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Unfulfilled ambitions: Russia's LNG sector in the grip of sanctions

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The technological sanctions which the West has imposed on Russia's LNG sector have drastically reduced the opportunities for the industry's expansion, and made it less likely that Russia can increase its share on the global LNG market. Moreover, the Russian Federation's ambitious targets for LNG production capacity have not been formally revised, which means that it is now virtually impossible to achieve them.

The slim chances of Russia's LNG production capacity increasing over the coming years have a negative impact on the country's overall gas exports. In view of Moscow's political decision to slash pipeline supplies to Europe, liquefied gas could help Russia to mitigate the consequences of this reduction as long as there are no formal restrictions on its imports to the EU; it could also ensure that European consumers remain partly dependent on Russian gas. However, the tough restrictions on technology exports to Russia have significantly reduced the likelihood of this scenario becoming a reality. That is because Russia has so far been able to instal new liquefaction capacity with the use of Western technology. However, as Russia has now lost access to this technology, it will have to rely on home-grown solutions to launch new LNG plants, which poses a major challenge. Western sanctions have also caused problems with the maintenance of facilities and the operation of gas carriers that serve them. Furthermore, it is proving difficult to finance the development of domestic technology under sanctions, not least because of the declining revenues from the oil and gas sector.

The state of the Russian LNG sector

In 2022, Russia was the world's fourth largest LNG exporter (around 8% of the market)[1] with sales of around 33 million tonnes (45.7 bcm).[2] Liquefied gas is the only Russian fuel whose deliveries to Europe increased last year, amounting to around 19.2 bcm (up 35% year-on-year).[3] In comparison, sales of pipeline gas to the countries of the so-called 'far abroad' (European customers excluding the Baltic states, as well as Turkey and China) fell by as much as 45% year-on-year,[4] to around 101 bcm.

[1] 'Shell LNG Outlook 2023', Shell, shell.com.

[2] А. Красинская, 'Экспорт СПГ из России вырос на 7,9% в 2022 г.', Argus, 17 February 2023, argusmedia.com.

[3] G. Zachmann, G. Sgaravatti, B. McWilliams, 'European natural gas imports', Bruegel, bruegel.org.

[4] 'Алексей Миллер: «В 2022 году «Газпром» работал стабильно, результативно в интересах России, граждан нашей страны', Gazprom, 2 January 2023, gazprom.ru.

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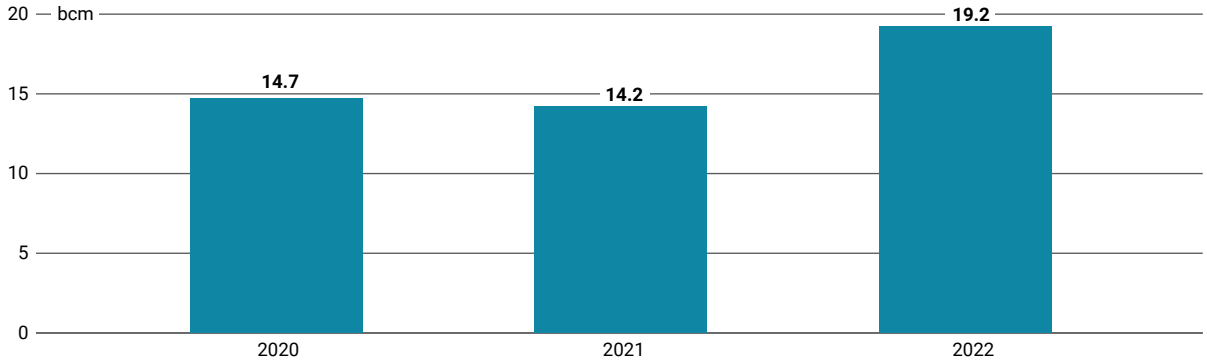
Chart 1. Russian LNG imports to the EU in 2020–2022



Source: the author's own compilation based on data from the Bruegel think tank, bruegel.org.

