

Sung, Jinsok

**Research Report**

## Implications of sectoral sanctions on Russia's gas sector

BOFIT Policy Brief, No. 12/2020

**Provided in Cooperation with:**

Bank of Finland, Helsinki

*Suggested Citation:* Sung, Jinsok (2020) : Implications of sectoral sanctions on Russia's gas sector, BOFIT Policy Brief, No. 12/2020, Bank of Finland, Institute for Economics in Transition (BOFIT), Helsinki,  
<https://nbn-resolving.de/urn:nbn:fi:bof-202012032519>

This Version is available at:

<https://hdl.handle.net/10419/251699>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

BOFIT Policy Brief  
2020 No. 12

Jinsok Sung

## Implications of sectoral sanctions on Russia's gas sector



Bank of Finland, BOFIT  
Institute for Economies in Transition

BOFIT Policy Brief  
Editor-in-Chief Mikko Mäkinen

BOFIT Policy Brief 12/2020  
3 December 2020

Jinsok Sung  
Implications of sectoral sanctions on Russia's gas sector

ISSN 2342-205X (online)

Bank of Finland  
BOFIT – Institute for Economies in Transition

PO Box 160  
FIN-00101 Helsinki

Phone: +358 9 183 2268

Email: [bofit@bof.fi](mailto:bofit@bof.fi)  
Website: [www.bofit.fi/en](http://www.bofit.fi/en)

The opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the Bank of Finland.

---

## Contents

Abstract .....	3
1. Introduction.....	4
2. Western sectoral sanctions on the Russian oil and gas industry .....	5
3. Russian gas projects influenced by US sanctions .....	7
3.1. Yamal LNG.....	7
3.2. Yuzhno-Kirinskoe field.....	8
3.3. Nord Stream 2 pipeline .....	9
4. Russian gas companies respond to sanctions .....	9
4.1. Localization of LNG technology and shipping capabilities.....	9
4.2. Acceleration of market diversification.....	12
5. Conclusions.....	13
References .....	14

Jinsok Sung<sup>1</sup>

# Implications of sectoral sanctions on Russia's gas sector

## Abstract

This paper considers the implications of Western economic sanctions on Russia's natural gas sector. Despite exposures to increased risk to the gas industry, companies in the sector accelerated localization of imported technologies and moved into new markets. Recent evidence of this shift includes the launch of pipeline gas exports to China in 2019 and development of LNG capabilities to serve the global market.

**Keywords:** Natural gas market, sectoral sanctions, localization

## Acknowledgments

Many thanks for the helpful comments on the various versions of this paper, including my colleagues at BOFIT (Laura Solanko, Heli Simola, Zuzana Fungacova, and Mikko Mäkinen), Gregory Moore for the language editing as well as Amina Talipova, Inna Kirilkina, Ekaterina Orlova and Andrey Suldin. All remaining errors or omissions are mine.

---

<sup>1</sup> Jinsok Sung (Russian Gas Society). E-mail: jinsok.sung@outlook.com. This paper is an individual work and the views expressed in the paper are those of the author and does not necessarily reflect those of Russian Gas Society.

# 1. Introduction

The EU, the US and other countries have imposed sanctions on the Russian economy. The sanctions target various industries in the Russian economy, including the energy sector. The economic impacts of sanctions on the Russian economy have been examined by Gurvich and Prilepskiy (2015), Korhonen, Simola and Solanko (2018), Barseghyan (2019) and others. A general finding of these studies is that sanctions caused Russia to suffer an annual GDP loss of 0.2-0.7% (Simola, 2019).

EU and US sectoral sanctions on Russia's oil sector focused on thwarting Russia's plans for production in Arctic off-shore areas and deepwater oil fields, as well as complicating Russian efforts at shale-oil production. The selective targeting of Western sanctions on specific companies and projects in the oil sector has been extensively analysed by Fjaertoft and Overland (2015), Guliyev (2015) and Mitrova, Grushevenko and Malov (2018). These authors suggest that sanctions have had little impact on Russian oil production and exports.

