

The status and future projections of LNG production and use in the Russian Arctic



2024

BELLONA

Working paper, 2024

The status and future projections of LNG production and use in the Russian Arctic

Published by: Bellona Foundation, Vilnius

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The Bellona Foundation is an international environmental NGO working on the major climate and environmental problems. Founded in 1986 as a direct action protest group, Bellona has become a recognised technology and solution-oriented organization with offices in Oslo, Brussels, Berlin, and Vilnius, and representatives in USA and several EU Member States.

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Introduction

Russia is the second largest natural gas producer in the world after the USA with a share of about 15% (638 billion m³ in 2023¹) of the total. 83% of the Russian gas comes from its Arctic territories. According to 2023 data, 99.6 billion m³ (30% less than in 2022) was exported through pipelines, and 45.4 billion m³ or 32.9 mln tons (2% less than in 2022) was exported in the form of a liquified natural gas (LNG)².

The Russian LNG industry started in the 1950s but the first large-scale project went into operation only in 2009. In 1953-1954 the first small-scale LNG plant in the Soviet Union was launched in the Moscow region to compensate for demand peaks from the gas pipeline Saratov-Moscow. Later in the 1990s LNG started to be used as fuel for automobile transport. Since then, small-scale projects were built in different Russian regions. At the same time, extraction of natural gas was growing, mainly for export to Europe through pipelines. In 2009 the first large-scale LNG plant "Sakhalin-2", with an annual capacity of 9.6 mln tons, started production at Sakhalin Island aiming for export to Asian market. "Sakhalin-2" was a joint project of the Russian state gas company Gazprom, British oil and gas company Shell, and two Japanese companies Mitsui and Mitsubishi³. After the Russian invasion of Ukraine in February 2022, Shell announced its intention to leave the project⁴.

The second large-scale LNG plant "Yamal-LNG" was launched in 2017 on the Yamal peninsula in the Russian Arctic, by the Russian oil and gas company Novatek, French energy company Total, and two Chinese companies. Annual production capacity of the Yamal LNG is 16.5 mln tons⁵.

In December 2023 the third large-scale LNG plant "Arctic LNG 2" in the Yamal region produced the first tonnages of LNG. It is a Russian company Novatek-led project, with the participation of French company Total (who left the project after the Russian invasion of Ukraine), two Chinese oil companies and two Japanese companies. Planned annual

¹ Rosstat estimated gas production in Russia in 2023 at 638 billion cubic meters. 31.01.2024. *Interfax*. [in Russian] <https://www.interfax.ru/business/943942>

² Russia reduced pipeline gas exports by 29.9% in 2023. 6.02.2024. *TASS*. [in Russian] <https://tass.ru/ekonomika/19912925>

³ LNG in Russia. Production capacity path. 8.05.2020. *Neftegaz.RU*. [in Russian] <https://magazine.neftegaz.ru/articles/rynok/547774-spg-v-rossii-put-proizvodstvennykh-moshchnostey/>

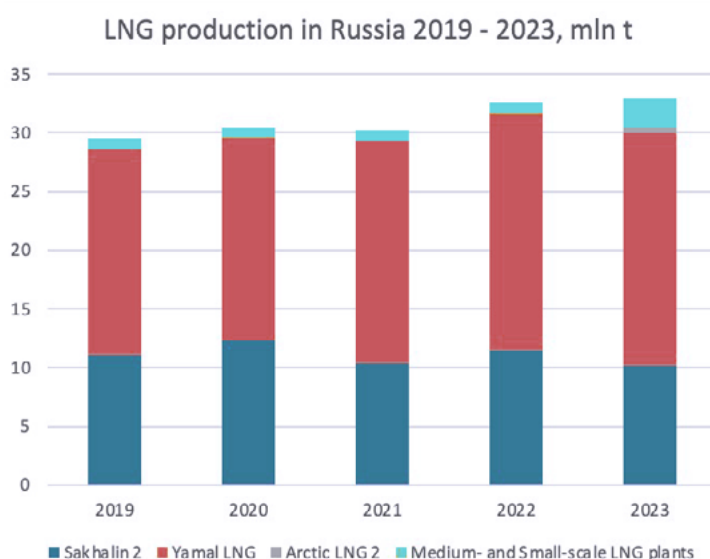
⁴ Shell intends to exit equity partnerships held with Gasprom entities. 1.03.2022. *Shell*. <https://www.shell.com/news-and-insights/newsroom/news-and-media-releases/2022/shell-intends-to-exit-equity-partnerships-held-with-gazprom-entities.html>

⁵ Yamal LNG corporate website. <http://yamallng.ru/en/>

production capacity is 19.8 mln tons⁶. In November 2023, the “Arctic LNG 2” project was included in the US sanctions list, which makes its future uncertain. As of early 2024 it has struggled to find customers since the French, Chinese and Japanese companies involved in the partnership have frozen business ties following US sanctions⁷.