This reduction in pipeline supplies stems from the Kremlin's political instrumentalisation of gas exports in an attempt to force Europe to make concessions over the war in Ukraine and the Western-imposed sanctions. Unlike gas delivered via pipelines, Russian LNG continues to flow freely into foreign ports, including those in Europe. The increase in liquefied gas exports partially mitigates the effects of Gazprom's falling sales, especially as there is no EU ban on imports of either LNG or pipeline gas. Although some Western countries (the US, the Baltic states, the UK)[5] have imposed embargoes on liquefied gas from Russia, the EU has so far confined itself to recommending that no new contracts be signed.[6] This allows Russia to continue making profits from LNG exports.

Two large-scale liquefaction plants are currently operating in the Russian Federation: the first one is Sakhalin-2, which was built by an international consortium and has a nominal capacity of 9.6 million tonnes per year; the other is the Novatek-operated Yamal LNG with a capacity of 17.4 million tonnes per year. Liquefied gas partly destined for export is also produced by two medium-scale facilities located in the Baltic Sea: the Novatek-controlled Cryogas-Vysotsk that was put into operation in 2019 (660,000 tonnes per year) and the Gazprom-built Portovaya LNG facility (1,500,000 tonnes per year), which started operations in September 2022. In addition, there are around 20 small-scale plants in Russia that produce a total of nearly 300,000 tonnes of LNG per year. However, the fuel they make is also destined for domestic consumers, and its importance in the export structure is small.

Table 1. LNG production at Russian medium and large-scale plants in 2016–2022 (in million tonnes per year)

Operator	Project	2016	2017	2018	2019	2020	2021	2022	Nominal capacity
Gazprom	Sakhalin-2	10.9	11.5	11.4	11.2	11.6	10.4	11.5	9.60
Novatek	Yamal LNG	-	0.3	8.6	18.2	18.6	19.4	21.0	17.40
Novatek	Cryogas-Vysotsk	-	-	-	0.45	0.55	0.76	0.71	0.66
Gazprom	Portovaya LNG	-	-	-	-	-	-	0.35	1.50

Source: the author's own compilation based on data from Gazprom and Novatek.

The expansion of Russia's LNG sector has so far been driven mainly by Novatek, the only Russian operator to have completed the construction of a new large-scale liquefaction plant in cooperation with foreign partners (Yamal LNG). Financial, administrative and political support from the Russian

[5] These countries introduced embargoes on Russian LNG supplies (or gas in general) unilaterally and at different times. The US announced an embargo on liquefied gas from Russia on 8 March 2022; the Baltic states decoupled from Russian supplies in 2022, and the UK banned LNG imports from the Russian Federation as of the beginning of 2023.

[6] K. Abnett, 'EU energy chief tells companies not to sign new Russian LNG deals', Reuters, 9 March 2023, reuters.com.

government (including numerous tax exemptions) made the launch of this plant possible.[7] The reasons for this support should be attributed to the close contacts between the company's management and Vladimir Putin.

In contrast, other Russian operators (Gazprom, Rosneft) have been making very slow progress in developing their own liquefaction capacity. In the case of Rosneft, the design phase of its liquefaction facilities is still ongoing. Meanwhile Gazprom has so far only managed to build one medium-scale plant in the Baltic Sea (Portovaya LNG). The Gazprom-managed Sakhalin-2 project was not developed as the company's own investment: the Russian company acquired a controlling stake from Shell in 2007.

The involuntary revision of production targets

According to the assumptions set out in the 2021 document entitled 'The Long-term Programme for the Development of Liquefied Natural Gas Production in the Russian Federation',[8] Russia plans to increase the volume of its LNG exports significantly. The strategy assumes that the share of Russian liquefied gas in the global market will reach 15–20% before 2035, and that the Russian sector will boost its production capacity to 140 million tonnes per year.

Table 2. Russian LNG production targets through to 2035 (in million tonnes per year)

	2019–2024	2025–2030	2031–2035
'Low' scenario	46.0	63.0	80.0
'High' scenario	65.0	102.5	140.0

Source: 'Долгосрочная программа развития производства сжиженного природного газа в Российской Федерации', The Government of the Russian Federation, 16 March 2021, government.ru.

