

APRIL  
2023

## The Strategic Repositioning of LNG: Implications for Key Trade Routes and Choke Points

Leslie PALTÍ-GUZMAN  
Marc-Antoine EYL-MAZZEGA



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ISBN: 979-10-373-0699-9

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**How to quote this publication:**

Leslie Palti-Guzman and Marc-Antoine Eyl-Mazzega, “The Strategic Repositioning of LNG: Implications for Key Trade Routes and Choke Points”, *Études de l’Ifri*, Ifri, April 2023.

**Ifri**

27 rue de la Procession 75740 Paris Cedex 15 – FRANCE

Tel. : +33 (0)1 40 61 60 00 – Fax : +33 (0)1 40 61 60 60

Email: [accueil@ifri.org](mailto:accueil@ifri.org)

**Website:** [ifri.org](http://ifri.org)

# Author

**Leslie Palti-Guzman** is Co-Founder & CEO GasVista and Leviaton ([www.leviaton.com](http://www.leviaton.com)), a market intelligence and predictive analytics provider focused on seaborne commodity trade flows and shipping routes. She has 16 years of experience as a commodity market research analyst, political risk adviser, entrepreneur, and energy intelligence reporter. Prior to founding GasVista, she was the head of Rapidan Energy Group's Global Gas Service, a senior analyst at Eurasia Group, and a senior reporter at Energy Intelligence. She is also a senior Associate (Non-Resident), Energy Security and Climate at the think tank CSIS and a New York University SPS Center for Global Affairs senior non-resident fellow. She holds an MA in international affairs from the Fletcher School of Law and Diplomacy at Tufts University. She also holds both an MA in political science and international affairs from the Institut d'Études Politiques (Sciences Po) in Paris.

**Marc-Antoine Eyl-Mazzega** is the Director of the Center for Energy & Climate within the French Institute of International Relations (Ifri). Prior to joining Ifri, he spent six years at the International Energy Agency (IEA), notably as Russia & Sub-Saharan Africa Programme Manager where he conducted oil and gas market analyses and was responsible for institutional relations with these countries and regions. He also held various other positions, such as at the Robert Schuman Foundation, where he was in charge of a Ukraine observatory. A French and German national, he holds a Ph.D. from Sciences Po Paris in international relations.

# Executive Summary

2022 saw the climax so far of the weaponization of energy. Following its geopolitical demise, Russia has undertaken its own gas amputation, moving from a super energy power status to a diminished role with uncertain prospects and only hard options left. Russia has cut off almost entirely pipeline gas supplies to the European Union (EU), first inflicting huge financial pain and collecting record high revenues, but then simply losing out its largest and best market with no realistic alternative, and no prospect of any significant return. However, the Kremlin could still further reduce some of the remaining pipeline gas or liquefied natural gas (LNG) supplies and thus cause some tensions in markets. Russia also retains leverage on oil markets, where the Kremlin managed to cope with the embargo as well as the price cap and maintain the relationship with Saudi Arabia which drives OPEC+ decisions.

Meanwhile, in 2022, the European energy system has managed to surprisingly adapt on the supply and demand side to the three shocks: the decoupling from Russian energy supplies, the hydropower generation crisis, and the French nuclear electricity crisis. Liquefied natural gas has made a comeback in Europe and has been a savior of industries, governments and populations. The LNG corridor between the EU and the United States (U.S.) has become the most dominant LNG trade route in 2022. This came at a huge cost though – EU's gas import bill soared ten times from 2020 and three times from 2021 levels.

For 2023, the European gas balance is much more fragile, as the demand reduction potential has reached its limits, same for the ability to attract additional non-Russian exports to Europe, at a time when missing Russian volumes will probably reach 120 billion cubic meters (bcm), instead of about 77 bcm in 2022. More moderate price levels since November 2022 have clearly overshadowed this fundamental mismatch, especially as the weather has been mild and China was still struggling with the pandemic.

With an additional 30-40 bcm of missing Russian gas to offset in 2023 compared to 2022, Europeans can be expected to benefit from an extra gas of around 20-25 bcm left in storages thanks to mild weather and available LNG. They have no choice but to continue saving energy in a hurry, that is both on gas and electricity. Gas demand in power generation had increased in the first nine months of 2022 before falling in Q4 2022, and well over 15 bcm can be saved here in 2023 as more nuclear is available altogether, alongside more renewables, and some coal. It will be critical to reduce peak loads though. The key improvement is in terms of logistics, with the massive new LNG import capacity deployed across Europe.

Overall, EU's import situation will be very tensed and fragile for the next winter. The key challenge is that EU's gas supply security ultimately depends on the weather in Europe, China's and Japan's LNG demand, and weather or technical outages in the Gulf of Mexico or in other producers. Any slight disruptions in supplies can have major impacts. As a last resort, bringing back some Groningen supplies, no matter how politically sensitive this would be, must be considered and prepared. Large financial compensations and effective governmental action would notably be required to offset the hardships.

In the medium term, EU gas demand will hardly recover, but can be expected to remain steady in a slightly lower 330-360/year bcm range, before possibly reducing to 280-300 bcm by 2030. In terms of import requirements, this would remain tremendous, even if there can be some little uptick here and there in EU Member states' gas and biomethane production. This will imply a continued, heavy demand for LNG.

The rupture between Russia and the West will have lasting and reverberating impacts on the geopolitics of commodity flows. Some shipping routes have already gained in traffic while others have declined and as a result the risks around chokepoints and safety of navigation are fast-evolving. The share of exports from the OECD countries will continue to grow and have a stabilizing impact on safety of shipping lanes. The post-war LNG trade pattern shifts will likely consolidate the Atlantic route between the U.S. and Europe as well as the North Sea Route for the bilateral Russia-China trade if icebreakers can be built, while possibly reducing traffic via the Panama Canal and the Suez Canal. Other geopolitical risks loom large, including a Taiwan blockade and U.S.-China systemic confrontation. Hormuz remains a flashpoint, even if the latest Saudi-Iran rapprochement, and China's agenda to reduce any risk of blockage, ease regional tensions.

Long-term efforts to cut shipping emissions will strengthen the case for intra-regional trade and shorter routes, slower cargo speed but it may not always be applicable especially when politics prevail.

The prioritization of routes between trusted partners could sometimes mean longer and more expensive routes, which can de-optimize global LNG trade flows, can put a strain on LNG tanker availability and make it challenging to meet new environmental norms from the International Maritime Organization and growing pressure to reduce greenhouse gas footprint.

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# Introduction

The unthinkable unfolded several times in a dramatic chain of events in 2022: Vladimir Putin invaded Ukraine on the day when its electricity system was to operate for the first time in an isolated mode in order to test the synchronization with Europe. Ukrainians have been bravely defending their country and defeating Russia's army in Kiev, Kharkiv and Kherson. Ukraine is turning into a new Israel, without nuclear weapons but with an EU membership perspective, an efficient, battle proof army, a growing IT and weapons industry, and a lower carbon electricity mix following the destruction of its thermal plants. Meanwhile, Russia is turning into another Iran, claiming it is under attack when it is pursuing the objective to dismantle the North Atlantic Treaty Organization (NATO) and the EU while widening its borders to include Ukraine and Belarus. The "Iranization" of Russia had started a decade ago when Putin and his entourage have been increasingly maneuvering Russia with a view of sole regime survival, using all tools possible, while benefiting from some popular support thanks to information control and as Russians were keen to turn the page on the dark years of the 1990s. The West's own shortcomings in Iraq and Libya have certainly also added resentment to the post-imperial syndrome. While it is unclear if the regime can survive this war the same way the Iranian regime survived the war with Iraq and waves of sanctions, Putin is crushing over a decade of socio-economic development, integration into the European economy and most importantly, a sentiment of progress. Same as Iran, Russia enjoys a robust domestic oil, gas and petrochemical industry which can cope with some of the sanctions, whose impact reduces as time passes, yet with costs and difficulties. However, its nuclear weapons and a United Nations (UN) veto position can hardly stop its technological and trade isolation and economic shrinking. It is noteworthy though that Russia still has achieved a few successes, such as in keeping its special relations with China, Saudi Arabia, India, South Africa, Türkiye and Brazil for example, and continuing to being a troublemaker in Sub-Saharan Africa. Will this help its economy? Marginally.

