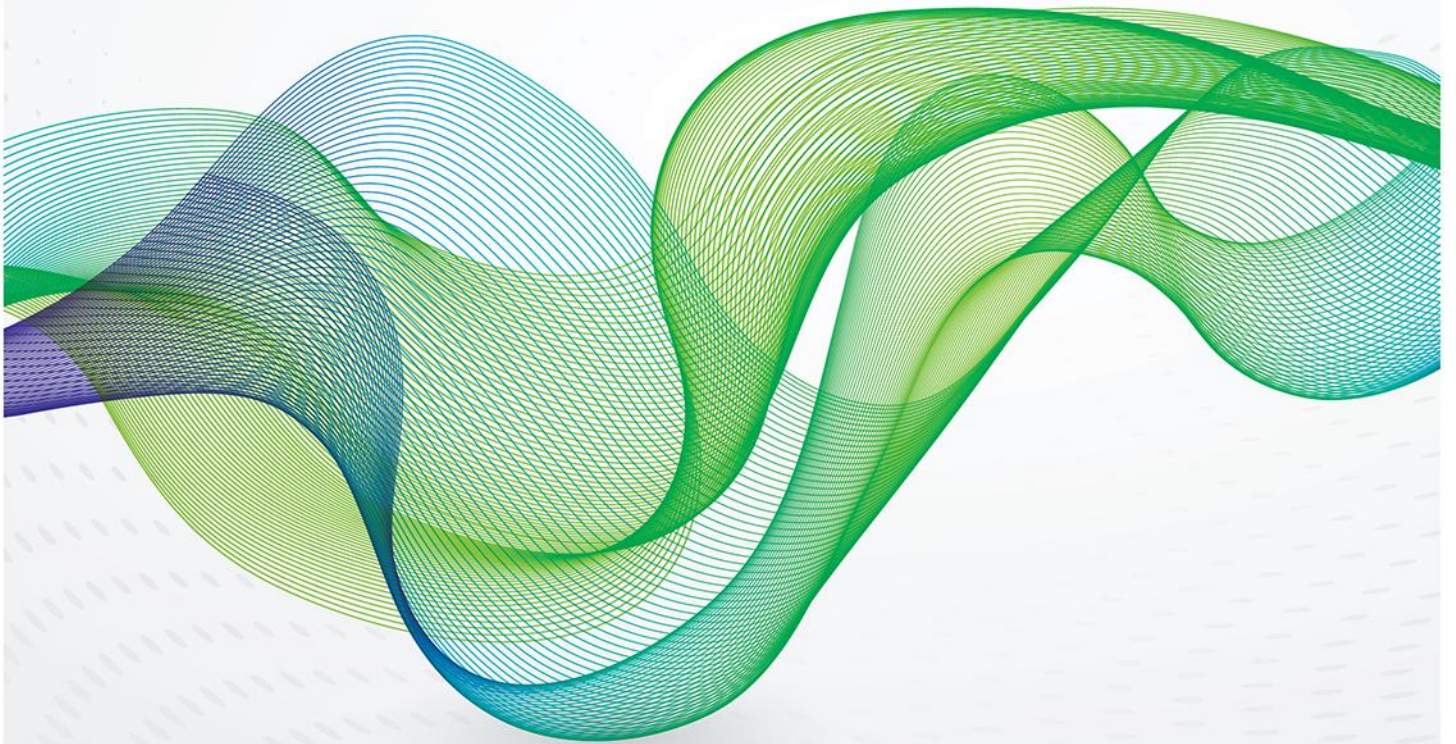


October 2024

Arctic LNG 2: The litmus test for sanctions against Russian LNG



Introduction

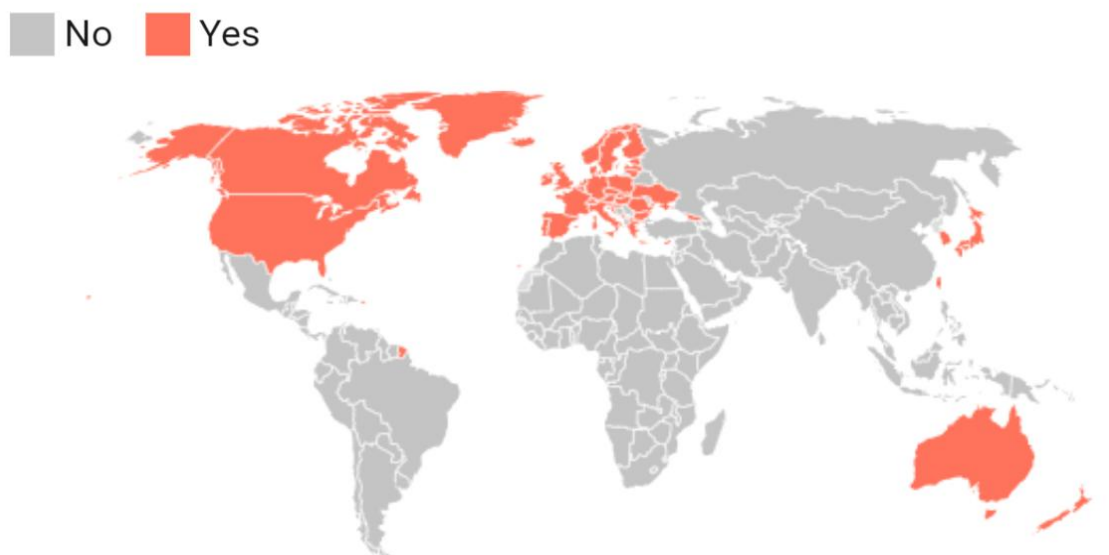
Russia's strategic bet to become one of the 'Big Four' global LNG producers and exporters, alongside Qatar, Australia, and the US, has been interrupted by unprecedented sanctionary pressure on its new LNG projects. The most advanced of these projects, Novatek's Arctic LNG 2 has become a focus point of the most recent rounds of the sanctions by the US and the EU. During 2023-24, despite headwinds resulting from international crises and with a one year delay, the project launched its first 6.6 mt liquifaction train. The second 6.6 mt liquifaction train is at an advanced stage of readiness and could be launched in early 2025. However, output from the plant has remained well below capacity owing to the lack of Arctic class LNG tankers as a result of the sanctions. In August-September 2024, the first shipments of LNG from the project started with the use of the so-called 'shadow fleet' of conventional LNG tankers which can be used during the summer navigation season. At the time of writing, however, there has been no confirmation of any cargoes reaching final customers, and the whole issue of the marketability of LNG from the project is up in the air due to the additional risk of secondary sanctions for potential buyers.