Russia was the world's second largest producer and largest exporter of natural gas in 2019 (BP Statistical Review of World Energy, 2020). By law, Gazprom, has exclusive rights over the export of pipeline gas from Russia. Gazprom, Gazprom Export, Gazprom Gazonefteproduct Holdings, Rosneft, Yamal LNG, Arctic LNG 1, Arctic LNG 2 and Arctic LNG 3 hold federal licenses for the export of liquefied natural gas (LNG).<sup>2</sup>

As a part of its export strategy, NOVATEK is actively developing LNG exports projects on the Yamal and Gydan peninsulas in the Arctic circle. Gazprom and Rosneft have LNG projects in the planning phase or under construction. The Russian investment group A-Property plans to build a large LNG export terminal on the coast of Khabarovsk region in the Russian Far East.<sup>3</sup>

Russia has vast potential for "small-scale" LNG exports based on stranded gas fields (mainly small fields that cannot readily be connected to pipelines in East Siberia).<sup>4</sup> Indeed, small-scale LNG exports by rail from the Republic of Sakha (Yakutia) to Mongolia began in 2019.<sup>5</sup> Given the increasing importance of natural gas in the global energy market, the role of the gas industry for Russian economy, as well as the emerging importance of LNG exports and the Russia's major position in the global gas market, the implications of sanctions on the Russian gas sector warrants discussion.

I start the discussion with an examination of the influence of economic sanctions on the gas sector in Russia and how the gas industry has responded to the challenges from sanctions in recent years. I then consider Russia's development of local manufacturing capabilities and localization of critical technologies to LNG production. Finally, I consider Russia's diversification of markets to strengthen the country's role in the global LNG market and support the pivot to Asian energy markets, particularly the Chinese market.

---

<sup>2</sup> TASS: <https://tass.ru/ekonomika/9984947>.

<sup>3</sup> Interfax Russia: <https://www.interfax-russia.ru/far-east/news/yakutiya-k-2022g-planiruet-vernutsya-k-rostu-ekonomiki-za-schet-proektov-gazproma-a-properti-kolmara-polymetal-i-nordgold>.

<sup>4</sup> LNG projects are often classified according to production capacity, e.g. small-scale, mid-scale or large-scale LNG. While production capacity parameters of small-, mid- and large-scale LNG projects varies by organization, typical definitions are (i) small-scale LNG = production capacity less than 80,000 metric tons per year, (ii) mid-scale LNG = 100,000 to 2 million tons per year, and (iii) large-scale LNG = more than 2 million tons per year. Large-scale (or "world-scale") LNG projects target consumers in the global LNG market. Target consumers of small-scale and mid-scale LNG projects are generally domestic or regional buyers (SKOLKOVO, 2018b).

<sup>5</sup> Gazprom Export: <http://www.gazpromexport.com/en/presscenter/press/2406/>.

## 2. Western sectoral sanctions on the Russian oil and gas industry

EU and US sectoral sanctions focus on three sectors of the Russian economy. They include companies in the energy, finance and military sectors. EU and US sanctions apply to selected companies in these sectors or to specific Arctic offshore, deep-water or shale-oil projects.<sup>6</sup> While the US has imposed sanctions on the oil and gas industry, the EU's energy sector sanctions only target the oil industry. EU and US sectoral sanctions were introduced in 2014 enacted by EU Council Decision 2014/512/CFSP and Executive Order 13662, respectively.

The initial sanctions decision by the European Council (Council Decision 2014/512/CFSP issued in July 2014) was amended by Council Decision 2014/659/CFSP in September 2014 and EU Council Decision 2014/872/CFSP in December 2014. The Council of the European Union has since reviewed and extended the sanctions every six months.

US executive orders, i.e. orders signed by the US president, have been used to manage US government action. Directives for US sanctions on Russia are set by the Office of Foreign Asset Control (OFAC), which is part of the US Department of the Treasury. US sectoral sanctions are specified under Executive Order 13662 issued in March 2014. Directives 1 and 2, issued in July 2014, were amended in September 2014 and September 2017 in response to the Countering America's Adversaries Through Sanctions Act (CAATSA), which was signed into law by the US president in August 2017. Directive 3 was issued in September 2014. Directive 4 was issued in September 2014 and revised in October 2017. It was followed by the Protecting Europe's Energy Security Act (PEESA) of 2019. The act was incorporated into the annual national defence spending bill, the National Defense Authorization Act for Fiscal Year 2020 (NDAA).