From a strategic perspective, Russia's army has devastated parts of Ukraine but there will be an unprecedented reconstruction effort. Russia has a new NATO neighbor, that is Finland, and the U.S. have been doing an energy and military comeback to Europe. Interestingly, Kyiv will be embattled between U.S.-British-Polish influences, and Western European ones. If the Russian factor of geopolitical fragmentation of Europe will largely disappear, and if the West so far has proven remarkably resolute and united and will most likely continue to be so, the U.S. comeback may become a factor



of geoeconomic tension within the EU. The Ukraine membership perspective will notably require a reform of EU institutions, such as unanimity for key decision-making, which will be very difficult and currently faces strong opposition from Poland. Finally, for the EU, which has been facing a surging gas import bill (Dutch TTF prices were six times higher in 2022 than U.S. Henry Hub) and for the first time in over ten years, a significant trade deficit in goods (over EUR 300 billion in 2022), the challenge will be not to further lose competitiveness and attractiveness especially versus the U.S. and Canada, and not to weaken its economies as it aims to decarbonize faster and deeper than its Organization for Economic Co-operation and Development (OECD) competitors.<sup>1</sup>

Following its geopolitical demise, Russia has undertaken its own gas amputation, moving from a super energy power status to a shrinking role with uncertain prospects and only hard options left. Russia has cut off almost entirely pipeline gas supplies to Europe, first inflicting huge financial pain, but then simply losing out its largest and best market with no alternative. Russia is becoming a discounted resource provider to China. Its energy position in Europe won't disappear entirely, but a return to business as usual is ruled out. Pressure for a no business at all approach is there and can be expected to remain, even if the fighting ends. This picture is slightly different for oil though, as Russia managed to adapt to sanctions, embargos, and price caps, retains its privileged relations with Saudi Arabia, and keeps some inroads into Europe.

Russia has also missed out its chance to modernize and take part in the European energy transition, with climate change being a massive threat to Russia. Instead, it has provoked a global uptick of coal and oil demand in power generation, an inflation in agricultural commodities and beyond the war atrocities, an environmental catastrophe in Ukraine. But it was successful to put the blame in the "Global South" on Europeans, who failed to counter this and deploy a proper narrative. Most EU Member States are no more importing Russian coal, oil, wood and gas, at least directly, without any devastating economic or social shock so far, which is a strategic surprise. Symbolically, gas prices dropped below the 50 euro (EUR)/megawatt hour (MWh) mark for the first time in months in mid-February and are now closer to 40 EUR/MWh, and oil has been trading in a 75-80\$/barrel range up until the latest OPEC+ (Organization of the Petroleum Exporting Countries) decision to cut supplies further.

With the war and progressive disruptions of Russian supplies, LNG has made a comeback to Europe and has been a life jacket for industries, governments, and populations. The U.S.-EU LNG corridor has become the most dominant trade route in 2022, which was indispensable to replace some of the loss of Russian pipeline gas. The rupture between Russia and the West

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1. M-A. Eyl-Mazzega, D. Gherasim, "The European Green Deal Three Years On: Acceleration, Erosion, Fragmentation?", *Briefings de l'Ifri*, Ifri, November 14, 2022.



will have lasting and reverberating impacts on the geopolitics of LNG flows and can give us an indication of future trends and risks to the most important shipping routes. LNG trade is under a greater influence of politics and government-to-government deals, which means a prioritization of trade between trusted partners.

Fundamental questions now arise when it comes to assessing the strategic nature of transformations of LNG trade and its role going forward, which this note aims to discuss: what are the transformations in trading routes that have been seen and how will they evolve in future? What are impacts on choke points and their geopolitical implications? And more generally, what are the longer-term consequences of Russia's self-inflicted gas amputation for regional and global gas markets, given Russia's declared ambition to continue its LNG export expansion and stated goal to pivot pipeline supplies from Europe to Asia? Can LNG markets and industries be spared from the weaponization of energy?

# Russia's Brutal Decoupling from Pipeline Gas Supplies to Europe Has Triggered Costly, but Efficient Adjustments

In the years preceding Russia's 2022 aggression, by the end of the 2010s, the LNG market had undergone a major transformation geared toward meeting a growing demand from China (soon to become the world's top importer with skyrocketing demand increases) and emerging nations, many of which had become importers, benefiting from the Floating storage and regasification unit (FSRU) technology and from low prices and abundant, flexible supplies following the U.S. export revolution. Imports from emerging nations increasing fourfold between 2010 and 2017 marked a demand shock, and as ten new importers entered this market, a supply boost was triggered: major upstream investments were planned in Russia, Qatar, the U.S., Africa and East Asia. Russia's expanding pipeline gas exports to Europe and China freed up LNG supplies for these new LNG hungry nations.<sup>2</sup>

As Gazprom was boosting exports to Europe and Germany planning its energy transition on two legs, renewables and natural gas, Europe's LNG import outlook was negative at best. European debates focused on (green) hydrogen, the (limited and negative) role of gas in the taxonomy, the greenhouse gas (GHG) footprint of the gas industry, and left little attention to the security of supplies. Germany's gas strategy consisted of no LNG plant construction and opening up a new pipeline to Russia. Only Poland, Lithuania, or Croatia, took more strategic actions.

When Gazprom started reducing pipeline supplies as from June 2021, little attention was paid as these steps happened within boundaries of long-term contracts and as 2020 had seen some European utilities obviously taking less gas than usual and storing less gas. Perhaps in preparation of the war, or because it thought its role as a flexibility provider was undervalued in winter, Gazprom had put almost no gas in storage for winter 2021-2022. This had prompted more spot LNG purchases and put prices under tension.<sup>3</sup>

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2. S. Cornot-Gandolphe, "New and Emerging LNG Markets: The Demand Shock", *Études de l'Ifri*, Ifri, June 2018.

3. A. Sabadus, "Nord Stream Deep Dive Finds Putin's Fingerprints", CEPA, available at: [www.cepa.org](http://www.cepa.org).

Russian pipeline gas exports to Europe have been severely curtailed especially after summer 2022 so that in total, Russian pipeline gas supplies to the EU amounted to about 64 bcm in 2022, compared with 141 bcm in 2021, with about 77 bcm missing, that is -55% (exact numbers will soon be released by the *DG Energy Q4 2022 Quarterly Gas Market Report*). Arbitration courts will decide to what extent Russian *force majeure* claims, ruble payment demands, and other moves were contractual violations, and if alleged under-nominations by European buyers were genuine. In any case, long-term contracts with Gazprom have lost their value. At the same time, Russian LNG supplies increased, and several European countries landed many Russian LNG cargoes, notably Belgium and France, and lately, southeast Europe. The EU gas demand has reduced by 13% (55 bcm) in 2022 according to International Energy Agency (IEA) figures,<sup>4</sup> driven by high prices, some industry closures, production curtailment or fuel switching, mild temperatures and some efficiency measures. The surge in LNG imports (+32 bcm, 2/3 coming from the U.S.) + higher Norwegian gas exports (+3.3% for pipeline gas, including +11% to Germany, and more Norwegian LNG) were just enough to further help offsetting the fall in Russian gas exports to the EU. China's -20% LNG purchases were key to free up cargoes to Europe, alongside the U.S. LNG export increase with a few more trains commissioned.

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4. "Background Note on the Natural Gas Supply-Demand Balance of the European Union in 2023", International Energy Agency, available at: [www.iea.org](http://www.iea.org).

# The Additional Challenge of Offsetting More Russian Supplies in 2023: Addressing Nine Uncertainties

For 2023, the balance is much more fragile, as the demand reduction potential has reached its limits, same for the ability to attract additional non-Russian exports to Europe, at a time when missing Russian volumes will probably reach 120 bcm, instead of just 77 bcm in 2022. More moderate gas price levels since November 2022 have clearly overshadowed this fundamental mismatch, especially as the weather has been mild and helped Europeans. Minds are now relaxed, no curtailments took place, and in France, EDF's nuclear fleet has been producing more, but the reality is that the balance is super tight and gas volumes will be missing in 2023 and 2024.

Nine fundamental questions, and uncertainties remain for the short to medium term as Europeans will struggle to offset an addition of around 30-40 bcm of Russian gas in 2023.

- **Why are some countries still receiving Russian gas and will this continue?**

Russian pipeline gas and LNG are not under sanctions. Overall, it is striking that two NATO members, Türkiye, and Hungary, continue receiving large pipeline gas volumes, some of which are supplied through Ukraine, or TurkStream/Blue Stream. A few other countries such as Austria, Serbia, but also Romania, a NATO member, have been receiving some smaller volumes. There are several reasons: some are not sending weapons to Ukraine, Gazprom and Russia still need revenues, there are still nominations through the Ukrainian route and because, obviously, Russia is interested in creating different situations and divisions within Europe and NATO. In the case of Türkiye, it may also be part of a possible wider trade off whereby Türkiye becomes a support hub for the Russian economy under sanctions. LNG exports from Yamal LNG and Sakhalin-2 LNG have been continuing because the Kremlin obviously does not want to kill its LNG export potential altogether, since it gives some leverage (for instance on Japan, whose Prime minister nevertheless visited Kyiv) and as it must take into account China's involvement. Russia is now honoring 70% of payments from its 2019 gas transport contract with Ukraine (Ukraine has called *force majeure* on one of the entry points due to the war and making more volumes available on the

other, which Gazprom did not accept) and Russia obviously cannot destroy Ukraine's pipeline system all together especially now that Nord Stream is destroyed. Overall, one can expect that Gazprom will still supply around 20-25 bcm of pipeline gas to Europe in 2023 (first to Hungary, then Austria, Serbia, and a few other volumes), in addition to 15-17 bcm of LNG (part of it, say 4-6 bcm reexported outside Europe), and 20-23 bcm of pipeline gas to Türkiye.