This surge is expected to match the dynamics of the global LNG market, which is forecast to see a spike in demand over the next two decades. According to Shell analysts, demand for this fuel will soar to 650–700 million tonnes per year by 2040 (up about 85% on 2021 consumption).[9] A surge in the liquefaction plant capacity in LNG-exporting countries (mainly the US and Qatar) is expected to meet this demand. A significant part of the plants under construction in these countries are expected to start production as of mid-2025. According to forecasts, we may also see shortages in the supply of liquefied gas over the coming years,[10] which would make competition more intensive and probably raise prices. Gas has also become less available thanks to a drop in supplies of Russian gas to the EU via pipelines. This has resulted in higher EU demand for imports of gas, including in liquefied form, from other sources.

As Russia reduces its pipeline supplies to the West while the EU plans to phase out Russian gas by 2027,[11] the Russian government has highlighted the need to expand the domestic LNG sector. When the Russian deputy prime minister Aleksandr Novak summed up the past year from the energy ministry's perspective, he said that the LNG market is becoming "maximally globalised" and that Russia's flexibility in the transport of this fuel was making it more competitive on the global market.[12] In this context, he stressed the importance of the low costs of liquefied gas production in the Russian Federation, which are largely due to the tax credits that LNG projects have been granted.

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[7] S. Kardaś, 'Expansion at the state's expense: Novatek as a driving engine of the Russian LNG sector', *OSW Commentary*, no. 275, 27 June 2018, osw.waw.pl.

[8] For more detail see S. Kardaś, 'Great ambitions: Russia expands on the LNG market', *OSW Commentary*, no. 394, 17 May 2021, osw.waw.pl.

[9] See 'Shell LNG Outlook 2023', *op. cit.*

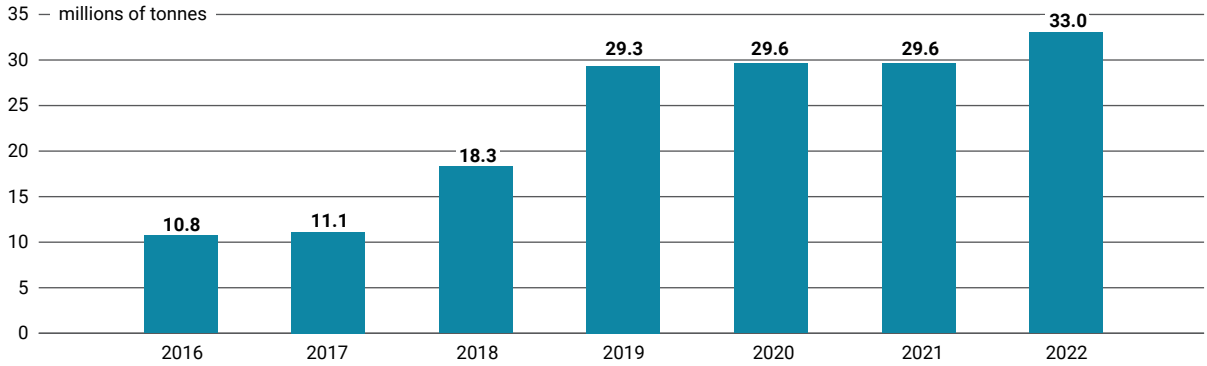
[10] 'Global LNG Outlook 2023–27', Institute for Energy Economics and Financial Analysis, 15 February 2023, ieefa.org.

[11] This target was signalled in the EU's RePowerEU plan from March 2022.

[12] А. Новак, 'Российский ТЭК 2022: вызовы, итоги и перспективы', Энергетическая Политика, 13 February 2023, energypolicy.ru.

Russia's programme for the development of LNG production assumes that its current rate of growth will be maintained. Between 2016 and 2022, the production volume tripled from 11 to 33 million tonnes. It should be noted here that this mainly came about due to the start-up of the Yamal LNG project and the operation of existing plants at levels above their nominal capacity. Moreover, the new facilities meeting these needs (with the exception of one line at the Yamal LNG plant) were launched in cooperation with Western companies, which supplied the necessary technologies and components.