Table 1 presents EU sanctions on oil sector in Russia. The EU finance sanction, defined by Article 1 of the EU Council Decision 2014/872/CFSP, prohibits access of specified companies to EU capital market financing instruments with maturities exceeding 30 days. The financing sanctions on the energy sector apply to Gazpromneft, Rosneft, Transneft, as well as their subsidiaries directly or indirectly owned with 50% or larger stake. The oil project sanctions do not specify any companies. These sanctions were added to the EU sectoral sanction list in Council Decision 2014/659/CFSP of September 2014. The EU oil project sanctions, defined by the Article 4 under Council Decision 2014/872/CFSP, restrict access to certain technologies and services that could potentially be used for oil production and exploration in Russia's deep-water areas (150m depth line), shale projects or Arctic offshore oil projects.

Table 1. EU sanctions on Russia's oil sector

<b>Article 1 of Council Decision 2014/872/CFSP</b> (amending Council Decisions 2014/512/CFSP and 2014/659/CFSP)	Restricted access of specified companies to EU capital market instruments with maturities exceeding 30 days.
<b>Article 4 of Council Decision 2014/872/CFSP</b> (amending Council Decisions 2014/512/CFSP and 2014/659/CFSP)	Restrictions on certain technologies and services that can potentially be used for oil production and exploration in deepwater (depths of 150m or more), shale projects or Arctic offshore oil projects.

Sources: EU Council Decision 2014/512/CFSP, EU Council Decision 2014/659/CFSP, EU Council Decision 2014/872/CFSP.

<sup>6</sup> US sanctions on Russia, Congressional Research Service (CRS) (2020).

US sectoral sanctions are listed in Table 2. Directives 1 and 3 are financial sanctions on the financial sector and defence industries. Directive 2 places a new financing sanction on the energy sector. It applies to loans longer than 60 days after a 2017 revision from 90-day lending to Rosneft, Transneft, NOVATEK and their various subsidiaries where those entities hold stakes of 50% or more. Directive 4 prohibits US companies from doing business with identified companies involved in development of Russian deepwater (500 feet) areas, Arctic offshore projects, or shale projects with potential to produce oil. The oil project sanction covers Gazprom, Lukoil, Surgutneftegaz, Rosneft and their subsidiaries where those entities hold stakes of 50% or more (Tables 2 and 3). The directive was expanded in 2017 to cover projects anywhere in the world where companies on the list held an ownership interest of at least 33% or a majority of voting interests (CRS, 2020 and US Department of the Treasury, 2020).

Table 2. US directives under Executive Order 13662

<b>Directive 1</b>	Restrictions to new equity investment and financing other than 14-day lending (previously 90 and 30 days) for identified entities in financial sector
<b>Directive 2</b>	Restrictions to new financing other than 60-day lending (previously 90-day lending) for identified entities in energy sector
<b>Directive 3</b>	Restrictions to new financing other than 30-day lending for identified entities in defence sector
<b>Directive 4</b>	It prohibits U.S. trade, provision of a certain services and technology with identified entities related to the development of Russian deepwater (500 feet), Arctic offshore, or shale projects that have the potential to produce oil project and such projects worldwide in which those entities have an ownership interest of at least 33% or a majority of voting interests (previously applied to projects only in Russia)

Source: US Department of the Treasury (2020).

Companies and projects under US oil project sanctions (Directive 4) are subject to the Export Administration Regulations (EAR), implemented by the Bureau of Industry and Security (BIS) of the Department of Commerce. EAR forbids the export, re-export and transfer certain goods to the companies under sanctions without obtaining a BIS license. PEESA, included in the NDAA for Fiscal Year 2020 allows for the imposition of sanctions on companies providing pipe-laying vessels for the construction of the Nord Stream 2 and TurkStream natural gas pipelines (CRS, 2020).

Table 3 summarizes Russian oil and gas companies under the EU and US sectoral sanctions. The EU and US sectoral sanctions on oil sector have a similar structure as when the EU and US reportedly worked in conjunction to develop sanctions in 2014. The restrictions included finance sanctions on the energy sector and provision of services and technologies related to Arctic, offshore and shale oil projects. The Russian gas sector, in contrast, is only affected by the US sanctions. NOVATEK is listed on the sectoral finance sanction and Gazprom on the oil project sanction. The Nord Stream 2 and TurkStream pipelines are targeted by the NDAA for Fiscal Year 2020 (CRS, 2020).