- **Why has Europe not banned or sanctioned Russian LNG?**

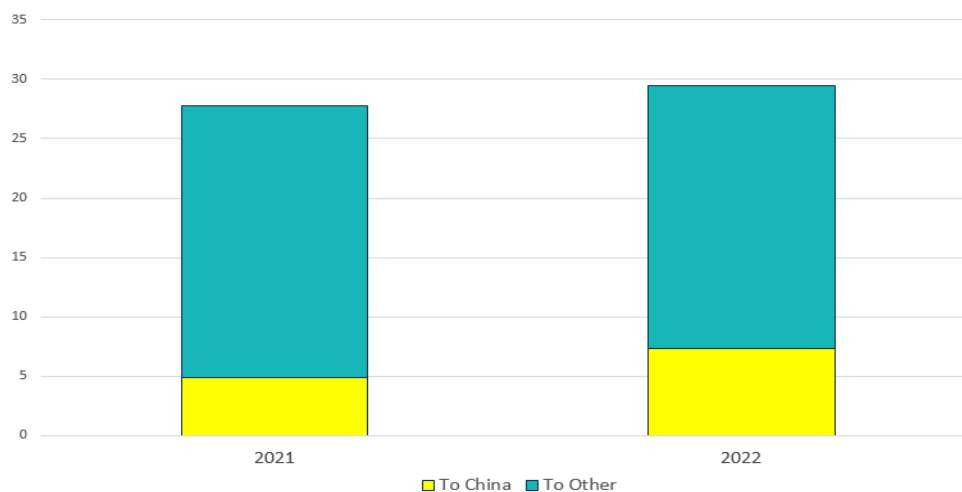
Only a few Baltic countries and the United Kingdom have banned imports of Russian LNG, while the rest of Western Europe remains dependent on Russia's Yamal LNG supply (and indirectly on Sakhalin-2 LNG supplies) especially during winter. About 8% of Europe's LNG imports still come from this Arctic project led by Novatek, but the share varies from 5% to 9% depending on the season, as the opening each summer of the Northern Sea Route allows more Yamal LNG cargoes to flow to Asia, namely China. By not forbidding the handling of Russian LNG in its ports, the EU is showing solidarity with Japan which still relies heavily on Russia's Pacific Sakhalin-2 LNG plant and not fueling a likely increase in LNG prices. In its latest round of sanctions, the EU has clarified that EU operators will be allowed to continue lending Russian companies/individuals access to infrastructure that handles European LNG imports. But Russian gas cannot be purchased under by the EU Energy Platform which aggregates demand in view of joint purchases for at least 15% of storage needs.<sup>5</sup> Another option under discussion is to give Member States the optionality to ban access of Russian operators to EU's gas infrastructure. It's worth pointing out that nearly half of European imports of Yamal LNG have been re-exported outside Europe in 2022 according to GasVista's Leviaton data and that these Europe's Yamal LNG reloads have played a large role in China's surge in LNG imports from Russia. Indeed, China has supplanted Japan in 2022 as the largest importer of Russian LNG via a diversification of routes and sources (see graph below).

The EU is very unlikely to ban Russian LNG from its ports anytime soon but this does not mean that shaming on importing Russian LNG will not pick up, or that Russia could not decide unilaterally to do so (same as it did with pipeline gas). It's noteworthy that Russia could still inflict some market stress by cutting LNG exports to Europe or Japan if its LNG plants were to fully halt. While this is a possibility, it is seen as not likely. Russia's LNG exports from Yamal LNG have remained constant in 2022 year-over-year, while LNG exports from Sakhalin-2 have increased by 23% compared to 2021.

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5. "The platform will play a key role in pooling demand, coordinating infrastructure use, negotiating with international partners and preparing for joint gas and hydrogen purchases", EU Energy Platform, available at: <https://energy.ec.europa.eu>.

**Figure 1: Russia's LNG exports to China (2022/2021, in Mt)**



Source: *Leviaton*; Note: China's LNG import data include direct imports + Europe's reloads to China, data accessed on 17 January 2023

- **What additional supply and demand side adjustments could be envisaged in Europe to avoid a crisis?**

With an additional 30-40 bcm of missing Russian gas to offset in 2023 compared to 2022, and a steady fall in domestic production of about 6 bcm, Europeans can be expected to benefit from an extra gas of around 20-25 bcm left in storages thanks to mild weather (storage are still 55%, even more in Germany, much less in France). They have no choice but to continue saving energy in a hurry, that is both on gas and electricity. Gas demand in power generation had increased in the first nine months of 2022 before falling in Q4 2022, and well over 15 bcm need to be saved here in 2023, which can be done as more nuclear is available altogether, alongside more renewables, and some coal. It will be critical to reduce peak loads, which EU policies are aiming for. Industry demand can overall be expected to increase slightly following the lower prices yet it must be noted that modernization and decarbonization investments have been accelerated in several sectors. LNG imports are at maximal level, and perhaps a few more bcms can be sourced from Azerbaijan, Libya, and Algeria. The key improvement is in terms of logistics, with the massive new LNG import capacity deployed across Europe (IEA has counted 130 bcm new capacity being installed or planned, with 40 bcm operational by end 2023 in the EU), decisively in Germany, the Benelux, Italy, and Greece notably.

Overall, EU's import situation will be very tense and fragile for the next winter. The key challenge is that EU's gas supply security depends on the weather in Europe, China's and Japan's LNG demand, and weather or technical outages in the Gulf of Mexico or in other producers. Any slight disruptions in supplies can have major impacts, so that ultimately, there will be no choice but to bring back some Groningen supplies, no matter how politically sensitive this will be. Large financial compensations and effective governmental action should offset the hardships.

- **What is the future of Russian pipeline gas supplies to Europe?**

Gazprom is left with low paying customers in Russia, limited oil-indexed exports to China and Türkiye, and must massively invest in infrastructure in a position of weakness, to develop new export outlets to China and Asia, which at best, would take years to deliver any meaningful results. And it can hardly expand into LNG due to technological sanctions. The sharp reduction in Gazprom gas production may well be lasting. The paradox is that the more Gazprom beefs up pipeline supplies to China via Power of Siberia, the better for the Chinese, but also indirectly, for the Europeans, as this eases the pressure on LNG markets. The Kremlin has been talking about setting up a gas hub in Türkiye, which at best will have limited volumes, and there are signs that it wants to keep some gas markets open in Europe, not least to maintain influence, leverage, and revenues, and try to deter competition and investment decisions in fueling the idea that it can come back anytime.

Overall, the point is that there will be no turning back. Gazprom could indeed push a few more volumes through Türkiye via Turkstream, helped by competitive pricing. Türkiye might take more volumes of possibly discounted Russian gas, but with limits – its economy is fragile, and Ankara remembers the days when Gazprom suddenly brings pipelines into maintenance. Overall, current total Russian gas exports (pipeline + LNG) to the EU can be expected at 35-42 bcm in 2023, and one could envisage they move up to 60 bcm/year at some point in the future, certainly not more, that is  $\frac{1}{3}$  of their pre-war level. One day, Russian reparations to Ukraine may be considered also in the form of additional gas transit and/or direct free gas and oil supplies to Ukraine, but Europeans would take at best limited volumes, at prices they set themselves through an amended joint purchasing mechanism. Lastly, no listed company in the West will ever sign long-term contracts with a Russian state-owned company, even for low carbon fuels.

- **What share of gas demand has been forever destroyed and what will come back?**

With lower gas prices since November 2022 and the recession avoided, there has been some uptick in fertilizer and glass production, industries have benefited from some fresher air and while the steel industry is planning to move to hydrogen in a few years,<sup>6</sup> all in all, it is clear that there is little room for additional, rapid gas demand reduction in Europe, unless industries simply shut in as they no more can pass on higher costs in their products to consumers. Balancing the large renewables, and greater deployment of heat pumps, in a context of German nuclear phase-out by end of April, will require flexible thermal gas capacities and demand side management. If new building constructions are expected to be banned from gas (with discussions starting soon in France as for the role of biomethane and hybrid heat pumps),