Besides large-scale LNG production facilities, there are a number of medium- and small-scale (less than 80 000 tons) LNG plants in Russia. Two medium-scale facilities are located in the Leningrad region: Novatek’s Cryogas Vysotsk (in operation since 2019 with a capacity of 0.66 mln t) and Gazprom’s Portovaya LNG (in operation since 2022 with a capacity of 1.5 mln t). Both facilities had planned to ship LNG to European countries but after introduction of the EU sanctions they are now looking for new customers in Asia. In August-September 2023, for the first time an LNG tanker shipped LNG from Portovaya LNG plant to China through the Northern Sea Route⁸.

There are 18 small-scale LNG plants currently in operation in Russia, with a total capacity of 0.26 mln tons. 60% of LNG produced in these plants is for export, and only 27% to an internal market as automobile transport fuel, and 13% - to the internal gas grid. 15 plants with a total capacity of 378 000 tons are in the development stage with major additional capacities in Kaliningrad, Khabarovsk, and Tumen regions⁹.



⁶ Novatek corporate website. <https://www.novatek.ru/en/business/arctic-lng/>

⁷ Foreign shareholders freeze participation in Russia’s Arctic LNG 2 project. 25.12.2023. *Reuters*. <https://www.reuters.com/business/energy/foreign-shareholders-suspend-participation-russias-arctic-lng-2-project-2023-12-25/>

⁸ Gazprom redirected LNG to China from its plant in the Leningrad region for the first time. 13.09.2023. *Vedomosti*. [in Russian] <https://www.vedomosti.ru/business/articles/2023/09/14/995078-gazprom-vpervie-perenapravit-v-kitai-spg-so-svoego-zavoda-v-lenblasti>

⁹ The capacity of small LNG plants in Russia will increase 2.5 times by 2025. 13.04.2023. *Vedomosti*. [in Russian] <https://www.vedomosti.ru/business/articles/2023/04/13/970689-moschnost-malih-spg-zavodov-v-rossii-virastet>

Table 1. LNG production in Russia by facility in 2019-2023, mln t

LNG plants in operation	2019	2020	2021	2022	2023
Sakhalin 2	11,1	12,3	10,4	11,5	10,2
Yamal LNG	17,5	17,3	18,9	20,1	19,88
Arctic LNG 2	0	0	0	0	0,33*
Medium- and Small-scale LNG plants	0,9	0,8	0,8	0,9	2,49
Total	29,5	30,4	30,1	32,5	32,9

* Calculated approximate number.

Source: Compiled by author based on the Russian federal state statistics service and news articles by Kommersant and Vedomosti

Most of the LNG produced by the large-scale facilities is intended for export - from Sakhalin 2 to Asia, from Yamal LNG to Europe, from Arctic LNG 2 – to Asia but at this time without clear plans due to international sanctions against these facilities.

Russia sees LNG as a prospective international market, hence, there are ambitious plans to grow production and export facilities despite the “western” economic sanctions. It seems that Russian authorities are convinced that the Asian market will buy all existing and additional volumes of Russian LNG. According to the Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period until 2035, LNG production should increase to 43 mln t in 2024, 64 mln t in 2030, and 91 mln t in 2035¹⁰. But these plans are unlikely to be reached in a timely fashion. As is seen with the US and European sanctions against the new Arctic LNG 2 project, it faces difficulties with acquiring necessary foreign equipment, building tankers in foreign shipyards and searching for new customers.

The oil and gas sector together with the energy sector are the major emitters of greenhouse gasses in Russia. There are no open statistics to calculate precisely how much GHGs were emitted from production, transportation and use of LNG. According to Novatek’s report on sustainable development, CO₂ emissions from extraction of natural gas was 8.63 t CO₂/thousand of barrels of oil equivalent and 0.23 t CO₂/t LNG from LNG production¹¹. Gazprom’s official figures shows that emissions of its gas business were 0.25 ton of CO₂eq per 1 ton of oil equivalent of products sold in 2022¹².

Both companies tried to offer so called “green LNG” from Yamal LNG and Sakhalin 2 to the international market in 2021, declaring that they had compensated for GHG emissions during the whole production and consumption cycle of their LNG by investing in afforestation in Sakhalin region aimed at increasing carbon sequestration of forests¹³, but since the Russian invasion of Ukraine these offers seem to no longer be on the market.