This comment reviews the development of the project amid sanctionary pressure, focusing on three main points of analysis. Firstly, the vulnerability of Russian LNG projects to sanctions is very high due to a complex value chain and multiple dependencies on unique technologies. Secondly, the recent focus of the sanctions on the logistics of the Russian LNG value chain has proven to be especially effective, delaying new projects, reducing their utilization, and increasing transactional costs. Thirdly, the ability of Arctic LNG 2 to market its output using specialized tankers and alternative shipping routes is being compromised. The success or failure of Arctic LNG 2 will prove to be an ultimate litmus test for the progress of Russia's LNG program.

Under pressure: sanctions and their impact on Russia's LNG projects

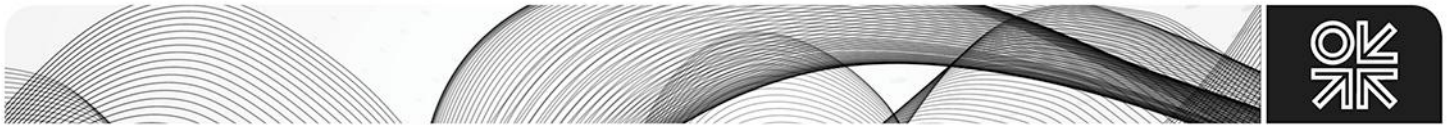
Since Russia's takeover of Crimea in 2014, but especially following the start of the military conflict in Ukraine in February 2022, multiple rounds of sanctions by the US, the EU, and other G-7 countries have been introduced against Russia (See Figure 1).

Figure 1: Countries that introduced sanctions against Russia



Source: Castellum.AI

According to the Castellum.AI sanctions tracker, 2695 sanctions had been introduced before February 2022, and 19,535 more since then, bringing the total to 22,230 as of August 2024. About one-third of these sanctions are against entities, with the remainder against individuals. A total of 237 sanctions



have been introduced on vessels, especially marine vessels.¹ Since energy plays such an important role in the Russian economy, the bulk of these sanctions and trade restrictions have been energy-related and, within the energy sanctions category, many restrictions have specifically focused on Russian LNG projects.

The first wave of sanctions in 2014 was aimed primarily at restricting Western financing for all Russian entities, but also targeted major Russian financial institutions and companies specifically. On 16 July, 2014, the US Treasury imposed sanctions on two major banks (Gazprombank and VEB) and two energy companies (Novatek and Rosneft), by including them in the OFAC sectoral sanction identification list and restricting their access to western financing.² This measure prohibited US individuals from providing new long-term (over 90 days) debt-financing to the designated Russian entities but did not affect any existing debt.³ Similar restrictions on long-term financing for Russian entities were introduced by the EU later in the year.⁴

This was a complication for Novatek, which was trying to put together the financing scheme for its Yamal LNG project at the time. However, after some delay, in 2016 Yamal LNG managed to find an alternative solution by securing a \$12 billion loan from the Export-Import Bank of China and the China Development Bank and also signed a strategic partnership agreement with CNPC on cooperation on the next-in-line Arctic LNG 2 project.⁵ The sectoral sanctions did not prevent Novatek from obtaining the necessary equipment and technologies for its LNG projects and moving ahead with its expansion program.

But the greater wave of sanctions since February 2022 has had a profoundly negative impact on Russia's LNG plans. When the Russian operators of the prospective LNG projects were formulating their growth strategies, they intended to maximize the efficiency of their operations by relying on the best equipment and technologies available in international markets. For much of this procurement, this meant reliance on their American, European, Japanese and Korean counterparts, the undisputed leaders in their market niches. An alternative approach of developing Russian-made substitutes or switching to solutions from 'friendly countries' was not possible, at least not immediately, since the LNG business has a complex value chain requiring highly specialized equipment and technology for which there are no readily available substitutes. This makes LNG potentially vulnerable to sanctions in ways that could slow down the progress of many projects, if not derail them altogether. Russian companies have attempted some import substitution, but this has been a slow and painful process with limited success to date, given the unexpectedly short-time frame for adjustment occasioned by unfolding geopolitical events.

The sanctions imposed by the US, the EU, and their allies have exposed multiple weak links in Russia's LNG value chain, as far as critical dependence on Western liquefaction technology and equipment is concerned. A ban on Western liquefaction technology and equipment supplies was included in the fifth package of European sanctions against Russia introduced on 8 April 2022. Its scope involved the supplies under effective contracts signed before 26 February 2022, for which Russian importers have already made payments; such supplies had to be terminated by 27 May 2022.⁶

In compliance with the sanctions, the European companies involved in the Russian LNG projects have terminated their operations and exited the country, losing profitable businesses and booking substantial financial losses. Shell – the owner of a proprietary dual mixed refrigerant liquefaction technology – was the operator at the first LNG plant in Russia on Sakhalin, in operation since 2009. It was the only foreign operator of an LNG project in Russia, but it exited in summer 2022 in response to the war,⁷ although –

¹ <https://www.castellum.ai/russia-sanctions-dashboard>

² <https://home.treasury.gov/news/press-releases/jl2572>

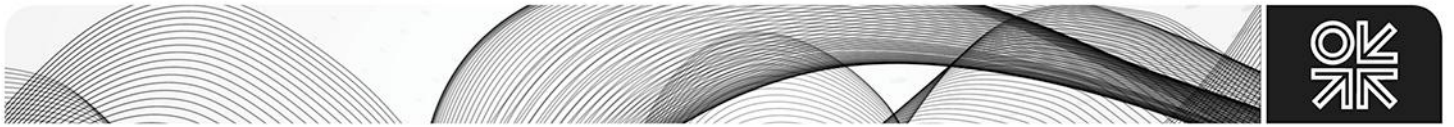
³ <https://sanctionsnews.bakermckenzie.com/us-announces-new-sectoral-sanctions-targeting-russias-financial-services-and-energy-sectors-sixth-round-of-ukraine-related-designations-and-strengthened-us-export-controls-targeting-russia/>

⁴ <https://www.theguardian.com/world/2014/jul/29/economic-sanctions-russia-eu-governments>

⁵ <https://www.highnorthnews.com/en/china-expand-role-novateks-arctic-gas-development>

⁶ Ashurst, "Russia Sanctions Tracker – EU", 2 May 2024, www.ashurst.com/en/insights/eu-sanctions/.