Chart 2. Russian LNG exports in 2016–2022



Source: the author's own compilation based on data published by the World LNG Report in 2016–22 and information provided by the Russian government.

The imposition of Western restrictions on the LNG sector (that is, a ban on the sale, transfer and exports of gas liquefaction equipment and technologies to the Russian market) precludes further cooperation between Russian and Western companies. At the declarative level, however, the sanctions have not led to a reformulation of the assumptions for the expansion of the LNG sector, which Deputy Prime Minister Novak confirmed in May last year.[13]

Despite this, the government in Moscow appears to have recognised the problem arising from the restrictions. Last year, the Russian Federation's Ministry of Economic Development lowered its forecast for the volume of LNG exports from Russia in 2023–5.[14] The current challenges to the development of the domestic industry were also addressed at a government meeting in March 2023 attended by officials from the ministry of industry and trade, the ministry of energy, and key Russian companies (Gazprom, Novatek, Rosneft and Rosatom).[15] Although the targets set out in the Long-term Programme for the Development of Liquefied Natural Gas Production in the Russian Federation were not officially changed during the meeting, deputy prime minister Novak set the strategic task of achieving a level of over 100 million tonnes of LNG production capacity per year "in the medium term". He said that in order to achieve this, it would be necessary to find a new resource base to produce the missing 34 million tonnes of LNG (he noted that the fields being developed as part of the existing and planned projects would provide the other 66 million tonnes). This points to a working revision of the assumptions for this sector: a probable reduction in the production target from 140 million to 100 million tonnes of LNG, precisely due to the difficulties arising from the sanctions. Interestingly, the matters discussed at the meeting included the need to develop home-grown technologies and train the personnel that would boost the potential of the domestic LNG sector.

[13] 'РФ пока не меняет прогноз производства СПГ к 2035 году до 140 млн т', Интерфакс, 26 May 2022, interfax.ru.

[14] S. Kardaś, 'Russia: worse forecasts for LNG exports', OSW, 10 June 2022, osw.waw.pl.

[15] 'Александр Новак провёл совещание по развитию производства СПГ в России', The Government of the Russian Federation, 7 March 2023, government.ru.

Rising burdens on the sector and dwindling resources for investment

The privileged position of the entities involved in the expansion of the Russian LNG sector (particularly the reduced taxation of their operations) has also contributed to the development of this industry to date. No export duties have so far been imposed on liquefied gas exports, while Novatek pays no extraction tax on the Yamal LNG project; it also has the option of obtaining an exemption from regional fiscal obligations.[16]

In spite of this, in 2022 discussions started on abolishing the exemptions for the LNG sector as part of a move to increase the tax burden on the oil and gas industry as a whole. Its revenues have indeed been dwindling, and the government has been trying to find new sources of funding, something which has also affected the taxation of this sector. The measures under consideration include the imposition of an export duty on LNG.[17] In addition, LNG exporters face a higher tax rate on profits from 2023: it has been raised from 20% to 34%. It is worth noting here that in February 2023, Gazprom and its subsidiaries that manage LNG projects were exempted from the higher tax burden.[18] This decision sparked a protest from Novatek, which competes with Gazprom in this sector.[19]

"No export duties have so far been imposed on liquefied gas exports, while Novatek pays no extraction tax, and has the option of obtaining an exemption from regional fiscal obligations.

At the same time, the Russian government has been seeking to spur the development of the domestic LNG sector to help it achieve the targets for increasing its production capacity. This refers in particular to large-scale facilities, where one production line is capable of producing more than two million tonnes of LNG per year. In 2021, the Ministry of Industry and Trade drafted a federal plan entitled 'LNG Market Breakthrough' that was designed to coordinate the efforts by both business and state to boost research and development (R&D) in key areas of the LNG sector.[20] The programme's main objective is to launch large-scale production of 18 types of equipment for liquefaction plants, including heat exchangers and gas turbines, by 2030.