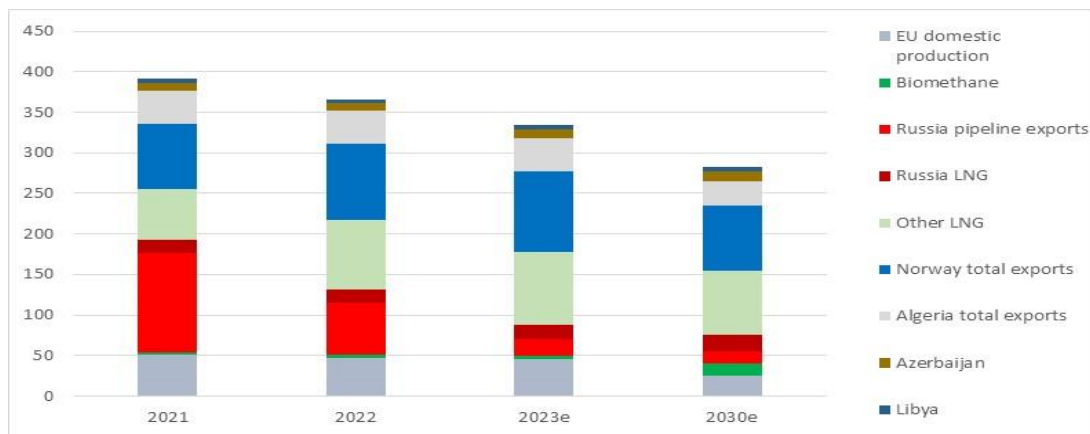
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6. S. Cornot-Gandolphe, “La sidérurgie européenne se prépare pour être à la pointe de la décarbonation”, *Notes de l’Ifri*, Ifri, January 2023.



a fact is that deep building renovations of existing building stock will hardly accelerate due to inflation and will be uneven. Germany has still installed more gas boilers in homes in 2022 than heat pumps. Overall, there will be an uptick in biomethane production, but this will at best slow down the reduction in EU's natural gas production. Industrial gas demand is still expected to decrease more rapidly than demand in the power or residential sectors. In a context of scarce low carbon electricity and insufficient grids and renewable deployment, hydrogen ramp up in Europe can only work if nuclear and gas are included as options.<sup>7</sup> This implies that assuming cheap gas prices and improved supply conditions, EU gas demand will hardly recover, but can be expected to remain steady in the 330-360 bcm range in the next years, irrespective of RePowerEU plans, before possibly reducing to 280-300 bcm by 2030. In terms of import requirements, this would remain tremendous. And imply a continued, heavy demand for LNG.

**Figure 2: EU's gas supply by source, 2021, 2022, 2023e and 2030e, in bcm**



Source: Ifri estimate, ENTSO-G, DG Energy

- **Can Europe lastingly rely on spot trade to replace Russian pipeline gas exports and is there renewed momentum for new large infrastructure projects to Europe?**

With large additional global LNG export capacities coming from 2025-2026, in a market where the number of buying countries has been severely reduced, one can expect gas prices to fall, which would make spot purchases quite advantageous, especially considering that oil prices can be expected to stay relatively high with Russia and Saudi Arabia still driving a restrictive OPEC+. The circle would ultimately take an upward turn at some point in future towards 2030 again.

7. M-A. Eyl-Mazzega and D. Gherassim, "The European Green Deal Three Years On: Acceleration, Erosion, Fragmentation?", *Briefings de l'Ifri*, op. cit.

For Europeans, the question is if they can technically and economically reduce their gas demand sharply by then so as not to be exposed to higher prices again when their competitors are not. This is unlikely though, and governments must make a decision as to whether they want to take future resilience guarantees or not, which is a choice that will be disputed in the context of the energy transition. However, does this mean new pipeline projects could be launched toward Europe with a 20-year payback period, and 4-5 years of construction? This is unlikely, unless these projects can be coupled with an optionality for direct hydrogen transportation, or on-site gas-to-hydrogen production, coupled with carbon capture and storage (CCS). But that would require producing hydrogen from a low-priced gas, as blue hydrogen would need to compete with other sources of low carbon hydrogen. And of course, hydrogen demand to be strong enough at a given geographical point so that producers can find buyers. All in all, LNG can be expected to have the upper end for new export projects, followed by low carbon ammonia.

- **Is Europe building too little or too much LNG import infrastructure?**

EU regasification capacity will grow by nearly 40% by 2030 from today's ~245 bcm/yr of capacity. This means buying security and optionality notably with the fast-track additions of new FSRUs, but the utilization of Europe's import terminals may vary widely depending on the season, location and market conditions. Europe's six new FSRUs, including Germany's first three, have started operations and more will join which means that EU regasification capacity has already increased by 35 bcm for winter 2022-2023, and will further increase by next winter. Beyond FSRUs, some onshore regasification terminals are planning to expand their capacities, most notably Rotterdam's GATE facility from 16 to 20 bcm/yr, and new land terminals are also proposed in Germany.

Possible lower utilization of German regasification terminals should not be the metrics to measure their success because they are above all energy security investments and there are still uncertainties about the volumes of Russian gas imports into Europe medium-term. Berlin already has three in operation and will start up a further two by the end of this year, including one with more complex operations involving an FSU (Lubmin).

However, these FSRUs come with a huge financial cost. There could be a backlash in Germany regarding the cost of bringing five new FSRUs (€6.5 billion) in the event gas demand reduces faster than expected, or Germany fails to reduce its GHG at the required pace. The German government will spend \$10,4 billion for the 2022-2028 period in FSRUs. Some in Germany are anxious about the loss of competitiveness and de-industrialization with large industrial players such as BASF considering relocating factories overseas, and Spain, Portugal, or South of the Mediterranean are serious new potential competitors. The financial burden of Europe's gas upheaval could be LNG bearish in the long-term and create political risks ahead of the next national elections.

**Table 1: Surge in Proposed FSRUs in Europe Following the Russia-Ukraine War**

Country	Location	FSRUs	Status	Developers	Regas Capacity (mt/yr)	Start-Up
Netherlands	Eemshaven*	Exmar - <i>S188</i>	operational since September 2022	Gasunie	5.8	Sep-22
Netherlands	Eemshaven*	New Fortress Energy - <i>Golar Igloo</i>	operational since September 2022	Gasunie		Sep-22
Germany	Wilhelmshaven <	Hoegh LNG - <i>Hoegh Esperanza</i>	operational since December 2022	Uniper	5.6	Dec-22
Germany	Lubmin	Hoegh LNG - <i>Neptune</i> (chartered by TotalEnergies)	operational since January 2023	Deutsche ReGas / TotalEnergies	5	Jan-23
Finland	port of Inkoo, southern Finland	Excelerate Energy - <i>Exemplar</i>	operational since January 2023	Gasgrid Finland Oy	3.6	Jan-23
Germany	Brunsbüttel <	<i>Hoegh Gannet</i>	operational since February 2023	RWE >	5.6	Mar-23
Germany	Wilhelmshaven	Excelerate Energy -- <i>Excelsior</i>	idle near Spanish coasts; left Israel early Dec.	Engie, E.On, Tree Energy Solutions, Excelerate	3.6	1Q 23
Italy	Piombino	<i>Golar Tundra</i>	In position since March 2023	Snam	2.7	Mar-23
Greece	Alexandropolis, nr Thessaloniki	<i>GasLog Chelsea</i>	Conversion to FSRU began in Feb. at Keppel yard in Singapore	Gastrade	4	end-2023
France	Antifer near Le Havre	<i>Cape Ann</i> (both chartered from Hoegh)	Cape Ann has been located at China's Tianjin Port since June 2021	TotalEnergies	5	Sep-23
Germany	Hanseatic Energy Hub, Stade <	Dynagas - <i>Transgas Force</i>	In shipyard?	Uniper >	5.4	winter 2023-24
<b>TOTAL</b>					<b>46.3</b>	

Source: GasVista, Leviaton platform accessed in March 2023 to check status of FSRUs

- **Will U.S. LNG continue to flow predominantly to Europe?**

The U.S.-Europe LNG trade route was one of the world's largest in 2022, illustrating the rapid evolution of flows following the war in Ukraine and the West's hyper-focus on Europe's energy security. Europe's reliance on LNG from all sources has increased 64% year-over-year, with the U.S. contributing to 45% of the bloc's LNG imports.<sup>8</sup>

For now, Europe cannot live without U.S. shale gas-to-LNG which has saved the continent from what could have been a much worse energy crisis and the U.S. LNG play is also becoming increasingly more dependent on Europe as a market for its gas. U.S. LNG contributed to 17% of all European gas imports in 2022, becoming the second source of supply behind Norway, while the share of Russian pipeline gas in all European gas imports was down to 17%, from 40%. Europe has also become the biggest market for U.S. LNG as 64% of gas-made-in-America landed in Europe last year.