¹⁰ Strategy for the development of the Arctic zone of the Russian Federation and ensuring national security for the period until 2035. [in Russian] <http://www.scrf.gov.ru/media/files/file/hcTiEHnCdn6TqRm5A677n5iE3yXLi93E.pdf>

¹¹ Novatek’s report on sustainable development 2022. https://www.novatek.ru/common/upload/doc/2023/NOVATEK_SR_2022_RUS.pdf

¹² Gazprom sustainability report 2022. <https://sustainability.gazpromreport.ru/fileadmin/f/2022/sustainability-report-ru-2022.pdf>

¹³ Sakhalin 2: Green light for “green” LNG. №10, 2021. *Gas industry*. [in Russian] <https://www.sakhalinenergy.ru/upload/medialibrary/5a8/a226f3t4rmze9wapuwezttouwi07tf1i/Gazovaya-promyshlennost-oktyabr-2021.pdf>

1. The current state of production, export and future projections of LNG cargoes carried by ships when operating in the Arctic

There is only one large-scale LNG production facility in the Russian Arctic – the Yamal LNG plant on the Yamal peninsula managed by Novatek. It went into operations in 2017 and now works at normal capacity producing annually around 20 mln t of LNG (19.9 mln t in 2023, 21 mln t in 2022). According to Novatek’s sustainability report, the amount of direct GHGs emitted from the Yamal LNG plant in 2021 was 5.2 mln t of CO₂e¹⁴ and 4.8 mln t of CO₂e in 2022¹⁵. More than 70% of LNG produced at Yamal was exported to Europe in 2023¹⁶, and 2.27 mln t of LNG was delivered to customers in Asia through the Northern Sea Route¹⁷, the same amount as was shipped to Europe and Asia in 2022. It is expected that during the next years the amount of LNG exported to Europe will be reduced and the export to Asia will increase.

Gazprom has also started using the Northern Sea Route for LNG deliveries. In September 2023, its LNG carrier “Veliky Novgorod” completed the first voyage along the Northern Sea Route to China. On board it had gas produced at Gazprom’s medium-scale LNG complex “Portovaya” in the Leningrad region¹⁸.

Russia plans a significant increase in LNG production using its Arctic natural gas resources. During the international gas forum in St.Petersburg in October 2023, the first deputy minister of energy Pavel Sorokin said that the ministry expects Russian LNG production to reach 100 mln t per year by 2030¹⁹. The route towards accelerated development of the use of natural gas was announced before the beginning of the Russian invasion of Ukraine as a Russian contribution to a “greener” world energy sector, but Russia has started to experience obstacles due to international sanctions and it is likely that the plans will be delayed or amended.

¹⁴ Yamal LNG GHG emissions report. 2021. <http://yamallng.ru/upload/otchet-po-planu-upravleniya-vybrosami-pg-za-2021-g.pdf>

¹⁵ Sustainability report 2022. Novatek. p.68-69. [in Russian] https://www.novatek.ru/common/upload/doc/2023/NOVATEK_SR_2022_RUS.pdf

¹⁶ Russian gas liquefied with reality. 09.01.2024. *Kommersant*. [in Russian] <https://www.kommersant.ru/doc/6443078>

¹⁷ Gas settled in ice. 05.12.2024. *Kommersant*. [in Russian] <https://www.kommersant.ru/doc/6379804>

¹⁸ Gazprom delivered a shipment of its LNG via the Northern Sea Route for the first time. 15.09.2023. *Interfax*. [in Russian] <https://www.interfax.ru/business/920940>

¹⁹ P. Sorokin at SPIGF-2023: By 2035, Russia can occupy up to 20% of the global LNG market. 31.10.2023. *Neftegaz*. [in Russian] <https://neftegaz.ru/news/spg-szhizhenny-prirodny-gaz/799870-p-sorokin-na-pmgf-2023-k-2035-g-rossiya-mozhet-zanyat-do-20-mirovogo-rynka-spg/>

Novatek's second large LNG plant "Arctic LNG 2" faced EU sanctions in May 2022 with a ban on delivery of equipment for an LNG production line, but it appeared to not be effective as, according to The Moscow Times' investigation, EU companies continued to deliver equipment and spare parts through intermediaries until January 2024. The total value of imported equipment from May 2022 till January 2024 was EUR 580 mln²⁰. At the same time Novatek was successful in finding alternative suppliers of the necessary equipment in China. Ships with Chinese equipment travelling to the Arctic LNG 2 facility were reported by investigators from High North News²¹.