⁷ Will Mathis, "Shell walks away from major Russian LNG project with nothing", Bloomberg, 1 September 2022, www.bloomberg.com/news/articles/2022-09-01/shell-walks-away-from-major-russian-lng-project-with-nothing.



helpfully for its Russian partner Gazprom – the 9.6 mt plant had gone through an extensive maintenance programme in 2021⁸ and so was in fairly pristine condition when its major Western partner departed. Shell recorded overall losses of about \$5 billion from its withdrawal from Russia.⁹

TotalEnergies announced its withdrawal from playing an active role in the development of new Russian projects and removed its representatives from Novatek’s board of directors, although it retained its shareholding position in the existing Yamal LNG project (where it has a 20 per cent stake). TotalEnergies booked about \$11 billion impairment losses for its interrupted Russian business in 2022.¹⁰

Japanese companies involved in Russian LNG projects in the Far East and the Arctic also said that they would keep their interests, citing the energy security interests of Japan. Less surprisingly, the Chinese partners (CNPC, China National Offshore Oil Corporation, and the Silk Road Fund) have reiterated their commitment to Russian LNG. As a result, at the time of writing, the existing Russian large-scale LNG plants under Russian operatorship (Yamal LNG and Sakhalin LNG) have been able to continue operations for over two years under sanctions and have undergone two regular annual maintenance cycles without any apparent problems relating to equipment functioning and/or technology.

Nevertheless, the comprehensive ban on the export of LNG technology to Russia has increased the level of uncertainty over the future of Russia’s LNG programme. The Russian authorities and LNG project developers have insisted that they will proceed with their plans regardless of Western pressure. Novatek has managed to develop its own medium-scale liquefaction technology called Arctic Cascade and has successfully implemented it at the 1 mt Train 4 of Yamal LNG (after some initial delays). Building on this foundation, in April 2023 Novatek also patented an ‘Arctic cascade modified’ technology capable of producing 3 mtpa,¹¹ and then in June 2023 it announced that it had also obtained a patent for its own large-scale liquefaction technology called ‘Arctic Mix’, which is capable of producing 6 mt of LNG per train using domestically-produced equipment.¹² However, any claims of technological independence in the large-scale liquefaction process are yet to be confirmed, with the proof coming only if these domestic Russian solutions are successfully implemented in tangible future projects.

The key issues for both Russia and the west concern future project developments, and in tacit recognition that the embargo on Western technology and equipment may only slow down, rather than halt, Russia’s progress, the US has adjusted the application of its sanctions to focus on the logistics part of the LNG value chain. The goal is to hamper the marketing of Russian LNG and to increase transactional costs by sanctioning the LNG tankers that have been ordered for new Russian projects and also those that have been involved in transportation of LNG from these new ventures.

Russia’s success in re-directing its crude oil and refined product exports from the EU to India and China in 2022-23 would seem to suggest that isolating Russia and preventing it from conducting marine energy trade is not easy. Russia has been very successful at skirting sanctions on liquids exports: the so-called ‘shadow fleet’ of oil tankers that Russian companies put together has allowed Russia to circumvent the price cap and the limitations on Western insurance services.

But LNG shipping is another issue entirely. In contrast with the situation in the marine transportation of oil and products where about nine thousand tankers operate, creating a similar ‘shadow fleet’ of LNG tankers is going to be extremely challenging for the Russian LNG project operators. According to the International Group of Liquefied Natural Gas Importers (GIIGNL) 2024 report, the global fleet of LNG carriers consisted of just 772 vessels in the end of 2023.¹³ The pool from which Russia could draw used

⁸ Stuart Elliott, “Russia’s Sakhalin Energy resumes LNG production at Sakhalin-2 after turnaround”, S&P Global, 18 August 2021, www.spglobal.com/commodityinsights/en/market-insights/latest-news/lng/081821-russias-sakhalin-energy-resumes-lng-production-at-sakhalin-2-after-turnaround.

⁹ <https://www.reuters.com/business/energy/shell-write-down-up-5-bln-after-russia-exit-2022-04-07/>

¹⁰ <https://www.wsj.com/articles/totalenergies-books-new-3-1-billion-impairment-on-russia-assets-11666871524>

¹¹ www.novatek.ru/en/press/releases/index.php?id_4=5669.

¹² www.novatek.ru/en/press/releases/index.php?id_4=5798.

¹³ <https://giignl.org/giignl-releases-2024-annual-report/>

LNG tankers is therefore relatively small and these vessels can be identified and followed. Modern satellite ship tracking systems enable the monitoring of LNG carriers even when they choose to switch off their transponders, making sanctions avoidance challenging.

Even if the comprehensive sanctions on the transportation of Russian LNG fail to stop new projects completely, they could result in the reduction of utilisation rates for the liquification plants and worsen the economics for new Russian projects. The real test case for this latest approach has been Novatek's new addition to the portfolio, Arctic LNG 2. It is now in the US's cross-hairs and the administration has stated publicly its aim to 'kill the project'.¹⁴

Novatek's plans for LNG in the Russian Arctic

Having successfully launched the 17.4 mt Yamal LNG, in September 2019 Novatek took FID and moved ahead with its next big project, the 19.8 mtpa Arctic LNG 2, located on the other side of the Ob' Bay in shallow waters offshore the Gydan peninsula, with an estimated capex of \$21.3 billion.¹⁵ The supply base for the project is the Utrenneye gas field with 847 bcm of A1+B1+C1 reserves as of 1 January, 2023, according to Russia's Ministry of Natural Resources. Novatek's license for the field runs through the year 2120.

In an attempt to replicate the success of Yamal LNG in bringing together an international consortium comprising one international company with LNG expertise (TotalEnergies), one major buyer of LNG (CNPC from China), and one major source of finance (the Silk Road Fund, whose investment opened the way for Chinese lenders to cooperate with the project), the shareholding structure of Arctic LNG 2 has evolved essentially along the same lines, with the addition of Japanese companies which were seen as future buyers of LNG as well as equipment providers to the project.