Table 3. Russian oil and gas companies subject to EU and US sectoral sanctions

Company/project (*subsidiary)	Company ranking by size in Russia	EU sectoral finance sanctions	EU sectoral oil sanctions (no companies specified)	US sectoral finance sanction	US sectoral oil project sanction	NDAAs for Fiscal Year 2020
Gazprom	1				X	
*Gazpromneft		X			X	
*Yuzhno-Kirinskoe field					X	
*Nord Stream 2						X
*TurkStream						X
Lukoil	2				X	
Rosneft	3	X		X	X	
Surgutneftegaz	6				X	
Transneft	13	X		X		
NOVATEK	15			X		

Sources: CRS (2020). The largest companies in Russia: <https://www.rbc.ru/rbc500/>.

All sectoral sanctions have had or could have direct or indirect influences on Russia's oil and gas sectors, and US sectoral sanctions have tended to expand and strengthen over time. Russia's gas industry is less vulnerable to sanctions than its oil industry, thanks to massive conventional gas fields that are yet to be developed or just under development. While Russian gas companies possess adequate experience and skills needs to develop these fields on their own, some gas projects have nevertheless been affected directly or indirectly by sanctions.

### 3. Russian gas projects influenced by US sanctions

This section considers three gas projects affected by US sanctions.

#### 3.1. Yamal LNG

Total S.A., a French oil and gas company, was the first international company to join the Yamal LNG project, acquiring 20% stake in the project in 2011. Total was followed by the Chinese state oil company China National Petroleum Corporation (CNPC), which acquired a 20% stake in 2014, and the Silk Road Fund, which acquired a 9.9% stake in the project in 2015. NOVATEK retains 50.1% of shares. NOVATEK, an operator of Yamal LNG, was added to the US sectoral sanction list during 2014 in the midst of construction of Yamal LNG. The move by the US treasury department limited the access of participants to dollar-based loans. According to media reports, the sanctions created risks of project delays and even provoked discussion of calling the whole thing off.<sup>7</sup> In any case, it was clear Yamal LNG faced obstacles in financing the project.

The project's financing difficulties were eventually resolved through the increased participation of Chinese, European, Japanese and Russian entities. In 2015, Silk Road Fund, a Chinese state fund, acquired a 9.9% of stake in the project, while Russia's National Welfare Fund provided a loan of 150 billion rubles.<sup>8</sup> In 2016, Chinese and Japanese state banks and European banks signed credit deals

<sup>7</sup> Financial Times: <https://www.ft.com/content/3f638d74-956d-11e8-b67b-b8205561c3fe>.

<sup>8</sup> Silk Road Fund: <http://www.silkroadfund.com.cn/enwap/27389/27391/31799/index.html>.

with the project (see Table 4). Loans from Chinese banks provided much of the necessary external financing capital through separate credit deals worth 9.3 billion euros and 9.8 billion yuan reached with Export-Import Bank of China and China Development Bank, respectively. That same year loans worth 3.6 billion euros from Sberbank and Gazprombank of Russia were signed. Further, two smaller credit deals with Intesa Sanpaolo and Japan Bank of International Corporation worth 0.75 billion and 0.2 billion euros were also secured in 2016. In 2017, a final loan deal for Yamal LNG worth 0.425 billion euros was jointly provided by Raiffeisen Bank International AG and Intesa Sanpaolo.

The cost of the project is \$27 billion. Out of that total, \$19 billion in loan deals from Russian and international financial institutions make it the largest project financing in Russian history.<sup>9</sup> The remaining \$8 billion have been provided by NOVATEK and its international partners, TOTAL, CNPC and the Silk Road Fund, who joined the project by acquiring stakes in the project in 2011, 2014 and 2015, respectively (Table 4). Despite early stage difficulties in financing due to the US finance sanctions, Yamal LNG was able to begin its operation at the end of 2017 as planned.