The programme is expected to help increase the share of domestic components in LNG projects to 40% by 2024 and to 80% by 2030. Along with the implementation of home-grown liquefaction technology (patented by Novatek under the name *Arkticheskiy kaskad*), this is supposed to allow Russia to put new facilities into operation without the involvement of Western suppliers. The initial version of the LNG Market Breakthrough programme envisaged allocating more than 127 billion roubles (c. $1.5 billion) to these efforts by 2030. Some of these funds (37 billion roubles) would come from the state budget, while the rest would be covered by investments from the companies concerned (including Rosatom and Novatek).[21] However, this sum was sharply reduced in 2022 as the signalled investment needs were scaled down. The updated version of the programme has slashed the overall cost of the project to around 89 billion roubles (more than $1.1 billion), including an unspecified 'main part' to be covered by off-budget funds contributed by business entities (the government has so far set aside only 300 million roubles for 2022–3).[22] In August 2022, the Russian prime minister also promised to allocate one billion roubles to offset the costs of research and development carried out by the companies involved.[23]

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[16] S. Kardaś, 'Expansion at the state's expense: Novatek as a driving engine of the Russian LNG sector', *op. cit.*

[17] Н. Николаев, А. Волобуев, '«Газпром» предложил обложить пошлиной поставляемый в Европу СПГ', Ведомости, 5 July 2022, vedomosti.ru.

[18] 'Приняты поправки о выведении «Газпрома» из-под повышенного налога для экспортеров СПГ', Интерфакс, 9 February 2023, interfax.ru.

[19] Т. Дятел, Д. Козлов, '«Ямал СПГ» почувствовал курсовую разницу', Коммерсантъ, 11 April 2023, kommersant.ru.

[20] The Russian government has not officially published the document in full. The information in this text on the content of the plan is taken from reports in the Russian media based on access to sources from the ministry.

[21] П. Смертина, 'Сжижу отечеству', Коммерсантъ, 9 July 2021, kommersant.ru.

[22] *Idem*, 'Поддержка СПГ разжижается', Коммерсантъ, 24 August 2022, kommersant.ru.

[23] 'Правительство выделит 1 млрд рублей на разработку СПГ-оборудования', Ведомости, 17 August 2022, vedomosti.ru.

Murky prospects for new production capacity

The current production infrastructure does not allow for the implementation of the government's ambitious goals, and the Western technological sanctions also stand in their way. All the existing large and medium-scale facilities have been built in collaboration with foreign partners and with the use of solutions developed by Western companies (APCI, Linde, Shell, Air Liquide). One exception is a production line at the Yamal LNG project with a capacity of 950,000 tonnes a year, which operates using the home-grown *Arkticheskiy kaskad* technology.

The Western-imposed technological embargo has prompted most Western partners to announce the termination of their cooperation on all Russian gas liquefaction projects. While the Gazprom-owned Portovaya LNG project was put into operation after the sanctions on technology exports were imposed, it was already in its final stage at that time. The Western restrictions have mainly affected the pace of implementation of the Arctic LNG 2 project, where Novatek plans to launch three production lines, each with a capacity of 6.6 million tonnes per year. According to the company's officials, work on the first line is nearing completion, and it is expected to be operational by the end of 2023. However, the entire project involved several Western companies that withdrew in 2022, which means that it is now impossible to obtain the necessary components to launch the other two lines (including Siemens compressors, Baker Hughes turbines and Linde heat exchangers at the condensing units). The restrictions have also called into question Gazprom and RusGazDobycha's joint project, the Baltic LNG plant in Ust-Luga (which has a planned capacity of 19.5 million tonnes per year). The project was supposed to have been carried out in cooperation with Linde.

> **Unlike Gazprom and Rosneft, the latter of which has shown interest in entering the LNG market, at present only Novatek is clearly signalling an intention to pursue its own projects in the liquefied gas sector.**

It should be noted that unlike Gazprom and Rosneft (the latter has shown interest in entering the LNG market), at present only Novatek is clearly signalling an intention to pursue its own projects in the liquefied gas sector. It is the only Russian company with its own liquefaction technology (the aforementioned *Arkticheskiy kaskad*) that is actually in use. It has been introduced on the fourth production line at the Yamal LNG project, although its launch had been postponed several times. According to Novatek's CEO Leonid Mikhelson, this was due to the poor quality of components that were supplied by Russian contractors.[24] The line was finally put into operation in 2022.