Table 1: Shareholder structure of Novatek LNG projects

<u>Stakeholders</u>	<u>Country</u>	<u>Interest (%)</u>
Yamal LNG		
Novatek	Russia	50.1%
TotalEnergies	France	20.0%
CNPC	China	20.0%
Silk Road Fund	China	9.9%
Arctic LNG 2		
Novatek	Russia	60.0%
TotalEnergies	France	10.0%
CNPC	China	10.0%
CNOOC	China	10.0%
Japan Arctic LNG (JOGMEC/Mitsui)	Japan	10.0%

Source: Author, based on Novatek public releases

A consortium of TechnipFMC, Saipem, and NIPIGAS (Russia) was awarded the contract on engineering, procurement, and construction of the LNG plant, with the design and construction of gravity-based structures (GBS), the floating alternatives to building the foundation for the plant on unstable permafrost, to be built by the Russian company SAREN, a joint venture of RHI Russia and Saipem. The prefabricated modules of the liquefaction trains will be assembled on top of GBS.

¹⁴ Charles Kennedy, "Russia shrugs off Arctic-2 LNG sanctions as Putin eyes 2024 on the throne", *Oil Price*, 6 November 2023, <https://oilprice.com/Latest-Energy-News/World-News/Russia-Shrugs-Off-Arctic-2-LNG-Sanctions-As-Putin-Eyes-2024-On-The-Throne.html>.

¹⁵ https://www.novatek.ru/en/press/releases/index.php?id_4=3405

Logistical challenge for Russian Arctic LNG projects

From its projects on Yamal and Gydan in the Russian Arctic, Novatek can ship west towards Europe or east towards Asia, but difficult ice conditions on either route would introduce a major complication for the marketing of the LNG. The company has developed a marketing strategy that requires the creation of a specialized fleet of the highest Arctic class LNG carriers (the so-called Arc7s), capable of navigating through thick ice on their own (albeit at a reduced speed). The Russian government, keen on developing the riches of the Russian Arctic and establishing navigation channels via the Northern Sea Route, has actively been investing in the creation of the port infrastructure and boosting the capabilities of the fleet of the nuclear ice-breakers.¹⁶

But even with the use of Arc7 LNG tankers assisted by nuclear ice-breakers, the eastbound route is available only for a limited time during the summer navigation season, normally July through November. Novatek has experimented with expanding this window by testing shipments commencing as early as May and ending as late as December/January in warmer years, but these have remained opportunities rather than standard operations.

When delivered via the Northern Sea Route, the delivery time from Yamal to China is comparable to delivery times from Qatar and the west coast of the US, but longer than delivery times from Australia and Indonesia. By comparison, the journey from Yamal to China via Europe, the Suez Canal, Gulf of Aden, and Strait of Malacca is far longer. (See Figure 2)

Figure 2: Export routes from Yamal LNG to Asia and routes from competing suppliers

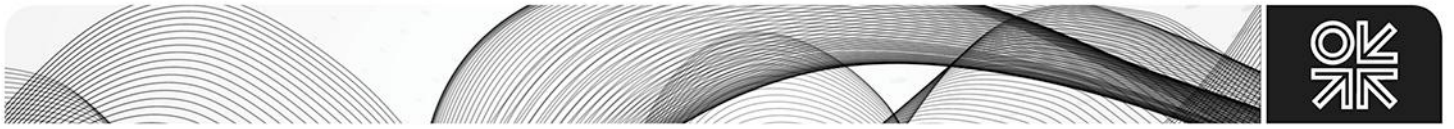


Source: Novatek¹⁷

As the map from Novatek illustrates, this has a substantial impact on the commercial viability of such deliveries: Novatek estimates the cost of delivery from Yamal to China via the Northern Sea Route at 2.2 USD/MMBtu, and the cost of delivery via Europe at 2.8 USD/MMBtu. Both of these are substantially more expensive than the costs of delivery from Qatar, Australia, and Indonesia, which Novatek

¹⁶ See Yermakov V. and Yermakova A. *The Northern Sea Route: A State Priority in Russia's Strategy of Delivering Arctic Hydrocarbons to Global Markets*, Oxford, 2021
<https://www.oxfordenergy.org/publications/the-northern-sea-route-a-state-priority-in-russias-strategy-of-delivering-arctic-hydrocarbons-to-global-markets/>

¹⁷ Novatek, 2021. *Unlocking Our Arctic Resources: Decarbonizing Our Footprint*. Investor Presentation, May 2021.
https://www.novatek.ru/common/upload/doc/IR_May_2021_Investor_Meetings_updated.pdf (see page 14)



estimates at 0.64-0.72 USD/MMBtu. Despite the shorter distance compared to delivery via Europe, the Northern Sea Route requires the use of ice-class LNG carriers, and (often) the support of icebreaker vessels, which adds to the cost of delivery.

The current LNG tanker fleet for Yamal LNG comprises fifteen Arc7s and eleven conventional LNG carriers. The Arc7 LNG carriers were built in South Korea at a total cost of about US\$5 billion (approximately US\$333 million per ship), custom-designed for the Yamal LNG project, each with a capacity of 170,000 cubic metres of natural gas, and measuring 299 metres in length and 50 metres in width. They are powered by 45 MW engines which can be fueled by either marine fuel oil, diesel, or LNG, and can travel at a speed of 19.5 knots in open water and at a reduced speed of 5.5 knots through sea ice up to two metres thick. The Azipod propulsion system allows them to move forward and astern through ice, greatly increasing their capabilities for independent travel through ice in the Arctic seas.¹⁸

Arctic LNG 2 had planned to order the construction and charter of twenty one LNG Arc7 carriers (one per 1 mtpa of the plant's expected output) with an improved design and better ice-breaking characteristics. Given the unique operating conditions of the project, the vessels are of a unique design and are almost twice as expensive as conventional LNG carriers.