Table 4. Financing structure of Yamal LNG

Entity	Amount	Year of signing
NOVATEK	50.1% of shares	
Total	20% of shares	2011
CNPC	20% of shares	2014
Silk Road Fund	9.9% of shares	2015
Russia's National Welfare Fund	RUB 150 billion loan	2015
China Development Bank and the Export-Import Bank of China	EUR 9.3 billion loan	2016
China Development Bank and the Export-Import Bank of China	CNY 9.8 billion loan	2016
Gazprombank and Sberbank	EUR 3.6 billion loan	2016
Intesa Sanpaolo	EUR 750 million loan	2016
Japan Bank of International Cooperation	EUR 200 million loan	2016
Raiffeisen Bank International and Intesa Sanpaolo	EUR 425 million loan	2017

Sources: press releases of NOVATEK, Henderson and Yermakov (2019). Ownership stakes of 2015. The reported loan deals do not include any shareholder stake in the Yamal LNG project.

### 3.2. Yuzhno-Kirinskoe field

The field, discovered in 2010, contains gas and gas-condensate sources. It is operated by Gazprom in the Sea of Okhotsk (east of Sakhalin Island). It was classified as a deepwater oil project under US sanctions in 2015, and is the only oil & gas field singled out by US sectoral sanctions. The field is classified as oil project because gas condensate is often classified as oil. Commercial production at the Yuzhno-Kirinskoe field was initially planned to commence in 2021, but now commissioning has been pushed back to 2023.<sup>10</sup> While there is no direct indication the postponement was caused by the US sectoral sanctions, some media sources claim that difficulties in purchasing offshore equipment delayed the project.

While Russia is the largest exporter of natural gas in the world, its current presence in the Asian gas market has been limited. Therefore, together with pipeline gas export projects to China, such as the operating Power of Siberia 1 and the proposed Power of Siberia 2, the field can be an important

<sup>9</sup> Henderson and Yermakov (2019).

<sup>10</sup> TASS: <https://tass.com/economy/961912>.

source for Russian exports to countries in the Asia Pacific region in future as it could be a feedstock field for potential Vladivostok LNG, Sakhalin 2 LNG expansion and Sakhalin-China pipeline projects.

### 3.3. Nord Stream 2 pipeline

Construction of the Nord Stream 2 gas pipeline, which stretches from Ust-Luga in Leningradsky region of Russia along the Baltic Sea bottom to Germany, began in 2018. Its financing deal was signed with ENGIE (French), OMV (Austrian), Royal Dutch Shell (British-Dutch), Uniper (German)<sup>11</sup> and Wintershall Dea (German) in April 2017. Gas transmission was originally scheduled for early 2020. However, commissioning was postponed after the imposition of the US sanctions on the project in December 2019 under the NDAA for Fiscal Year 2020. The TurkStream gas pipeline, which was also included on the US sanction list, nevertheless began to supply gas to Turkey in January 2020.<sup>12</sup>

Both CAATSA and the NDAA for Fiscal Year 2020 can be used to oppose new energy export pipelines from Russia to the US allies. However, CAATSA was not used to counter the construction of Nord Stream 2 (CRS, 2020).<sup>13</sup> The NDAA for Fiscal Year 2020 resulted in the departure of pipeline-laying vessels of the Swiss-Dutch company Allseas, which was taking part in the Nord Stream 2 project. Allseas suspended its involvement in the project to avoid US sanctions. Nord Stream 2 received its final necessary permissions for construction from Danish Energy Agency (DEA). In July 2020, the DEA granted Nord Stream 2 a permit for resumption and completion of the pipeline construction through Danish territorial waters. In October 2020, an operation permit of the project was granted by DEA.<sup>14</sup> Although the project is currently on hold necessary permits are in place and Nord Stream 2 can begin construction of the 160 km leg needed to finish the pipeline. The US Congress is preparing an amendment to the NDAA for Fiscal Year 2021, which may include additional sanctions on Nord Stream 2 and the onshore extension section of the TurkStream string that runs from Bulgaria to Serbia and Hungary.<sup>15</sup>

## 4. Russian gas companies respond to sanctions

### 4.1. Localization of LNG technology and shipping capabilities

Western sanctions have made the substitution of critical foreign technologies with local production imperative. Although sanctions do not apply to the technology used in gas production and LNG facilities, Russian energy companies have actively responded to the risk of future sanctions by developing their own LNG technology. The importance of domestically produced LNG technology was emphasized in the government's "Road Map" on localization of critically important equipment

<sup>11</sup> In March 2020, Fortum, a Finnish energy company, became the majority owner of the company.