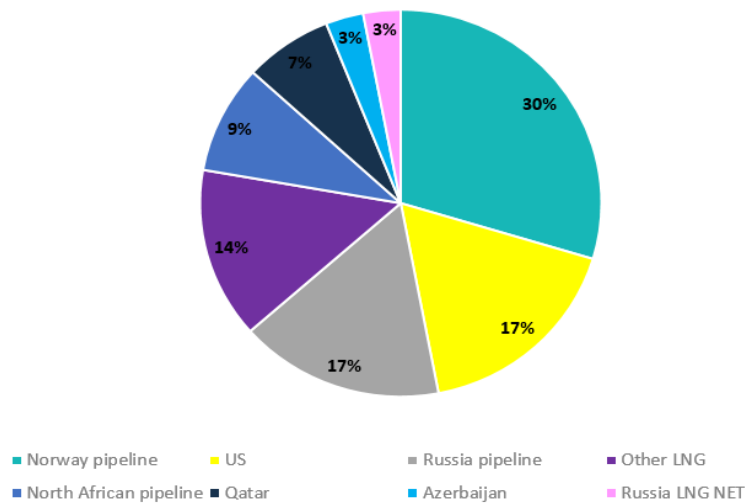
LNG flows have been caught in a magnet pull to Europe due to market forces as wealthy European countries were ready to pay premium prices to secure the fuel away from other destinations. Meanwhile the role of energy diplomacy and national policies will play a bigger role in coming years as trade between trusted partners increase and as governments intervene more in energy markets from financing infrastructure to secure procurements via government-to-government deals.

On both sides of the Atlantic, governments which had their eyes set on hydrogen and renewables, will have to swallow the LNG pill for longer. The role of LNG in the energy transition has been much debated but the fuel has become indispensable to offset the missing Russian pipeline gas, keep the factories running and the lights on while limiting the reversal of the coal-to-gas switching. The emphasis of the transatlantic LNG dialogue will be to reduce its GHG emissions, with an emphasis on methane emissions, in order to show consistency with EU's Fit for 55 package.

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8. L. Palti Guzman and J. Majkut, "US LNG Remapping Energy Security," CSIS, January 2023.

**Figure 3: Share of EU's Gas Imports by Source (2022)**



Source: *Leviaton*

- **Will there be intense competition between Europe and Asia to attract LNG cargoes?**

LNG competition between Asia and Europe will depend on several factors including timing of the demand/supply rebalancing, seasonality, pricing and geopolitics. Asia still attracted 65% of global trade in 2022 but its supply came less from the U.S. and more from other suppliers such as Qatar and Australia.

The timing of China's LNG recovery will be critical to Europe's storage refilling and whether there will be intense competition to import winter cargoes. Last year Europe benefited from China reselling for profit its unwanted contracted LNG. It also begs the question whether China will want to continue to increase its coal demand at the expense of advancing its 'blue sky'<sup>9</sup> and climate agenda which has been vastly derailed since 2020 -to be on a 1,5°C trajectory, China would need to rapidly peak its GHG emissions, while its commitment to peak before 2030 leaves a lot of room for additional emissions. China's energy appetite will return but the timing and scope remain uncertain, representing a major security of supply risk for Europe, and a medium- to long-term demand risk for US LNG exports.

Japan, still the world's largest LNG importer, has also a critical role to play in the redirection of trade flows. Tokyo, which is 100% dependent on LNG for its gas consumption, is growing anxious about the competition with Europe to attract supplies at a time when the market is tight, especially as JERA had not renewed a 5,5 megatonne (Mt) LNG contract with Qatar end 2021. As a result, Japan is finally ready to sign new long-term contracts this year for deliveries post-2026 as medium-term competition to attract cargoes

9. "China's 'Blue Sky' Efforts May Ease Energy Crunch and Coal Rally", *Bloomberg News*, October 20 2022, available at: [www.bloomberg.com](http://www.bloomberg.com).

away from Europe increases. Japan's government is also stepping up to guarantee energy security: strategic LNG reserves are to be prepared in the event of any competition between Asia and Europe to attract cargoes. And the country is eyeing to restart additional nuclear power plants to limit LNG needs.

Meanwhile, the prolongation of unaffordable spot LNG prices (above \$10/MMBtu) will continue to kill demand in emerging markets and these buyers are unlikely to return to spot markets. LNG imports could become further marginalized unless international gas financing resumes, which is part of a needed debate on investing in a low-carbon economy rather than a carbon-free one and which has started at COP-27 and will continue into 2023 and beyond.<sup>10</sup>

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10. "COP27 – 'Loss And Damage' Success Tempered by Lack of Implementation", UNEP FI, December 7, 2022, available at: [www.unepfi.org](http://www.unepfi.org).

# **New LNG Trade Patterns, Routes and Implications for Supply Chain Bottlenecks: Medium Term Perspective**

## **New LNG Export Capacity Operationalization: Where, How Much, Where To?**

2022 was a very close race between the world's three largest LNG suppliers. Australia has kept the world's biggest LNG exporter crown in 2022 with ~84 Mt, ahead of Qatar which exported ~82 Mt, and the U.S. which reached ~81 Mt. The global LNG trade reached about 400 Mt in 2022 out of a global liquefaction capacity of 472 Mt per year (by April 2022 according to the International Gas Association), which suggests a utilization rate of 84%, which is very high and may not be sustained.

Beyond the ambitious Qatari export infrastructure expansion which will bring export capacity from around 80-82 Mt to 110-112 Mt by 2027 (assuming 4 additional trains are commissioned by then) to markets, the growth of LNG export infrastructure will be predominantly North American, floating and medium-scale. In other words, nearly 80% of new LNG supply by 2030 will come from Qatar and the US. There is ~100 Mtpa of global liquefaction capacity currently under-construction and more projects, notably in North America, will add to this pool of new supply. But higher interest rates and inflation costs for raw materials mean that the developers will prioritize the first phase of their projects; modular equipment and could downsize from their original plans if needed.

Key large-scale projects expected to take final investment decisions (FIDs) in 2023 which will impact the LNG demand-supply balance towards the end of the decade include Mozambique's Rovuma LNG, the Port Arthur and Rio Grande projects in the US, and Papua LNG.

### ***Russia's Future LNG Prospects: How Much Are These a Wild Card?***


Prior to the war, Russia was poised to become one of the top-4 largest global LNG exporters, with Novatek set to become a huge LNG player, complemented by smaller projects developed by Gazprom or Rosneft. With



sanctions hitting financial flows, and engineering services, key Western service and equipment providers have exited Novatek’s projects. Nonetheless, Novatek, which is not under sanctions, has been continuing to receive shipments of equipment from China or South Korea notably, and train 1 of Arctic-2 LNG may well be completed and become operational either in 2023 or 2024 with a slight delay. The fate of the other trains, and of other projects, remains uncertain. What can be said at this stage is that Novatek has proven it has an outstanding ability to master complex projects in complex regulatory and geopolitical environments, and that its projects’ shareholders have remained in place.

Russian industrial actors are seeking to develop their own liquefaction (based on Arctic Cascade installed on train 4 of Yamal LNG, a smaller, 0.9 Mt train) and LNG transportation technologies (Atomenergomash) as part of an accelerated effort of import substitution. Novatek is also deprived of many of the LNG vessels that were to be assembled at the Zvezda shipyard, but this does not mean it will face a dramatic shortage in LNG vessels altogether given wider availability of ship-to-ship transfers, and icebreakers. Novatek will also be able to receive at least one of its ordered FSUs for transshipment operations outside of icy waters. All in all, it can be expected that for the Kremlin, developing a Russian LNG industry remains a strategic priority, but that Russianized projects can be expected to work in a sub-optimal manner and be smaller scale, with higher operational costs, and delays.

**Figure 4: Largest LNG Trade in 2022 Between Countries or Blocs (million tons)**

 Rank	EXPORTER	IMPORTER	Leviaton accessed on 1/9/2023
#1	USA	EUROPE-28	49
#2	AUSTRALIA	JAPAN	34
#3	AUSTRALIA	CHINA	23
#4	QATAR	CHINA	15
#5	AUSTRALIA	KOREA	12
#6	USA	FRANCE	11
#7	QATAR	INDIA	11

Source: Leviaton

This implies that there can be a small growth in LNG exports in the foreseeable future, which could be offset though by challenges to maintain the existing infrastructure due to difficulties to source spare equipment and ensuring proper maintenance operations. Should Russia master the LNG technology, and ship transportation at a large scale, this would be an unprecedented breakthrough which other technologically advanced nations, have failed to undertake. Novatek has another project it could realize at some point in time – Obskyi – perhaps at a different scale, and Gazprom is still

working to develop its Ust Luga project for example, while there is, obviously, also a communication element in it.<sup>11</sup> In any case, the Kremlin will hardly admit loudly that they will fail to deliver on their plans (if this is the case), while some in Europe, Japan or Korea will probably also never publicly state that they hope for some of these projects to be realized, and may, here and there, have a soft approach on sanctions.