Despite Novatek's success in avoiding equipment sanctions and being able, although with a delay, to start LNG production on the Arctic LNG 2 plant, it has also faced difficulties with securing LNG carriers for transportation and lost all its long-term contracts with buyers due to the US sanctions put in force in November 2023. Its first line started production in December 2023, later than initially planned, and the first delivery should have been at the beginning of 2024, but in February 2024 it had significantly reduced production²² with no certainty about when and where the LNG will be sold. The second production line was planned to start in 2024 and is almost ready, however the third production line, which was planned to be in operation in 2026, is now suspended²³.

Following US sanctions, all shareholders, who also planned to be long-term customers for Arctic LNG, froze their participation in the project. This includes French Total, the two Chinese companies CNPC and CNOOC, and a Japanese consortium consisting of Mitsui and JOGMEC, who all have 10% shares of Arctic LNG 2, totalling 40%²⁴. Japanese and Chinese companies asked the US for exemption from the sanctions but as of March 2024 there was no news as to whether they received any reaction from the US administration. Since all long-term contracts for LNG delivery are now frozen, Novatek will have to sell its gas on the "spot" market (public financial market in which financial instruments or commodities are traded for immediate payment and delivery), likely with a discount, and will face challenges with delivery.

²⁰ European companies, bypassing sanctions, supplied equipment for the LNG project of Putin's friend worth half a billion euros. 12.03.2024. *The Moscow Times*. [in Russian]
<https://www.moscowtimes.io/2024/03/12/evropeiskie-kompanii-v-obhod-sanktsii-postavili-oborudovanie-dlya-spg-proekta-druga-putina-na-polmilliarda-evro-a124133>

²¹ China continues deliver prefabricated modules in support of Russia's Arctic LNG 2 project. 8.01.2024. *High North News*.
<https://www.highnorthnews.com/en/china-continues-deliver-prefabricated-modules-support-russias-arctic-lng-2-project>

²² Arctic LNG 2 Nearly Stops Production in February Amid Sanctions. 4.03.2024. *Energy Intelligence*.
<https://www.energyintel.com/0000018e-0925-d02b-abee-af2545a80000>

²³ LNG shipments from the Arctic LNG-2 project may begin later than expected. 8.02.2024. *Neftegas.RU*. [in Russian]
<https://neftegaz.ru/news/spg-szhizhenny-prirodnyy-gaz/817352-otgruzki-spg-s-proekta-arktik-spg-2-mogut-nachatsya-pozzhe-chem-ozhidalos/>

²⁴ Foreign shareholders of Arctic LNG 2 have frozen participation in the project. 25.12.2023. *Interfax*. [in Russian]
<https://www.interfax.ru/russia/937810>

Arctic LNG 2 is not the only large-scale LNG project planned in the Russian Arctic. There are 9 plants planned in different Arctic regions with total projected capacity of 114.8 mln tons of LNG (see Table 2). It is difficult at this point to predict whether all those plans will come to fruition, but it is likely they will experience significant delays due to international sanctions. Since all of them aim to export LNG, their fate will also depend on how the Arctic LNG 2 project will overcome the sanctions and whether it will be able to find new long-term reliable customers for its product.

Table 2. Planned new large-scale LNG production facilities in the Russian Arctic, as of 2023

No	Name of the project	Capacity, mln t	Planned year of operation	Owner	Status of the project
1	Arctic LNG 2, lines 1-3	19.8	2023-2026	Novatek	Under construction
2	Obsky LNG	5	2024-2025	Novatek	Under construction
3	Murmansk LNG	20.4	2027-2029	Novatek	Planned
4	Arctic LNG 1	19.8	2027-2029	Novatek	Planned
5	Arctic LNG 2, lines 4-6	19.8	2030-2032	Novatek	Planned
6	Vostok gas LNG	7.5	2035	Rosneft	Planned
7	Kara LNG	7.5	2035	Rosneft	Planned
8	Shtokman LNG	7.5	2035	Gazprom	Planned
9	Anabarneftegas LNG	7.5	2035	Tujmaada-neft	Planned
Total planned capacity		114.8			

Source: agaz.org

2. The current use and future projection of LNG as fuel for ships operating in or near Arctic waters

Russia has a modest marine fleet running on LNG as a primary fuel with 14 vessels, the majority of which are oil tankers operating in the European waters. Following the international environmental trend to reduce air pollution from shipping, the Russian government announced ambitious plans for LNG use on ships. However, at the same time economic sanctions against Russia, introduced as a reaction to Russia's unlawful military invasion of Ukraine, will likely delay and result in cuts to these plans, because the Russian shipbuilding industry is currently not able to produce LNG-running vessels without Western technology, in particular engines. It will likely lack the economic stimulus and opportunity to convert the entire fleet to LNG in time, when a significant portion of Russia's budget finances the war.