<sup>12</sup> TurkStream has parallel strings of gas pipelines running from Russia to Turkey. The first string carries gas to Turkish customers, The second string is dedicated to gas transmission to southern and southeastern Europe. TurkStream has an aggregate throughput capacity of 31.5 billion cubic meters, or 15.75 billion cubic meters per string.

<sup>13</sup> US Department of State: <https://www.state.gov/caatsa-crieea-section-232-public-guidance/>.

<sup>14</sup> Danish Energy Agency:

<https://www.en-press.ens.dk/pressreleases/nord-stream-2-ag-may-use-pipe-laying-vessels-with-anchors-3020058>, and <https://en-press.ens.dk/pressreleases/permit-for-operation-of-the-nord-stream-2-project-is-granted-by-the-danish-energy-agency-3039449>.

<sup>15</sup> TASS: <https://www.tass.com/economy/1179067>.

for mid- and large-scale LNG projects and LNG carriers approved in 2019.<sup>16</sup> At the moment, only a few international companies have experience in the construction of large-scale LNG production facilities and their technologies are used in LNG export plants around the world. These technologies are incorporated in the Sakhalin 2 LNG and Yamal LNG facilities.

Table 5 shows companies with natural gas liquefaction technology. Key LNG technology areas and equipment required for local production in Russia include liquefaction technology, gas turbines, compressors and heat exchangers. As of 2020, liquefaction technologies developed by five companies are commercially used for large-scale LNG plants operations: AirProducts (US), ConocoPhilips (US), Shell (British-Dutch) and Linde (US/Germany) and Equinor (Norway).

Localization efforts of LNG technologies in Russia is led by NOVATEK. The company has developed its own LNG liquefaction technology. This innovation, christened “Arctic Cascade,” will first be incorporated in Yamal LNG’s 4<sup>th</sup> train, which has a production capacity of 0.9 million metric tons per year. Arctic Cascade is suited to cold environments, which is where all NOVATEK’s planned LNG plants will be located. Arctic Cascade technology will be used in Obsky LNG’s three trains.<sup>17</sup> The facility has a planned capacity of 1.6 million metric tons per year.<sup>18</sup> Train 4 of Yamal LNG is scheduled to begin operation at the end of 2020, while Obsky LNG is planned to come on stream in 2024. Gazprom is also developing its own liquefaction technology for large-scale LNG projects, but has yet to apply it.

There is a larger selection of liquefaction technology for small-scale LNG projects. For example, the Finnish company Wärtsilä provides solutions for various small-scale LNG plants around the world, including LNG fuelling stations for trucks and ships. Air Liquide (France) is another well-known provider of small-scale LNG solutions.

Table 5. Companies with natural gas liquefaction technology

Producers of natural gas liquefaction technologies for large-scale LNG projects	Country
AirProducts	US
ConocoPhilips	US
Linde	US-Germany
Equinor (formerly Statoil)	Norway
Shell	British-Dutch
*Gazprom	Russia
Producers of natural gas liquefaction technologies for small- and mid-scale LNG plants (selected)	Country
Air Liquide	France
NOVATEK	Russia
Wärtsilä	Finland

Sources: Mid-scale LNG in Russia: Between the sky and earth, SKOLKOVO (2018b), Company websites and media sources.

\* Not yet applied to LNG projects in operation.

<sup>16</sup> Ministry of Energy of the Russian Federation (2019): <https://www.minenergo.gov.ru/node/7693>.

<sup>17</sup> The LNG train is the LNG plant’s liquefaction and purification facilities.

<sup>18</sup> Henderson and Yermakov (2019).

Table 6 shows LNG technologies and equipment adopted for Russian LNG projects. Most liquefaction technology, compressors, heat exchangers and turbines are imported. While such equipment is also produced in Russia, it has not been used because its capacity was inappropriate for the LNG projects in question or otherwise not specifically suited. For example, the liquefaction technology of Shell and AirProducts is used for Sakhalin 2 LNG and Yamal LNG trains 1,2 and 3. NOVATEK's Arctic 2 LNG relies on Linde's technology.