## **The Evolution of Choke Points: Straits and Passages such as Panama, Suez, Gibraltar, Denmark, Malacca, Hormuz and India**

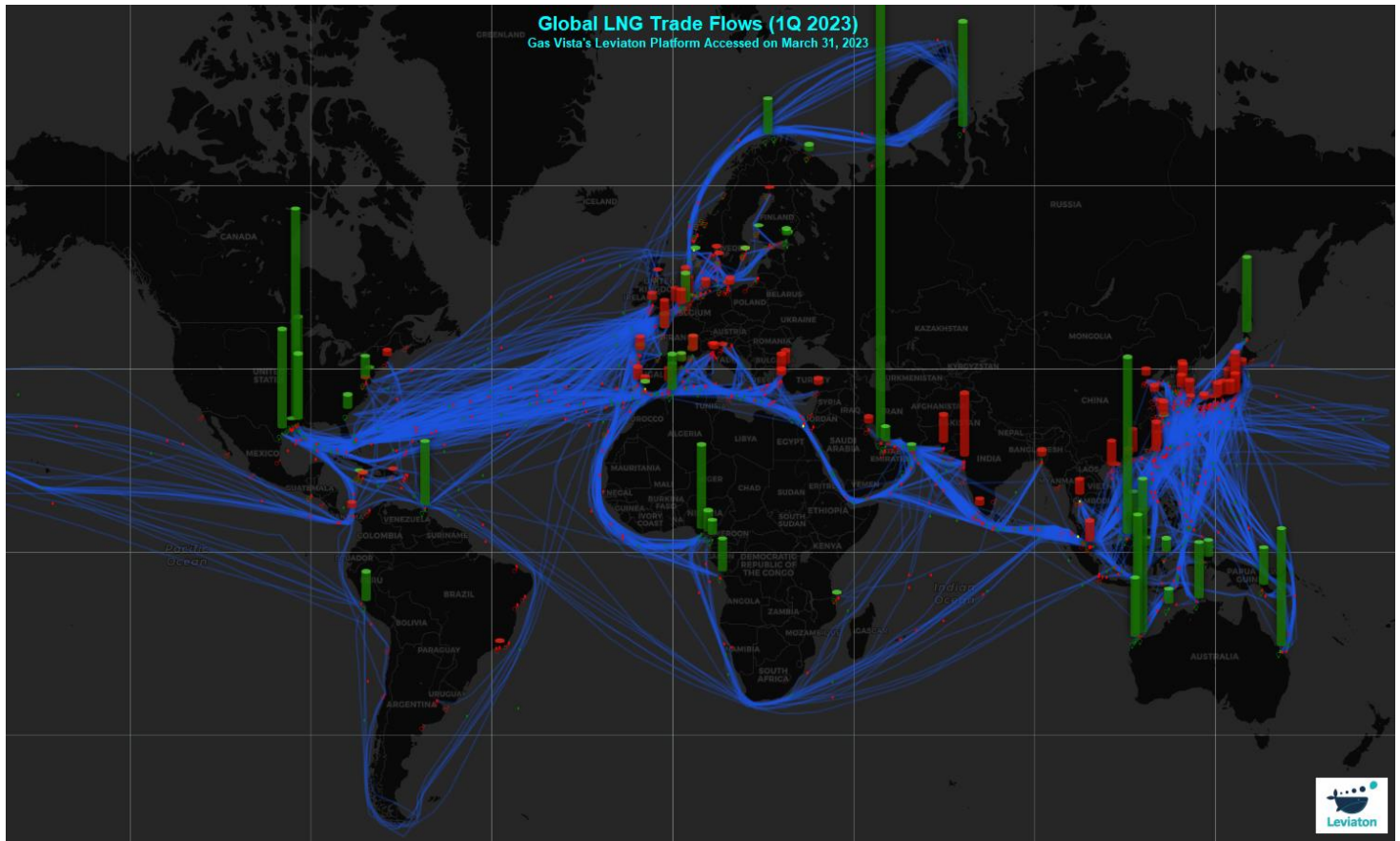
The rupture between Russia and the West will have lasting and reverberating impacts on the geopolitics of commodity flows. Some shipping routes have already gained in traffic while others have declined and as a result the risks around chokepoints and safety of navigation are fast-evolving. The share of exports from OECD countries will continue to grow and have a stabilizing impact on safety of shipping lanes. The U.S. and Australia, which now belong to the world's top three LNG exporters have enabled importers to not just diversify sources but also routes, allowing Japan for instance to reduce its exposure to Qatar and the Strait of Hormuz. In the future, exports from Canada, Mexico and Israel will grow the list of OECD suppliers while supply from the US and to a lesser extent from Australia will continue to increase. Meanwhile the post-war LNG trade pattern shifts will likely consolidate the Atlantic route between the US and Europe as well as the North Sea Route for the bilateral Russia-China trade, while possibly reducing traffic via the Panama Canal and the Suez Canal. Other geopolitical risks loom large, including a Taiwan blockade and U.S.-China systemic confrontation.

Dangers to the security of navigation are diverse including (but not limited to) collisions, warfare, cyber-attacks, blockades, piracy, embargoes, terrorism. Commodity players are particularly aware of shipping risks around few strategic chokepoints and some of them pause heightened threats specifically to LNG trade. While most buyers have already diversified supply sources/routes and traders are increasingly accustomed to rerouting/bypassing congested Canals/areas, transportation crises will likely occur. The global gas context of record high spot LNG prices, global LNG supply tightness and Europe's state of high stress due to Russia's gas weaponization could be aggravated by any shipping disruption and spot prices could experience stratospheric levels.

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11. For more details on these issues, follow Ben Seligman's regular LinkedIn updates, or read Tatiana Mitrova's latest analysis, available at: [www.energypolicy.columbia.edu](http://www.energypolicy.columbia.edu).

**Map 1: Global LNG Trade Flows (1Q 2023)**



Source: Leviaton

We have considered in this paper a few scenarios (non-exhaustive):

- **Does the Strait of Hormuz disruption remain a serious threat to global gas trade?**

Threats of Strait of Hormuz closure will continue to make headlines as political instability rises within Iran and a geopolitical rift intensifies with Iran and Russia on one side and Western allies on the other. The recent Chinese brokered reopening of diplomatic relations between Iran and Saudi Arabia can ease immediate risks, but in a very fragile and uncertain manner as long as Iran continues to move always closer to being in a position to develop a nuclear weapon and put it on a missile. Cyber-attacks and/or drone strikes at key oil/gas infrastructures in Saudi Arabia, or aimed at regional U.S. military bases could also lead to a broader conflict. An increase in the frequency of flare-ups could slow down Qatar's expansion. In the event of a Hormuz disruption, some alternative trade flows and shipping routes would gain in importance. The call on U.S. exports would especially increase given its continuous export growth, Asian market access and alternative trading routes (via the Panama Canal or longer routes via the Cape).

The recently announced Iran-Saudi Arabia deal brokered by China reaffirms:

- 1) the fragile stability in the region which remains governed by Great Powers politics;
- 2) the need for China to maintain undisrupted flows of oil and gas at affordable costs to grow its economy and keep its social stability.

Any closure would most probably only last a limited period, but the impact on commodity prices would be huge given that nearly 23% total LNG consumption passes through the strait. Hormuz is one of the most important choke points for LNG trade with more than ~90 Mt of LNG being transported annually (exports from Qatar and Abu Dhabi and imports from Dubai and Kuwait).

Qatar's role as the world's second LNG exporter, controlling 21% of global supply, means that any impossibility to exit its gas could lead to unprecedented volatility in spot LNG prices, while its main customers will need to offset undelivered cargoes with alternative supply. The most vulnerable countries will be China, India, South Korea, Pakistan, Taiwan, and the UK, which were the largest importers of Qatari LNG in 2022. Although Qatar is no longer the world's largest supplier, its 82 Mtpa output remains indispensable to meet rising Asian LNG demand and balance the global LNG market. The market would also feel the lack of exports from the UAE. Abu Dhabi represents only 1.5% of global exports but it has ambitious expansion plans with a new export terminal that would more than double its yearly output of 6 Mt. India, Japan and South Korea were its largest markets in 2022. Interestingly, India is one of the country's most reliant on the Hormuz LNG trade route with 66% of its 2022 LNG imports coming from Qatar and Abu Dhabi and this vulnerability keeps increasing (it was 55% in 2021).

But continuous diversification of routes and supply will diminish the threat over time as importers have learned not to put all their eggs in one source of supply. Japan's reduced reliance on Qatar means a decreased exposure to the Strait of Hormuz. Qatar-Japan trade has decreased 70% in 2022 (due to contracts expiring and lack of renewals), while Australia-Japan trade has increased 10%.

- **Why is there renewed attention to the traffic risks around the Danish Straits?**

The Danish Straits are the three channels connecting the Baltic Sea to the North Sea through the Kattegat and the Skagerrak. Navies from many great powers are already patrolling the area to ensure free flow of oil in the Danish Straits, yet a crisis scenario could include Russian oil spills, a tanker collision, and sabotage of infrastructure for instance. The world still does not know who sabotaged the Nord Stream pipelines.

New FSRUs in the Baltic will bring renewed attention to traffic around the Danish Straits at a time when Finland joins NATO and Sweden is candidate. The Baltic states imported nearly 7 Mt of LNG last year – with Poland and Lithuania as the two largest importers for now – and the region will likely import above 10 Mt in 2023 due to the additions of new import terminals. Although the new FSRUs in the Netherlands, Finland and Germany have experienced a slow start-up and will take months to fully ramp-up, we anticipate higher traffic and increased geopolitical rivalry in this region. Russia has also increased its LNG activity in the region with exports from its Vysotsk and Portovaya LNG plants near St.Petersburg, exiting the Straits to reach further away destinations in the Mediterranean or Asia, and Gazprom plans to build a large LNG terminal at Ust Luga, which is much more uncertain though due to sanctions. There are definitely more crisscrossing of tankers and heightened risks of incidents.