Against all odds

Arctic LNG 2 was already well underway when the sanctions hit. At the end of 2021, the project was estimated to be 59 per cent complete, with progress on the construction of the first LNG train estimated as 78 per cent complete.¹⁹ The project operator had managed to procure most of the critical equipment for Train 1 and a significant portion for Train 2, including cryogenic heat exchangers, gas turbines, and the compressors for the liquefaction trains, prior to the start of the war in Ukraine, which allowed the project to proceed even amid the introduction of technological sanctions against Russian LNG projects. As the war in Ukraine started, Novatek swiftly procured the remaining critical equipment necessary to finalize the construction of Train 1, ensuring that Trains 2 and 3 could also proceed. The company stated it had managed to obtain most of the necessary equipment apart from the powerful gas turbines which were originally contracted to Baker Hughes. Out of the total of twenty contracted turbines, four had been delivered by Baker Hughes. Arctic LNG 2 therefore had to re-design Train 1 to run with four gas turbines rather than six.

Novatek used the APC3MR technology made by Air Products for its Yamal LNG plant, but after the US introduced sanctions against Russia, it turned to the mixed fluid cascade technology made by Germany's Linde for its next project, Arctic LNG 2. It had also engaged France's Technip as an EPS contractor. However, both Technip and Linde terminated their EPS contracts for Arctic LNG 2,²⁰ leading to critical interruptions in the supply of gas turbines. After reviewing alternatives, Novatek has changed the concept for Trains 2 and 3 and plans to build a power plant on site that will provide electricity for electric power drives instead of the previously planned gas turbines to run compressors, pumps and other equipment.²¹ The new provider of gas turbines is China's Harbin Guanghai Gas Turbine Company; the Chinese turbines are apparently less efficient but for Novatek the expediency and ability to meet the project deadlines was a more important factor.²²

Electrification of Arctic LNG 2 was estimated to increase capital expenditure for the project from \$20 billion to \$22+ billion, but should result in lower operating costs for the project, according to Novatek.²³ Electrification of Trains 2 and 3 will also dramatically reduce the greenhouse gas emissions from the project, making Novatek's LNG 'greener' than most of its competitors.

¹⁸ <http://yamallng.ru/en/project/tankers/>

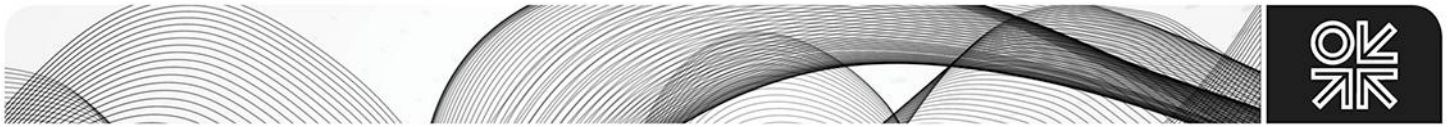
¹⁹ [www.novatek.ru/common/upload/doc/CC_2022\[2\].pdf](http://www.novatek.ru/common/upload/doc/CC_2022[2].pdf).

²⁰ Energy Intelligence, "Technip, Linde continue Russian exit", 28 July 2022, www.energyintel.com/00000182-456a-dab7-adce-cdfa55ae0000.

²¹ Interfax, "Novatek to order 1,500MW power plant for Arctic LNG 2 from China's Wison", 16 May 2023, <https://interfax.com/newsroom/top-stories/90530/>.

²² <https://www.highnorthnews.com/en/china-supply-key-turbines-novateks-arctic-lng-2>

²³ <https://tass.com/economy/1635639>.



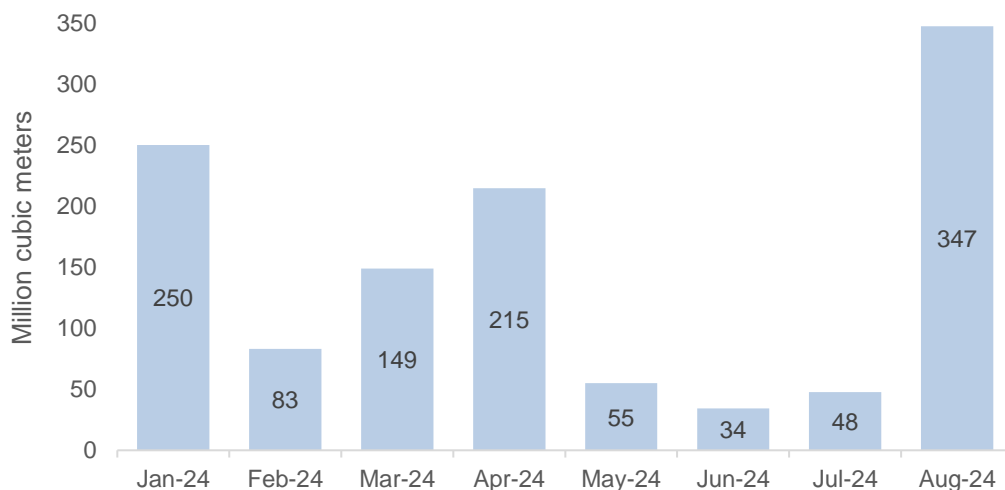
The modules of the power plant for Train 2 have been constructed by China's Wison New Energies. In an apparent attempt to shield itself from the threat of US sanctions, Wison announced in June 2024 that it would cease cooperation with Russia by selling its interest in Zhoushan Wison Offshore & Marine Limited, the yard where the modules for Arctic LNG 2 have been built.²⁴ The ships carrying several modules for Train 3 which were already en route to Belokamenka near Murmansk have made about turns and returned to China.²⁵

The Zhoushan yard, however, has apparently continued work on constructing the power generating modules for Arctic LNG 2, and an elaborate scheme has been developed to deliver them to Russia, that involved using six vessels, unloading and reloading the modules in various Chinese ports to obscure their origin, and renaming as well as repainting vessels mid-voyage, to create plausible deniability for any connection with Wison. At the end of September 2024, several vessels carrying power generating modules departed from the Chinese port and have been heading toward Arctic LNG 2 site via the Northern Sea Route.²⁶

Meanwhile, during the navigation season of summer 2023, Novatek towed the giant gravity-based structure (GBS) with its pre-assembled topside modules for Train 1 from the construction facility near Murmansk to the site of Arctic LNG 2 on the Gydan peninsula in the Russian Arctic.²⁷ The company succeeded in finalizing the construction of the first 6.6 mtpa train of Arctic LNG 2 in December 2023. During 2024, work on Train 2 continued, and in August 2024 the second GBS with pre-assembled topside modules was towed to Gydan and work started on connecting it to the field, with the launch of Train 2 expected in early 2025, bringing the operating nameplate capacity of Arctic LNG 2 to 13.2 mtpa. However, the plant most likely will not be able to utilize this capacity for an extended period of time, primarily due to the limitations on the logistics of the disposal of the output.