Despite the emerging difficulties, work on the technology has continued, allowing Novatek to patent its improved version (*Arkticheskiy kaskad modifitsirovannyy*) last April. The company claims that this upgrade will make it possible to launch a large-scale line with a capacity to produce up to 3 million tonnes of LNG per year.[25] According to Mikhelson, the company's future projects, including the planned Obsky LNG plant with a capacity of around 6 million tonnes per year, will fully rely on home-grown technology and Russian-made equipment. However, this solution has not been put into use as yet. It is also unclear to what extent it has been developed on the basis of foreign components. The feasibility of using home-grown technology and the ability of Russian industry to supply the necessary equipment are therefore in question.

The sanctions have also hurt Russia's LNG transport capacity by making it difficult for gas carriers to serve the facilities in a timely manner. Even back in 2021, Russian shipyards were already struggling

[24] '«Новатэк» недоволен работой российских поставщиков оборудования для 4-й линии «Ямал СПГ»', ТАСС, 3 September 2021, tass.ru.

[25] Л. Баласян, 'НОВАТЭК получил патент на усовершенствованную СПГ-технологию «Арктический каскад»', Коммерсантъ, 13 April 2023, kommersant.ru.

to keep up with the freight needs of domestic companies on the Northern Sea Route. Due to delays in the construction of gas carriers for Novatek, the Zvezda shipyard in the Russian Far East was forced to ask for support from Western partners.[26] In 2023, a representative of the maritime carrier Sovkomflot (which cooperates with Novatek in the operation of vessels) announced that the delivery date for the gas carriers for Arctic LNG 2 had to be pushed back to 2024 due to the difficulties in importing foreign equipment as a result of the sanctions.[27] Also in 2022, a South Korean shipyard scrapped its contract for gas carriers for Novatek's project.[28] Significantly, Yamal LNG is also served by foreign-flagged vessels. If the sanctions are extended to cover the handling of Russian LNG shipments, Russian plants may find it difficult to export their production due to the limited number of available gas carriers.

The outlook: Russia's increasing marginalisation in global LNG exports

If the first line of Arctic LNG 2 is put into operation in late 2023, the nominal production capacity of all the Russian medium and large-scale liquefaction plants will reach around 36 million tonnes of LNG per year by early 2024. This means that Russia will fail to meet its target of boosting production to 46 million tonnes per year by the end of 2024 at the latest (in the 'low' scenario), as set out in the Long-term Programme for the Development of Liquefied Natural Gas Production in the Russian Federation. Moreover, as new projects slow down or become frozen, Russia is highly likely to fall behind other LNG exporters. Assuming that global supply will surge once new liquefaction capacity comes onstream in the US and Qatar, Russia's market share is set to plummet, which will contribute to the country's increasing marginalisation. The profitability of investing in new Russian plants will also fall sharply due to the growing competition on the market. Current investments in LNG production capacity outside Russia may even lead to a situation where global supply outstrips demand from 2026 onwards. Finally, Russia's inability to deliver more LNG abroad as Europe shifts away from pipeline gas imports may also negatively affect gas production in Russia itself over the coming years.

> **"If the sanctions are extended to cover the handling of Russian LNG shipments, Russian plants may find it difficult to export their production due to the limited number of available gas carriers.**

This negative outlook primarily stems from the introduction of the sanctions regime and the ban on exports to Russia of the Western technologies that had been used in Russian LNG projects until 2022. Therefore, it will be more difficult or even impossible to launch new projects that use home-grown technologies on a larger scale. It is still unclear to what extent Novatek's *Arkticheskiy kaskad* can be implemented in large-scale facilities, or at what rate Russia will be able to start the mass production of domestic components.