- **Is Gibraltar a new worrying choke point for Europe?**

The Strait of Gibraltar can be easily blocked and as traffic rises collisions could become more frequent. Storms can also impact traffic as well as business at the port which is a popular bunker stop for tankers as well as a site for ship-to-ship operations. The Gibraltar route is crucial to bring Qatari volumes to Northern Europe, specifically the UK and Belgium, which imported 6 Mt and 5 Mt from Qatar respectively in 2022. But it is also key to bring West African LNG to Mediterranean Europe and North African LNG to Western Europe. Interestingly, 30% of U.S. LNG heading to Europe used the Strait of Gibraltar in 2022. As LNG trade in the Mediterranean expands with new import and export infrastructures, it will be critical to monitor congestion and heavy traffic. A few months ago, a LNG tanker and a bulk carrier collided off Gibraltar as they were manoeuvring to exit the port of Gibraltar.

- **Is Panama Canal bottleneck still a concern for the future of U.S. LNG trade?**

The U.S. LNG play built initially its business model around several attributes and one of them was the shorter distance to Asian markets via the Panama Canal. The Panama Canal route remains the most dominant to export U.S. LNG to North East Asia, but alternative routes will continue to gain traction due to costs and arbitrages. Some players have been avoiding the Panama Canal due to fees, congestion or want to keep the flexibility to re-route their cargoes to Europe. For traders, transit bottlenecks at the Panama Canal add costs, mess up fleet rotation/optimization which in turn could hurt U.S. LNG exports.

But Asian anxiety regarding Panama Canal's congestion has been alleviated over the past months given the call on U.S. LNG to Europe. This is great news for proposed U.S. LNG export projects which are marketing their volumes to Asia. But in the meantime, notably Japanese entities looking to diversify routes and move away from Russian LNG have been pushing for



North American West Coast projects. The Panama Canal transit to Asia has become less busy: our GasVista's Leviaton Ai maritime platform picked up 180 cargoes exported from the U.S. to Asia via the Canal in 2022 versus 271 cargoes in 2021. That said, congestion at the Canal is far from being just about LNG, as other segments are often prioritized such as the containers.

Another concern is the growing political and geopolitical risk around the reliability of the Panama Canal which could impact the margin investment decisions of Pacific players in U.S. LNG projects, U.S.-Asia trading routes and flows. The U.S. government, and specifically the U.S. Southern Command, is worried about China's potential military influence in the Panama Canal.<sup>12</sup> Meanwhile the *Wall Street Journal* writes about Panama hosting Russia's war games and political instability in the Central American country.<sup>13</sup>

- **Do tensions in the South China Sea present LNG Trade flow risks?**

Risks to freedom of navigation in the East China Sea, Taiwan Strait and across the South China Sea will continue to make headlines, increasing shipping insurance costs. The South China Sea remains a major route for LNG trade (slightly above 10% of global exports transit it) and is the most used for exports from Qatar and Malaysia. But except for mainland China, Asian LNG importers (existing and future) will prioritize U.S. LNG cargoes with the tacit understanding that U.S. supply will bring route diversification and benefit from U.S. naval protection; Japan has also prioritized Australian LNG over Qatari LNG. While many energy and shipping companies do not anticipate LNG transit route issues in the South China Sea yet, there is a growing risk of escalation due to the Chinese militarization of the zone and higher odds of confrontation between Chinese and U.S./allied navies (e.g. the Philippines navy).

There is growing American concern about Chinese South Sea claims because actions by Beijing could undermine freedom of navigation and current/future trade routes. Vietnam and the Philippines will start importing LNG in 2023, including likely U.S. volumes. The U.S. would be compelled to act if China were to interfere with the freedom of navigation of U.S. cargoes.

Regarding Taiwan, there is no credible threat of a near-term invasion, missile strikes or blockade (but higher risks post-2025) as reunification (peaceful or not) has always been a long-term objective. The deterioration of Beijing-Washington relations and their respective Pacific military build-ups is also creating more anxiety.

Malaysia and Brunei last year exported a combined 22.5 Mt of LNG to Japan, Korea and Taiwan (JKT), of which nearly all transited via the South

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12. J. Grady, "Chinese Investment in Western Hemisphere Raising Concerns for U.S., Says SOUTHCOM Commander", *USNI News*, January 22, 2023, available at: <https://news.usni.org>.

13. M. A. O'Grady, "Is Panama Next for a Hard Left Turn?", *WSJ*, July 24, 2023, available at: [www.wsj.com](http://www.wsj.com).

China Sea, with Japan being the most exposed (15.6 Mt or 245 cargoes in 2022), followed by Korea (6.3 Mt or 90 cargoes in 2022) according to GasVista's Leviaton data.

Meanwhile all of Qatar's exports to JKT transit via the South China Sea which is about 19.6 Mt (or 250 cargoes), with Korea being the most exposed (10.4 Mt or 124 cargoes in 2022), followed by Taiwan (6.3 Mt of 88 cargoes). Interestingly Japan has very little exposure to the South China Sea for Qatari LNG, given its restructuring of long-term LNG portfolio with a diminished reliance on Qatari LNG. But Qatar is hedging ongoing geopolitical risks by maintaining China as its largest LNG customer now and tomorrow.<sup>14</sup>

Only 12% of Australian LNG dedicated to JKT goes through the South China Sea, Taiwan being the most exposed (3 Mt in 2022) to potential disruptions; Korea and Japan respectively received only 1.8 Mt and 1.2 Mt via the South China Sea from Australia.

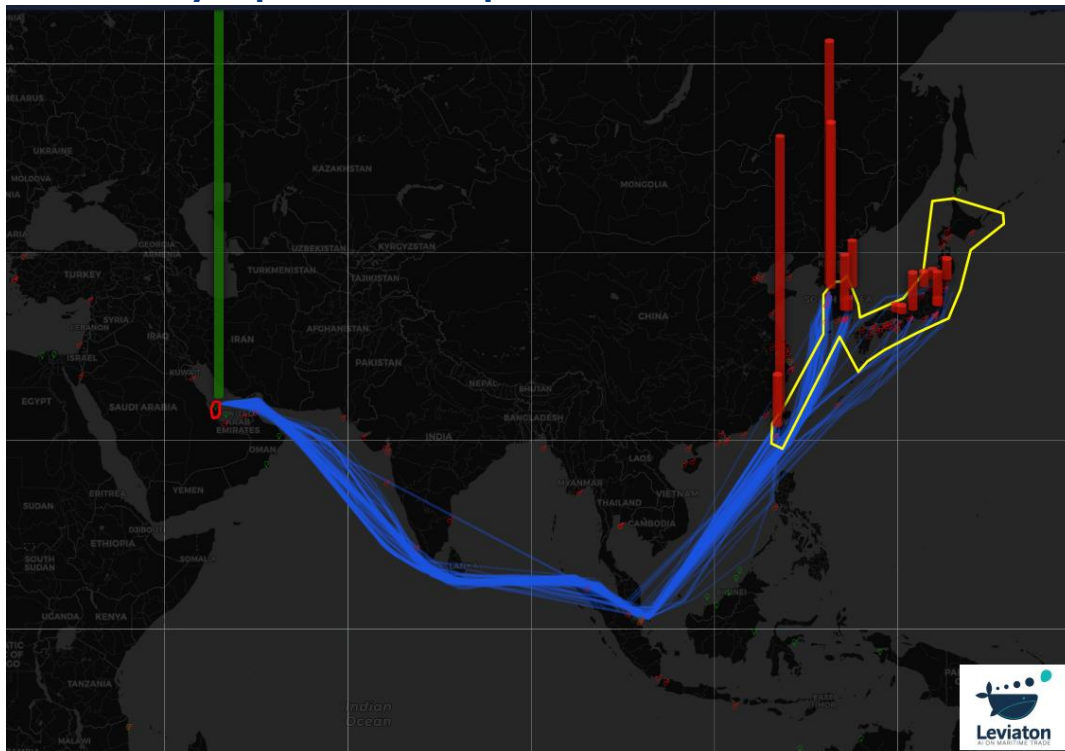
In the event of a war footing in the South/East China Sea/Taiwan strait regions, cargoes will find a way to re-route and reach their destination. If the U.S. imposes an embargo on China, Australia will cease to export to China, obliging the latter to import more from Russia and possibly Qatar. U.S. gas will continue to go to Europe, but it will also offer a safe route to reach Japan and South Korea. Any surplus of Australian supply could head to India and other South Asian countries. Swaps between producers could pick up. It will be important for Taiwan to constitute strategic fuel reserves in anticipation of a blockade.