Notwithstanding the readiness of Train 1, Arctic LNG 2 gas production remained limited until August, when it jumped on the first shipments of LNG from the project. (See Figure 3)

Figure 3: Arctic LNG 2 monthly gas output



Source: Kommersant daily citing materials from Russia's Ministry of Energy²⁸

The realization of the growing mismatch between the production capacity of Arctic LNG 2 and its ability to dispose of its output has apparently made Novatek postpone Train 3 of Arctic LNG 2 to 2028²⁹ and concentrate on the better utilization of the capacity of the first two trains. To achieve this, Novatek needs

²⁴ <https://www.highnorthnews.com/en/chinese-wison-new-energies-ceases-work-russias-arctic-lng-2-project>

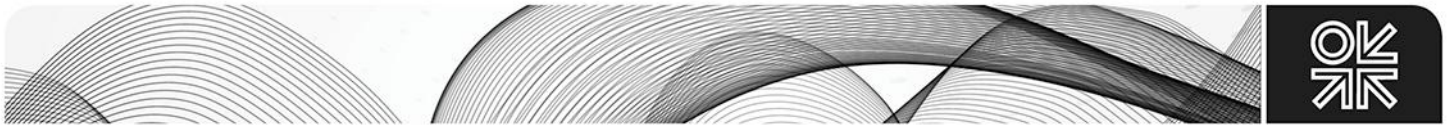
²⁵ <https://gcaptain.com/u-s-sanctions-send-russian-lng-modules-back-to-chinas-wison-yard/>

²⁶ <https://www.highnorthnews.com/en/inside-elaborate-scheme-transport-chinese-power-plant-russias-arctic-undetected>

²⁷ www.novatek.ru/en/press/releases/index.php?id_4=5927.

²⁸ <https://www.kommersant.ru/doc/7183418>

²⁹ <https://www.rbc.ru/business/22/08/2024/66c5d7e39a794747eccfaa4f>



to bring up to speed the construction of the two Arc7s at the Zvezda shipyard that are nearest to completion. In June 2024 Novatek relocated 200 engineers and skilled personnel from Murmansk to the Zvezda shipyard to facilitate the construction of Arc7s there. This is expected to allow the first two LNG carriers to start operations at the end of 2024/beginning of 2025, which in combination with FSUs might help Arctic LNG 2 to utilize about half of the capacity of its first liquification train.³⁰

The curse of the Arc7s

Under the original scheme Arctic LNG 2 had planned to charter twenty one LNG carriers (one per 1 mtpa of the plant's expected output): fifteen from the Russian Zvezda shipyard and six from Korea's Hanwha Ocean. But the unavailability of the planned number of Arc7s owing to sanctions is going to be an ongoing problem for the project.

The order at Hanwha Ocean was placed in October 2020 and comprised the vessels ordered by the prospective shippers from Arctic LNG 2: three for Sovkomflot and three for Mitsui OSK Lines (MOL) to be completed and delivered by 31 July, 2023. The US sanctions against Sovkomflot prevented the payment for the vessels and ultimately blocked their delivery. Hanwha Ocean cancelled the initial contract with Sovkomflot and ended up with three completed expensive Arc7s for which it could not find alternative buyers.³¹ The other three LNG carriers for MOL were not sanctioned, and their construction continued and has been finalized, but these also now cannot be chartered for Arctic LNG 2 due to the sanctions on the project and finding alternative buyers has proven to be problematic.³²

These six Arc7s were supposed to be used for shipping the output from Train 1 of Arctic LNG 2, so when they became unavailable, the shareholders with offtake contracts in proportion with their interest in the project (60 per cent for Novatek and 10 per cent each for TotalEnergies, CNPC, CNOODC, and the consortium of Mitsui and Mitsubishi) had to announce force-majeure to avoid contractual penalties for non-delivery.³³

The Arc7s in construction at the Zvezda shipyard, which is owned by Rosneft and is located in the far east of Russia, were scheduled for delivery in line with the expected launch of Train 2 at the end of 2024. While the Russian shareholders intended to eventually create their own advance shipbuilding capabilities, initially they had to rely on technological support from Korea's Samsung Heavy Industries (SHI) for the construction of the most challenging blocks of the ships, as well as on the French firm GTT for the construction of gas membranes, and on European marine engine manufacturers MAN and Wärtsilä for the Azipod thrusters and other propulsion elements.

On 3 January, 2023 GTT, the world's only supplier of marine membrane containment systems used in LNG tankers, a key component of the vessels, announced that it was ceasing its activities in Russia, in compliance with the EU's 8th and 9th packages of sanctions on the provision of engineering services.³⁴ At the time of the announcement the membranes were apparently already installed in two of the Arc7 LNG carriers at Zvezda: 'Alexey Kosygin' and 'Pyotr Stolypin'.³⁵ During 2023-24 three more Arc7 LNG tankers were launched at Zvezda ('Sergey Witte', 'Konstantin Posyet', and 'Victor Chernomyrdin'). It appears that at least the first two Arc7 LNG carriers are going to be ready by the beginning of 2025 at Zvezda and could be used to ship output from Train 1 of Arctic LNG 2 in combination with regular LNG carriers, with the latter option possible when ice conditions allow. (See Table 2)

³⁰ <https://www.highnorthnews.com/en/russian-shipyard-deliver-critically-needed-arc7-lng-carriers-arctic-lng-2>

³¹ <https://gcaptain.com/us-sanctions-block-lng-carriers-for-russian-arctic-project/>

³² <https://www.bloomberg.com/news/articles/2024-02-06/us-sanctions-halt-delivery-of-new-vessels-to-russian-lng-plant>

³³ <https://www.upstreamonline.com/lng/sanctions-bite-at-russia-s-arctic-lng-2-project-as-foreign-shareholders-suspend-involvement/2-1-1576378>