In the face of Western companies' departure from Russia, servicing and maintaining the existing lines represents another challenge. It is worth noting that maintenance work at the Sakhalin-2 project scheduled for this July has sparked market concerns over whether Russia will be able to complete it without the assistance of their liquefaction technology supplier (Shell); if this work drags on, it could become impossible to supply Asian customers with LNG from the Sakhalin fields. Novatek has also scheduled maintenance work for this year after it was postponed from last year. If difficulties with the necessary periodic maintenance of operating equipment emerge, that could cause cyclical disruptions to production, especially if there is a need to replace the components which came from Western suppliers. According to figures from the International Energy Agency, the volume of Russian LNG exports already fell by 9% in the first quarter of this year compared to the same period in 2022, partly due

[26] I. Wiśniewska, 'Północna Droga Morska w polityce Rosji', *OSW Commentary*, no. 400, 14 July 2021, osw.waw.pl.
[27] '«Совкомфлот» перенес сроки строительства газовозов для «Арктик СПГ — 2»', Прайм, 26 April 2023, 1prime.ru.
[28] Т. Дятел, 'Танкеры расплылись', Коммерсантъ, 25 May 2022, kommersant.ru.

to a shift away from production above the nominal capacity of the Sakhalin-2 terminal. This fall will also be compounded by this year's maintenance work.[29]

It should be emphasised here that developing home-grown LNG technologies and components will require ever more funding from the federal budget and from the stakeholders. However, both the reduced funding under the government's LNG Market Breakthrough programme and the rising tax burden on liquefied gas exporters indicate that it is becoming increasingly difficult to find new funds for further investments as budget revenues decline. However, the Russian government may decide to stimulate the industry by providing direct financial support for the companies. Evidence of this includes the preferential treatment Novatek has been given with regard to the distribution of foreign assets in Sakhalin-2, and the fact that the government has refrained from introducing an export duty on LNG.[30]

> **As new projects slow down or become frozen, Russia is highly likely to fall behind other LNG exporters and see its market share plummet, which will contribute to the increasing marginalisation of Russian exports.**

Should Russia fail in its efforts to commercialise its own large-scale gas liquefaction technology, it could seek to set up more small and medium-scale plants in the country. Russian industry officials have been hinting at this prospect, while also pointing to the difficulties involved. Until now, many of the companies involved in the small-scale LNG segment have operated locally as suppliers of fuel to isolated district heating networks and had no possibility of exporting it (permits for the sale of gas abroad are granted by the state). Therefore, it would be necessary to liberalise the relevant regulations in order to allow small-scale plants to sell gas in liquefied form to foreign customers. In addition, a prospect of setting up LNG plants along the Northern Sea Route was based on the assumption that they would be served by gas carriers and icebreakers. If more liquefaction facilities were to be located there, a larger fleet would be required, and this would call the profitability of these projects into question.

Nevertheless, in view of the global LNG deficit in the years to come, Russian production will still be present on the world market: it will amount to between 30 and 40 million tonnes per year, depending on the stability of the existing lines and on how well the launch of Arctic LNG 2 goes. In the event that the EU imposes an effective embargo on this fuel, Russia will likely try to redirect its volumes to other customers such as Turkey and India. It is currently difficult to institute a ban on Russian LNG imports to the EU due to European fears of winter shortages. These worries are compounded by the growing competition for this fuel on the global market amid concerns over a potential supply deficit. Despite this, one measure the EU could take to limit LNG imports from Russia would be to formally restrict the possibility of entering into new supply contracts. However, we should remember that if Russia is cut off from Western technology, the Russian government will still have the option of seeking alternative suppliers of components, for example in Asia. In this situation, it would be worth considering the extension of Western secondary sanctions to include those entities that cooperate with Russian companies on new projects. Such restrictions could further slow down the expansion of Russia's LNG sector. They would also be justified on environmental grounds, as Russia's mining projects are located in permafrost areas.

In the long term, however, as a surge in new liquefaction capacity comes onstream from 2025 onwards in countries such as the US and Qatar, it will be more difficult for Russian producers to return to their position as one of the world's largest LNG exporters, which will reduce their influence on the market. LNG sales will also generate less revenue both for the Russian budget and for the local business linked to the ruling elite, such as Novatek.

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[29] 'Gas Market Report, Q2–2023', International Energy Agency, May 2023, iea.org.

[30] F. Rudnik, 'Novatek is taking over Shell's assets in Sakhalin', OSW, 26 April 2023, osw.waw.pl.