The largest owner of LNG-run vessels in Russian is the state-owned shipping company Sovkomflot – the biggest shipping company in the country with 145 ships in its fleet in 2020. Sovcomflot has been promoting the use of LNG in ships since 2015 and first started using LNG-run vessels in 2018. According to its sustainability report, emissions of CO₂ from its fleet in 2020 reduced by 17% compared to 2017, when it did not have any LNG-run vessels²⁵. Newer data is not available as Sovkomflot stopped publishing its annual report after the Russian invasion of Ukraine.

The recent annual rise in the number of Russian LNG-powered vessels due to the completion of new build ships has been compensated by the sale of vessels due to the Russian invasion of Ukraine and the following economic sanctions. In 2022 Sovkomflot, after being sanctioned in March 2022 had to sell around a dozen of its ships, including 4 LNG-powered oil tankers, to pay debt to its western creditors²⁶.

Nevertheless, government plans for LNG expansion have not been updated yet. During the III All-Russian natural gas motor fuel forum held in April 2023, the First Deputy Minister of Energy Pavel Sorokin announced that there are plans to increase the number of LNG

²⁵ Sovkomflot's annual report 2020. <https://ar2020.scf-group.com/ru/sustainable-development/environmental-protection/atmospheric-emissions>

²⁶ WSJ: Sovcomflot sells tankers due to sanctions. 12.05.2022. TASS. [in Russian] <https://tass.ru/ekonomika/14612405>

vessels in Russia to 300 by 2035. 70 of them will be marine vessels (7 cargo, 8 tankers, 10 passengers, and 44 tugs), 187 river vessels, and 74 fishing ships²⁷. It is important to note that these plans are not yet confirmed in state strategies. The concept of natural gas motor fuel development is now under discussion in the Ministry of Energy.

At the moment there are 11 known orders placed or announced for marine LNG-powered vessels, including 2 icebreakers with dual fuel engines (see Table 3). These two icebreakers were ordered by Rosmorport in 2021, but it is unlikely that they will be completed by 2024 or even at all due to lack of national LNG technology and economic sanctions. For these reasons in 2022 Rosatom and Norilsk Nickel cancelled their orders for icebreakers due to the inability to supply the necessary equipment for construction.

Following the sanctions, the Finnish company Wartsila, one of the major suppliers of LNG and dual fuel ship engines for the Russian fleet, stopped all business in and with Russia²⁸. In 2023 South Korean shipbuilding Samsung Heavy Industries (SHI) and Daewoo Shipbuilding and Marine Engineering suspended their cooperation with Russian customers. Daewoo cancelled three contracts with Sovcomflot for new ship construction²⁹. The delivery of oil tankers being built at the Russian Zvezda shipyard has been delayed as well due to difficulties with the delivery of equipment.

In addition to the lack of national technologies for building ships with LNG-powered engines, both insufficient bunkering infrastructure and lack of economic stimulus also limits the development of the LNG fleet in Russia.

In 2021 there was an attempt to introduce an economic stimulus for the use of LNG in the fleet. However, the amendments prepared to the Russian Merchant Shipping Code and the Federal Law № 261-FZ "On Sea Ports in the Russian Federation" aimed at stimulating the use of environmentally friendly technologies in shipping did not end up in the State Duma.

The only advantageous policy for LNG-powered vessels is provided by Rosmorport, the Russian port operator, in the form of a 10% discount on port fees for tankers using LNG as the main type of fuel in one Arctic port (Murmansk) and 5 ports in the North-West of Russia (Vysotsk, Kaliningrad, Primorsk, Ust-Luga, as well as for container ships using LNG in the Big Port of St.Petersburg)³⁰.

²⁷ By 2030, LNG consumption in water transport may increase 7 times and reach 2 billion cubic meters. m per year – Ministry of Energy. 20.04.2023. *Portnews*. [in Russian] <https://portnews.ru/news/346275/>

²⁸ Wärtsilä had to abandon valuable projects after departure from Russia. 01.02.2023. *Shippingwatch*. <https://shippingwatch.com/suppliers/article14929064.ece>

²⁹ Samsung Heavy Industries Stops Russian LNGs Despite Slowing Orders. 26.12.2023. *The Maritime Executive*. <https://maritime-executive.com/article/samsung-heavy-industries-stops-russian-lngs-despite-slowing-orders>