³⁴ <https://gtt.fr/news/ukraine-russia-update-gtts-exposure>

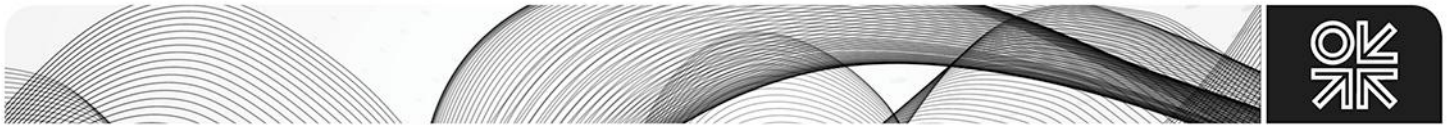
³⁵ <https://www.highnorthnews.com/en/french-engineering-company-exits-cooperation-russian-shipyard>

Table 2: Arc7 LNG carriers ordered for Arctic LNG 2 project

	<u>Name</u>	<u>Shipyard №</u>	<u>IMO</u>	<u>Korean Partner</u>	<u>Ship Owner</u>	<u>Notes</u>
1	Alexey Kosygin	Zvezda 041	9904546	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Delivered to Zvezda, but subject to US sanctions
2	Pyotr Stolypin	Zvezda 042	9904675	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Delivered to Zvezda, but subject to US sanctions
3	Sergei Witte	Zvezda 043	9904687	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Delivered to Zvezda, but subject to US sanctions
4	Konstantin Posyet	Zvezda 044	9904699	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Delivered to Zvezda, but subject to US sanctions
5	Viktor Chernomyrdin	Zvezda 045	9904704	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Delivered to Zvezda, but subject to US sanctions
6	-	Zvezda 046	9918779	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
7	-	Zvezda 047	9918781	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
8	-	Zvezda 048	9918793	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
9	-	Zvezda 049	9918808	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
10	-	Zvezda 050	9918810	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
11	-	Zvezda 051	9918822	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
12	-	Zvezda 052	9918834	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
13	-	Zvezda 053	9918846	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
14	-	Zvezda 054	9918858	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
15	-	Zvezda 055	9918860	Samsung Heavy Industries (SHI)	Smart LNG (Novatek-Sovcomflot JV)	Contract cancelled
16	Pyotr Kapitsa	-	9918004	Hanwha Ocean (formerly DSME)	Sovcomflot	Contract cancelled
17	Zhores Alferov	-	9918028	Hanwha Ocean (formerly DSME)	Sovcomflot	Contract cancelled
18	Lev Landau	-	9918016	Hanwha Ocean (formerly DSME)	Sovcomflot	Contract cancelled
19	Ilya Mechnikov	-	9918030	Hanwha Ocean (formerly DSME)	Mitsui OSK Lines (MOL)	Cannot be delivered
20	Nikolay Basov	-	9918042	Hanwha Ocean (formerly DSME)	Mitsui OSK Lines (MOL)	Cannot be delivered
21	Nikolay Semenov	-	9918054	Hanwha Ocean (formerly DSME)	Mitsui OSK Lines (MOL)	Cannot be delivered

Source: Kpler

However, this would still leave a significant shortage of Arctic class LNG tankers even for the transportation of Novatek's 4 mtpa share of the output from Train 1, so Novatek has decided to increase the turnover of its dedicated fleet by shortening the effective route distance to cover only the ice-covered zone – where the ability of Arc7s to independently travel through ice really matters – and then reloading to conventional LNG tankers that can navigate the open sea for the rest of the journey to the final market



destinations. To this end, Novatek has created two reloading facilities comprising newly built 361,000 cubic metre floating storage units (FSUs), one near Murmansk (the Saam FSU), on the westbound route from Yamal,³⁶ and the other (the Koryak FSU) off the coast of Kamchatka, on the eastbound route.³⁷

The FSU vessels arrived at their sites in Summer 2023 and have been ready to start reloading operations since then.³⁸ However, on 14 September 2023, the US imposed sanctions on Arctic Transshipment LLC, the operating company for Novatek's FSUs.³⁹ Any vessel loading at the FSUs will be subject to sanctions and EU ports will deny them entry. Additional sanctions were then imposed in November 2023 targeted at any companies trading Russian LNG from Arctic LNG 2. This direct attempt to limit the sales of Russian LNG underlines how serious the US is in its goal of preventing the new Russian LNG projects from progressing, even if the technology to build them may now be available.

A game of cat and mouse

During the summer of 2024, Arctic LNG 2 started the first shipments from the project with the shadow fleet of conventional second-hand LNG tankers. These vessels are not ice-class, so their use for the project is limited to the summer window, from July to October. The seven ships were identified and put on a SDN list by the US at the end of August 2024, along with the three entities under which they were registered in China, India, and UAE.⁴⁰

Three LNG carriers in particular, 'Pioneer', 'Asya Energy', and 'Everest Energy', managed by India-based Ocean Speedstar Solutions, have been suspected of loading cargos at Arctic LNG 2 while deliberately falsifying their positional data (so-called 'AIS Spoofing'). The first one occurred on 1 August, when 'Pioneer' was spotted next to the Train 1 floating structure.⁴¹ The second call at Arctic LNG 2 happened on 10 August 10, when 'Asya Energy', a Moss-type spherical cargo LNG tanker docked next to Train 1.⁴² The third loading took place on 25 August, by 'Everest Energy'.⁴³ Apparently, Train 1 is not working at full capacity and currently can only load four LNG tankers per month. It was reported that five loadings at Arctic LNG 2 might have taken place as of the middle of September.⁴⁴

The loaded ships might attempt open water LNG ship-to-ship direct transfers to non-sanctioned LNG carriers or offload at the FSUs near Murmansk and off the coast of Kamchatka, assisted by AIS spoofing. Apparently, all these options have been adopted, according to satellite surveyance. On August 26, 'Pioneer' was spotted performing what looked like a ship-to-ship re-loading in the Mediterranean, nineteen miles off Port Said on the Egyptian coast. The alleged receiving vessel was identified as 'New Energy', an LNG carrier not sanctioned at the time and managed by recently-incorporated India-based Plio Energy Cargo Shipping.⁴⁵ However, on 30 September 'Pioneer' went through Suez Channel fully loaded and heading for Asia, so the suspected ship-to-ship transfer to 'New Energy' might have been a false report.⁴⁶ 'Asya Energy' and 'Everest Energy' made short trips to offload their cargos at the Murmansk floating storage terminal and returned to Gydan for new loadings.⁴⁷ 'Everest Energy', after loading its cargo, completed a trip via the Northern Sea Route and approached

³⁶ Malte Humpert, "New LNG storage hub set to accelerate flow of Russian gas to Europe", *High North News*, 30 June 2023, www.highnorthnews.com/en/new-lng-storage-hub-set-accelerate-flow-russian-gas-europe.

