia's attack on Ukraine now directly threatens the world's second-most important economic region as China doubles down its efforts to establish hegemonic control over the single most important economic area. The threat is global and responses must be commensurate. As our Russian counterparts might put it: "Всё переплетено" (*it's all intertwined*).

Proactive U.S. efforts to enhance Europe's gas security and blunt Russia's ability to use gas for hybrid warfare would directly support its ability to sustain and upgrade its combat credibility in East and Southeast Asia. By incentivizing upstream gas investments globally through the demand call associated with a broader European move to replace Russian gas with LNG, Gas Geoeconomics would over the medium term also help increase global LNG supply to the ultimate benefit of U.S. allies in Asia, foremost among them Japan and South Korea. Meanwhile, the sooner Europe can end purchases of Russian gas, the sooner the Kremlin faces a decision between effectively exiting the global gas market or else spending tens of billions to build more gas pipelines to China—obligating financial resources that would otherwise be used to rebuild Russia's military. Gas geoeconomics is an essential prerequisite for victory in Ukraine, U.S. credibility in Asia, and should be one of Washington's top national security priorities.

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