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14. J. Dargin, "What's at Stake in the Massive China-Qatar Gas Deal", Carnegie, December 29, 2022, available at: <https://carnegieendowment.org>.



## Maps 2: Qatar's Exports to Japan-Korea Taiwan (JKT) Are Very Exposed to Disruptions in the South China Sea



Source: Leviaton

- **The Suez Canal**

The Suez Canal's largest LNG shippers include Qatar (Westward), Russia, Northwest Africa and the U.S. (Eastward). LNG market participants consider the 2021 Suez Canal incident a one-off that won't justify the extra expense of further optimizing shipping or boosting inventories. The LNG trade was only affected at the margins by the brief closure of the Suez Canal because Qatar had enough supply slack in the system, since most buyers have already diversified supply sources and routes; and because traders are accustomed to rerouting/bypassing congested Canals (e.g. Panama) and taking the long route around the Cape, especially when charter rates are low. That said, we can expect the following improvements when the next transportation route crisis occurs:

- ▀ Technology: Accurate and widely available real-time data will provide faster insights on blockades;
- ▀ Swaps: The start-up of Qatar's Golden Pass liquefaction plant in the U.S. will expand its options for swaps in the event of chokepoint obstacles (e.g. blockade of Strait of Hormuz).

- **The geopolitics of the North Sea Route (NSR) is even more palpable after Russia's invasion of Ukraine**

The Russia-China LNG corridor will grow, and the Northern Sea Route could become one of the main routes for this bilateral trade to transport Russia's Arctic LNG to Asia. China has become the largest importer of

Russian LNG in 2022 surpassing Japan and the start-up of Arctic 2 LNG (even if delayed) will consolidate this trade route. The navigation of the route used to be seasonal, however global warming and the melting of the ice will allow for a year-long passage.

However, the Northern shipping route (NSR), which provides an outlet for Russia's Arctic LNG, could become its biggest liability in an ecologically conscious world. Despite Novatek's unchanged ambitious expansion plan to reach 57-70 Mt by 2030, NSR will attract intense environmental criticism. Opponents to use of the route point out that increased vessel traffic in the Arctic will contribute to more CO<sub>2</sub> emissions, while some responsible shipping stakeholders have decided to not engage in business that uses the NSR owing to its contribution to global warming. As gas companies face increased scrutiny over emissions and tracking/monitoring, Novatek and its partners are well aware of the reputational risks associated with the use of the route and will defend its use on the basis of three benefits:

- ▶ Shorter shipping routes reduce total bunker fuel use and greenhouse gas emissions.
- ▶ Offering an alternative to the Suez Canal eases congestion/bottleneck problems;
- ▶ Yamal and Arctic LNG tankers use low-emitting LNG as bunker fuel and their nuclear-powered icebreakers are emissions-free (but not waste-free).

Given the growing competition for 'greener' LNG and the trend towards comparing LNG suppliers by carbon footprint, the standardization of GHG emissions accounting should be a priority for the industry and policy-makers.

## **Production and Availability of LNG Tankers and Implications of Decarbonization of Shipping**

Long-term efforts to cut shipping emissions will strengthen the case for intra-regional trade and shorter routes, slower cargo speed but it may not always be applicable especially when politics prevail. The prioritization of routes between trusted partners could sometimes mean longer and more expensive routes, which can de-optimize global LNG trade flows, can put a strain on LNG tanker availability and make it challenging to meet new International Maritime Organization (IMO) environmental norms and growing pressure to reduce GHG footprint. Overall, the world is set for a surge in LNG tanker demand and shipping yards in Korea and China are all very busy. This increase will feed the growing LNG export capacity in the world, but also help replacing a growing share of aging vessels. GTT, the French leader in membrane technology, reports

162 new orders<sup>15</sup> (with about 640 vessels now in operation), with half of them being built in Korea and China.

LNG shipping capacity will expand by 38% between 2021-2027 which will provide sufficient flexibility for spot trade, winter emergencies and ‘comfortable’ utilization rates. But it will also be important to watch whether more orders will be added in the coming months/years to match additional supply that will enter the market in 2026 and beyond.

2022 was a record year for newbuild LNG carrier orders with China’s shipyards coming out as major winners while South Korean yards still control 75% of new LNG carrier orders for now. The order book for LNG has reached a record in 2022 on the back of the European energy crisis and export project expansions in Qatar and the U.S. A LNG tanker costs roughly \$240-330 million and takes about 3-4 years to get built. At a time when South Korea’s three shipyards are maxing out in terms of capacity, China is ramping up its credibility by opening new yards with LNG shipbuilding expertise; the transfer of technology to China seem for now inevitable. It remains to be seen whether orders placed in China will arrive on time and will match quality standards. There could be a geopolitical backlash brewing and a call for a U.S. Ships Act to break China’s control of the Sea.

Shorter, cheaper and greener LNG transportation are the future, which will reduce the number of tankers needed. For instance, bringing Australian LNG to Europe is carbon intensive and uneconomical and medium-term will be less acceptable when the monitoring of emissions in LNG shipping becomes more commonplace. However Australian cargoes could be swapped so that physical Australian supply remains in the Pacific basin. Swaps are greener than shipping long distance.

However, there could be a scenario in which there is a shortage of clean LNG tankers. EU ETS, IMO’s CII and looming efficiency measurements, could create a three-tier LNG market which will make the oldest most polluting carriers less desirable:

- 1) Steam-turbine tankers (240 carriers) consume a lot of fuel and don’t have boil-off systems ,
- 2) DFDE carriers emit 15 more methane than later engine designs (190 carriers),
- 3) low- and high-pressure two-stroke vessels (215 carriers) are the latest generation; dirtier vessels could be pushed into the Pacific to avoid the EU ETS.

This trend could also trigger less liquidity in the market because there will be more segmentation.

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15. “GTT Investor Presentation: FY 2022 Results, Technology for a sustainable world”, February 17, 2023, available at: [www.gtt.fr](http://www.gtt.fr).

# Conclusion

Overall, 2022 saw the climax so far of the weaponization of energy. In past years, this worrisome trend included Russia's seizure of Crimea and its large offshore gas resources, Russia/Saudi Arabia coordination on oil supplies, Western limited energy technology and investment sanctions following the Crimea annexation, U.S. sanctions affecting Nord Stream 2 amidst efforts by Russia to use this pipeline as a geopolitical tool to fragment Europeans, or a cyber-attack on U.S. oil infrastructure. Building on these precedents, Russia has conducted a sharp escalation: Russia's deliberate attacks on Ukraine's energy infrastructure, using cyber tools first and then in combination with missiles and drones, its hijacking of a nuclear power plant and subsequent blackmail, its cyber-attacks on Western satellites, and ultimately, the Kremlin's move to cut off most European customers from pipeline supplies, in total disrespect, if not violations, of supply obligations. Formal proof of who ordered and conducted the Nord Stream explosions has yet to be presented, and while it is a perfect plot that several stakeholders could have ordered, the idea that Russia cannot be blamed as it would not have destroyed its own infrastructure simply does not hold when considering all the above and the fact that it could have well been looking for a *force majeure* type situation to justify its termination of gas supplies. RePowerEU had the ambition to curtail Russian gas supplies as fast as possible, with an uncomfortable position facing the need to honor long-term gas contracts, but Putin chose to ease European dilemmas by cutting the gas supplies to most of its European customers.

Last but not least, energy has been instrumentalized by Russia in its attempt to destabilize global fertilizer and food supply chains, and put the blame on the West, including for the supply shortfall in global energy markets which the Kremlin has ordered first, as from summer 2021. The European oil embargo, administrative seizure of Russian energy assets in Europe or price cap are coercive measures too, but in response to Russia's blatant violation of international law aggravated by its status of being a UN Security Council Member and the fact it had committed in 1994 to Ukraine's sovereignty when Ukraine, de facto then the world's second nuclear power, chose to denuclearize as it trusted the Budapest Memorandum. But also, a result of the fact that Russian companies were putting security of supply, and economic security, in jeopardy. Next steps might include some additional hurdles for foreign investment in Russia's energy sector, possible forced nationalization of Western assets in Russia and attacks on Europe's critical energy infrastructures, and the subsequent retaliations.

These developments showcase the extent to which energy systems are of strategic importance and are already leading to policy shifts all across the globe, as energy security becomes a top priority alongside assertive industrial policies. For Europe's, this has been an extremely brutal, but needed, awakening, not least also because of their vulnerability to low carbon technology supply chains, and their diverging views on nuclear and hydrogen. Policy responses have been insufficient so far to address these fundamental challenges.

This note has outlined the extent to which LNG is now becoming central to the energy supply security of Europe, but also its evolving role for China, Japan or South Korea. With Russia's war against Ukraine and the West continuing, and Russia's role in this industry uncertain, so are the prospects for this industry to stay immune from the continued serious geopolitical troubles ahead.





27 rue de la Procession 75740 Paris cedex 15 – France

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