³⁰ Factbook LNG Russia 2023. www.agaz.org

Table 3. Russian LNG fleet in 2023

Vessel name	Year of construction/estimated	Operation status	Type of vessel	Owner	Main geography for operations
Gagarin Prospect	2018	Sold in 2022	Oil tanker	Sovkomflot	Europe
Lomonosov Prospect	2018	Sold in 2022	Oil tanker	Sovkomflot	Europe
Mendeleev Prospect	2018	Sold in 2022	Oil tanker	Sovkomflot	Europe
Korolev Prospect	2019	In operation	Oil tanker	Sovkomflot	Europe
Samuel Prospect	2019	Sold in 2022	Oil tanker	Sovkomflot	Europe
Vernadsky Prospect	2019	In operation	Oil tanker	Sovkomflot	Europe
Vladimir Monomakh	2021	In operation	Oil tanker	Rosnefteflot	Europe
Marshal Rokossovsky	2021	In operation	Ferry Ro-Ro	Rosmorport	Europe
Dmitry Mendeleev	2021	In operation	Bunkering vessel	Gazpromneft	Europe
Vladimir Vinogradov	2022	In operation	Oil tanker	Rosnefteflot	Europe
Nickolay Zadornov	2022	In operation	Oil tanker	Sovkomflot	Global
Vladimir Arseniev	2022	In operation	Oil tanker	Sovkomflot	Global
Okeansky Prospect	2022	In operation	Shuttle-tanker	Sovkomflot	Global
General Chernyakhovsky	2022	In operation	Ferry Ro-Ro	Rosmorport	Europe
Vladimir Arsenyev	2022	In operation	Shuttle-tanker	Sovkomflot	Arctic
Nikolay Zadornov	2022	In operation	Shuttle-tanker	Sovkomflot	Arctic
Akademik Gubkin	2023	In operation	Oil tanker	Rosnefteflot	Europe
Vostochny Prospect	2023	In operation	Oil tanker	Sovkomflot	Global
Nursultan Nazarbaev	2024	Planned	Oil tanker	Rosnefteflot	Europe
Vostochny prospect	2024	Planned	Oil tanker	Rosnefteflot	Europe
Okeansky prospect	2024	Planned	Oil tanker	Rosnefteflot	Europe
No name	2024	Planned	Icebreaker	Rosmorport	Europe
No name	2024	Planned	Icebreaker	Rosmorport	Arctic
Akademik Ivanter	2025	Planned	Oil tanker	Rosnefteflot	Europe
No name	2025	Planned	Oil tanker	Rosnefteflot	Europe
No name	2025	Cancelled	Icebreaker	Norilsk Nickel	Arctic
No name	2025	Planned	Small scale LNG vessel		Far East
No name	2026	Planned	Small scale LNG vessel		Far East
No name	2026	Planned	Oil tanker	Rosnefteflot	Europe
No name	2026	Planned	Oil tanker	Rosnefteflot	Europe
No name	2027	Cancelled	Icebreaker	Rosatom	Arctic
No name	2028	Cancelled	Icebreaker	Rosatom	Arctic
No name	2029	Cancelled	Icebreaker	Rosatom	Arctic

Source: www.agaz.org and www.new-ships.com

Besides LNG-powered vessels listed in the Table 3, there are 15 gas carriers with dual fuel engines in operation built by the South Korean shipbuilding company Daewoo Shipbuilding & Marine Engineering (DSME, now Hanwha Ocean), which transport LNG from the Yamal LNG plant to customers in Europe and Asia. They use LNG and boil-off gas while carrying the product, but almost all of them are owned by non-Russian companies and sail under foreign flags. The first of their kind named “Christophe de Margerie”, which is the only one owned by Russian Sovkomflot, started operations in 2017. It is an LNG tanker-type Yamalmax with an ice-class Arc7 (according to the Russian classification) allowing year-round navigation without icebreaker assistance from Yamal in a western direction and during summer navigation - in an eastern direction along the Northern Sea Route³¹.

In 2023 LNG carriers shipped Novatek’s gas along the Northern Sea Route to Asia from mid-June to the end of November, completing 31 deliveries³². The earliest start of navigation to Asia was in May 2020, and the latest in January 2021, but during that voyage the ship damaged one of its three propulsion units. Nevertheless, Novatek has plans to operate tankers in the eastern direction all year round³³. LNG carriers usually deliver gas from Yamal to customers in Europe and Asia, but Novatek seeks to optimize their use by building new LNG terminals in Murmansk (Western direction) and Kamchatka (Eastern direction) to tranship gas to conventional tankers and letting Yamalmax tankers operate only in the Arctic waters. For that purpose, two LNG storage ships “Saam” and “Koryak” have been built by DSME for Novatek and handed over for use in 2023, but as they also have been affected by US sanctions in September 2023³⁴, their use is now under question.