³⁷ *Financial Tribune*, "New LNG storage hub to hasten Russian gas delivery to Europe", 2 July 2023, <https://financialtribune.com/articles/energy/118914/new-lng-storage-hub-to-hasten-russian-gas-delivery-to-europe>.

³⁸ *Energy Intelligence*, "Novatek FSU arrives at Kamatcha LNG terminal", 14 July 2023, www.energyintel.com/00000189-53fa-d10f-adfd-53fa27230000.

³⁹ *Energy Intelligence*, "US sanctions hit Russia's Arctic LNG 2, Transshipment Projects", 14 September 2023, www.energyintel.com/0000018a-94de-dbc0-a7fb-9dfe4ed80000.

⁴⁰ <https://www.woodmac.com/news/opinion/the-us-broadens-sanctions-against-arctic-lng-2/>

⁴¹ <https://eadaily.com/en/news/2024/08/12/a-gas-carrier-with-sanctioned-russian-lng-went-away-from-european-eyes>

⁴² <https://qcaptain.com/blink-and-youll-miss-it-russia-deploys-second-stealth-lng-tanker-to-sanctioned-gas-project/>

⁴³ <https://www.upstreamonline.com/lng/third-cargo-loaded-at-russian-lng-scheme-despite-new-us-sanctions/2-1-1699453>

⁴⁴ <https://www.reuters.com/markets/commodities/tanker-russias-arctic-lng-2-completes-voyage-via-northern-sea-route-data-shows-2024-09-19/>

⁴⁵ <https://www.energyconnects.com/news/oil/2024/august/tanker-carrying-sanctioned-russian-lng-tries-ship-transfer/>

⁴⁶ <https://www.reuters.com/world/middle-east/sanctioned-tanker-with-lng-cargo-passes-via-suez-canal-data-shows-2024-09-30/>

⁴⁷ <https://cyprusshippingnews.com/2024/09/10/tanker-linked-to-sanctioned-firm-berths-at-russias-arctic-lng-2-plant-data-shows/>



Koryak FSU on 19 September 2024.⁴⁸ As of the middle of October, four LNG tankers loaded with liquified gas from Arctic LNG 2 project are at sea in the Asia-Pacific region, according to Kpler⁴⁹.

As the extreme scrutiny surrounding the vessels suspected to be part of Russia's shadow LNG fleet indicates, avoiding sanctions might prove to be extremely challenging. The US authorities have demonstrated their willingness to apply pressure on vessels and entities at the slightest hint of their connection with Arctic LNG 2, not waiting to see hard evidence. In record time, on 5 September the US Department of the Treasury's Office of Foreign Assets Control (OFAC) imposed sanctions on 'Mulan' and 'New Energy', the LNG tankers suspected of reloading cargo from the earlier sanctioned LNG tankers that called at Arctic LNG 2 and on the two shipping entities that manage these tankers: Gotik Shipping Co., with offices in India and Liberia, and Plio Energy Cargo Shipping, based in India.⁵⁰

Conclusion

The LNG market is becoming much more fungible, as was demonstrated in 2022, when cargoes were diverted away from Asia during the European energy crisis. In a similar fashion, in theory Russian LNG cargoes sanctioned by Western countries could be diverted to non-sanctioning countries in the East. However, the actions of the US will certainly complicate the trading of Russian LNG and will lengthen transport distances, especially in winter, when the Northern Sea Route freezes over, thus increasing costs. Whether they will stop Russian LNG developments completely is another matter, as Chinese and Indian counterparts may be prepared to back some or all of the planned projects.

At the time of writing, no confirmed delivery of any of the cargoes from Arctic LNG 2 has taken place. Clearly, the ability of Arctic 2 to get its initial cargoes delivered and paid for will be critical – not just for the project itself but for any future Russian projects. If Arctic LNG 2 fails to market the cargoes already on the water in the Asia-Pacific region, it would represent a major setback and would effectively put Russia's LNG expansion program on hold.

There are many reasons to believe that it will be very hard for Russian LNG sellers to emulate the success that Russian oil exporters have had on the crude and products side in evading the sanctions. The obvious reason is that the liquids shipping fleet is enormous and difficult to track in the grey market – whereas LNG is much smaller and easier to track. Moreover, the US Treasury seems to be very active at sanctioning Russian LNG and does not have the reservations it might have had with regards to crude oil, possibly due to concerns about a tighter market and subsequent upward pressure on oil prices with related sensitivities for US domestic politics. In contrast, there is no downside for the US in a tighter LNG market or higher LNG prices in Europe and Asia; on the contrary, the US export-oriented LNG projects would be beneficiaries of such an outcome.

The fate of the first shipments from Arctic LNG 2, currently on the water in Asia, is going to be a litmus test for the marketability of sanctioned Russian LNG cargoes. It is an important signpost to watch in the coming days and weeks. The specific impact of the latest round of US sanctions will be critical, as the threat of secondary sanctions is a strong deterrent for any prospective buyer of LNG operating in the dollar-based economy.

On the other hand, weaponization of sanctions might hurt the position of the US dollar as a global currency should potential buyers of Russian hydrocarbons in Asia gradually introduce alternative settlement mechanisms that would effectively lead to the formation of a two-tiered trade system and the diminished circulation of the US dollar in energy trade. Russia has been proposing an alternative digital currency and an alternative to SWIFT for the expanded BRICS group of countries that together account for about one-third of the world's GDP, and the issue is on the agenda of the upcoming BRICS meeting in Kazan in the end of October 2024. These matters are beyond the scope of this comment; suffice to say that sanctions are a double-edged sword, and one should carefully consider the balance of their benefits and costs.

⁴⁸ <https://www.reuters.com/markets/commodities/tanker-russias-arctic-lng-2-completes-voyage-via-northern-sea-route-data-shows-2024-09-19/>

⁴⁹ <https://www.naturalgasworld.com/four-tankers-still-at-sea-with-unsold-cargoes-with-russias-arctic-lng-2-kpler-says-118430>

⁵⁰ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/lng/090624-us-sanctions-two-more-lng-carriers-two-shipping-companies-for-russia-trade>