Preparing for the launch of its second LNG project Arctic LNG 2, Novatek ordered another 15 similar LNG carriers from the Russian Zvezda shipbuilding company in 2018. They should have been equipped with Wartsila’s dual-fuel engines and delivered in 2022, 2024, and 2025³⁵. As of March 2024 the building at Zvezda is delayed due to economic sanctions, which resulted in failure in the delivery of imported ship parts. The first tankers are now expected in 2024 but could be delayed further³⁶. Later in 2020, Novatek agreed on a building order of another 6 tankers with DSME, with delivery dates in June and December 2023³⁷. But in 2022 DSME cancelled the contract for three tankers, which should have been owned and managed by Russian Sovcomflot, due to the sanctions introduced against Sovcomflot³⁸. Later on, rumours had it that DSME would continue building these carriers as they were forwarded to another future owner (unknown)³⁹. The other three tankers will be completed in 2024 (2 tankers) and 2026 (1 tanker) and handed to the Japanese company Mitsui OSK Lines, which has 10% shares of the Arctic LNG 2 project.

³¹ LNG transportation. Yamal LNG. <http://yamallng.ru/project/tankers/>

³² Gas settled in ice. 05.12.2023. *Kommersant*. [in Russian] <https://www.kommersant.ru/doc/6379804>

³³ NOVATEK carried out its third LNG transshipment operation off Kildin Island since the beginning of December. 20.12.2023. *Neftegas*. [in Russian] <https://neftegaz.ru/news/transport-and-storage/808317-novatek-gotovit-3-yu-s-nachala-dekabrya-operatsiyu-perevalki-spg-u-o-va-kildin/>

³⁴ NOVATEK’s “Arctic transshipment” is included in the US sanctions list. 14.09.2023. *Portnews*. [in Russian] <https://portnews.ru/news/353476/>

³⁵ NOVATEK sent gas carriers to Zvezda. 11.01.2019. *Kommersant*. [in Russian] <https://www.kommersant.ru/doc/3850604>

³⁶ Novatek’s new 400 meter long LNG storage vessel is entering Arctic waters. 19.06.2023. *The Barents Observer*. <https://thebarentsobserver.com/en/arctic-Ing/2023/06/novateks-new-400-meter-long-Ing-storage-vessel-entering-arctic-waters>

³⁷ Novatek’s new 400 meter long LNG storage vessel is entering Arctic waters. 19.06.2023. *The Barents Observer*. <https://thebarentsobserver.com/en/arctic-Ing/2023/06/novateks-new-400-meter-long-Ing-storage-vessel-entering-arctic-waters>

³⁸ Media: Korean DSME terminated the contract for the construction of three gas carriers for Arctic LNG-2. 25.05.2022. *Marine news*. [in Russian] <https://morvesti.ru/news/1679/95783/>

³⁹ Arctic LNG-2 is now on its own. 25.12.2023. *Kommersant*. [in Russian] <https://www.kommersant.ru/doc/6425739>

3. The provision and development of LNG bunkering facilities in the Arctic

At the end of 2023, there were no LNG bunkering facilities in operation in the Russian Arctic, except for the LNG facility in the Port of Sabetta, which is used for filling LNG carriers with gas produced at the Yamal-LNG plant, owned by Novatek. The LNG carriers then deliver Russian natural gas from Sabetta to customers in Europe and Asia.

Currently, one LNG terminal is being built in the Murmansk region in Ura Bay. Its purpose is to transfer LNG from large-scale shuttle vessels carrying LNG from the Arctic plants to other types of LNG carriers, which deliver it to customers outside the Arctic. This terminal was planned to be in operation by the end of 2023, but since then there is no news about it and a delay into 2024 is likely.

In 2021 the first and only LNG bunkering vessel “Dmitry Mendeleev” was built by the Chinese Nantong Shipyard for Gazpromneft. It has a capacity of 5,8 thousand m³ of LNG. It started operating in September 2022 and is used in the ports of the Baltic Sea (not in the Arctic region) to fuel the road-railway ferries “Marshal Rokossovsky” and “General Chernyakhovsky” on the route between the ports of Baltiysk (Kaliningrad region) and Ust-Luga (Leningrad region). It is owned by Gazpromneft and collects LNG from the Gazprom LNG facility “Portovaya” in the Leningrad region⁴⁰.

Before the Russian invasion of Ukraine in 2022, Russian authorities were vocal about their ambitious plans to develop LNG infrastructure, including bunkering facilities in the main ports in the Arctic. In 2021 the Long-term state development programme for the production of LNG in Russia was adopted⁴¹. Besides the main focus on the development of large-, medium- and small-scale LNG production, there were provisions about stimulating LNG-fuelled sea transport and bunkering infrastructure, although without any concrete targets. The state programme “Development of the natural gas motor fuel market”⁴² adopted in 2020 states the target for an increase in the use of natural gas as a transport fuel (total on all transport modes) up to 2.7 billion m³ by the end of 2024. At the end of 2022 the use of natural gas for transport in Russia reached 1.7 billion m³, most of it used on commercial automobile transport and buses⁴³.

⁴⁰ The Gazpromneft Marine Bunker “Dmitry Mendeleev” loaded from the Gazprom LNG plant in the Leningrad region. 19.01.2023. Portnews. [in Russian] <https://portnews.ru/news/341636/>

⁴¹ Long-term development programme for the production of LNG in Russia. 16.03.2021. [in Russian] <http://static.government.ru/media/files/l6DePkb3cDKTgzxbb6sdFc2npEPAd7SE.pdf>

⁴² Development of the natural gas motor fuel market. The state sub-programme. 2.03.2020. <http://static.government.ru/media/acts/files/1202003050009.pdf>

⁴³ The use of alternative fuels for cars is growing in Russia. 14.11.2023. Rossiyskaya gazeta. [in Russian] <https://rg.ru/2023/11/14/bez-dyma-i-kopoti.html>

Nevertheless, different Russian officials keep announcing plans to build LNG bunkering terminals in the main ports along the Northern Sea Route. At the III All-Russian natural gas motor fuel forum held in April 2023, the First Deputy Minister of Energy Pavel Sorokin said that by 2035 it is planned to build 25 LNG bunkering facilities in the Russian sea and river ports, including 3 in the Arctic region – in the ports of Murmansk, Arkhangelsk, and on the Yamal peninsula. He also indicated that in 2022 the use of LNG by sea and river transport in Russia was 270.9 mln m³. The target for this indicator is to reach 2 billion m³ of LNG use by sea and river transport by 2030⁴⁴. Sorokin also announced targets for the use of natural gas as a transport fuel on all transport modes in total – 9.5 billion m³ by 2030 and 16 billion m³ by 2035. According to Sorokin, natural gas is a necessary resource for the green transition and an instrument to reach climate goals⁴⁵. During 2023 the new proposal for natural gas motor fuel development was under review by the Ministry of Energy, but by the end of the year, it had not yet been published.

In light of the current situation with the ongoing Russian invasion of Ukraine and international economic sanctions against Russian business and officials, it is highly unlikely that all the announced plans for the development of LNG infrastructure, including bunkering in the Arctic region, will be implemented.

⁴⁴ By 2030, LNG consumption in water transport may increase 7 times and reach 2 billion cubic meters. m per year - Ministry of Energy. 20.04.2023. Portnews. [in Russian] <https://portnews.ru/news/346275/>

⁴⁵ P. Sorokin at SPIGF-2023: By 2035, Russia can occupy up to 20% of the global LNG market. 31.10.2023. Neftegaz. [in Russian] <https://neftegaz.ru/news/spg-szhizhenny-prirodny-gaz/799870-p-sorokin-na-pmgf-2023-k-2035-g-rossiya-mozhet-zanyat-do-20-mirovogo-rynka-spg-/>

Conclusions

The Russian LNG sector started rapid development in the 2010s stimulated mostly by external factors. First and foremost was the desire for export profits, and secondly, by the desire to create an image of “green” development and devotion to a climate agenda while using traditional carbon resources. Before the full-scale invasion of Ukraine, Russia was successfully implementing its plans for the development of LNG production and use of LNG on ships associated with deliveries of oil and LNG to European customers. Two large-scale LNG plants (Sakhalin 2 and Yamal LNG), and two medium-scale LNG plants (Cryogas Vysotsk and Portovaya LNG) started operations between 2009 and 2022. They did not lack western investments and were mostly oriented towards export.

Use of LNG on ships is restricted to the export of oil and gas. Almost all LNG-run Russian vessels are oil tankers, and LNG carriers which use boil-off gas while carrying the cargo. Other companies extracting natural resources in the Arctic and shipping them, like Norilsk Nickel, continue to use diesel ships for their deliveries.

The Russian invasion of Ukraine in February 2022, followed by international economic sanctions, have clearly influenced the developments of the Russian LNG sector, especially new production facilities and LNG-run shipbuilding. Although the sanctions were introduced partially and not in the most effective way, they caused delays in opening new production facilities and deliveries of new LNG-run ships. They also increased uncertainty in finding customers and organising logistics for export from the new Arctic LNG 2 project. It is likely that EU countries will be gradually reducing their import of Russian LNG in the coming years, and hence the ability of Russia to continue LNG development will depend on its ability to find new long-term customers who will not be concerned about secondary sanctions. Plans for increasing the use of LNG in shipping will likely be delayed and/or downgraded to be less ambitious.

Map of LNG facilities in Russia, 2023