Russia's import substitution policies in the LNG industry are gradually beginning to show results. Liquefaction technology, heat exchangers and compressors, made by Russian companies, will be part of NOVATEK's Yamal LNG 4 and Obsky LNG, and there are increased prospects for import substitution in future LNG projects. While mid-scale Yamal LNG 4 has succeeded in increasing its share of domestically produced equipment and Obsky LNG is expected to boost its share of domestically produced equipment, it is early to judge how successful the localization process in energy industry has been as a whole.<sup>19</sup> While Western sanctions have been the driving force of development of domestically made products, it is likely that some localization would have taken place without such pressure. In pipeline construction, for example, Russia is largely self-sufficient. In other words, the technologies needed for LNG exports would likely have been developed, but more gradually.

LNG carriers are another important aspect of large-scale LNG projects. For Yamal LNG, a fleet of Arc7 ice-class LNG have been built by a consortium of Finnish, Korean and Russian companies. The fleet navigate from ports on the Yamal peninsula through some of the coldest seas on earth. The 15 Arc7 ice-class carriers have been designed by the Finnish Aker Arctic and constructed in the shipyards of Korea's Daewoo Shipbuilding and Marine Engineering (Aker Arctic). The Finnish Wärtsilä will provide navigational systems for five ice-breaking LNG tankers<sup>20</sup> for Arctic LNG 2. The Korean shipyard Samsung Heavy Industry, a technology partner of Zvezda shipyard in Vladivostok, will assist in the manufacturing of the LNG carriers. Even with these Arctic-class carriers, the Northern Sea route cannot be navigated during winter. NOVATEK is thus planning to set up transshipment and storage terminal on the Kamchatka peninsula from which LNG cargoes can be transported to Asian countries throughout the year. The transshipment terminal could eventually operate as a regional transit hub and storage terminal for NOVATEK.

<sup>19</sup> Kommersant: <https://www.kommersant.ru/doc/4227287>.

<sup>20</sup> Wärtsilä: <https://www.wartsila.com/media/news/16-07-2020-wartsila-to-equip-5-lng-gas-carriers-with-fully-integrated-bridge-systems-under-arctic-lng-2-project-2747275>.

Samsung Heavy Industry: [http://www.samsungshi.com/Eng/pr/news\\_view.aspx?Seq=1125&mac=bfb3750527f64b5c3916171df8d48565](http://www.samsungshi.com/Eng/pr/news_view.aspx?Seq=1125&mac=bfb3750527f64b5c3916171df8d48565).

Table 6. List of companies at Russian LNG projects

Project	Capacity of production line, (million tonnes)	Liquefaction technology	Heat exchanger	Turbine	Compressor	Status
<i>A. Operational LNG projects</i>						
Sakhalin 2 LNG	4.8 (x2)	Shell	Linde	GE	Elliott	Operational
Vysotsk LNG	0.66	Air Liquide		Caterpillar/Solar Turbines	REP Holdings	Operational
Yamal LNG T 1-3	5.5 (x3)	AirProduct	AirProduct	GE/Baker Hughes	GE/Baker Hughes	Operational
<i>B. LNG projects under construction or in planning</i>						
Arctic 1 LNG	Approximately 20					In planning
Arctic 2 LNG	6.6 (x3)	Linde		GE/Baker Hughes/ Nuovo Pignone	Siemens	Under construction
Baltic LNG	6.5(x2)					In planning
Far East LNG	6.2					In planning
Obskiy LNG	1.6 (x3)	NOVATEK	Zio-Podolsk	Siemens	Kazancompressormash	In planning
Portovaya LNG	1.5	Linde	Linde			Under construction
Vladivostok LNG	1.5	Gazprom				In planning
Yamal LNG T 4	0.9	NOVATEK	Zio Pololsk/ Cryogenmash		Kazancompressormash	Under construction

Sources: Company websites and media sources.

## 4.2. Acceleration of market diversification

Gas deliveries from the Soviet Union to Europe began in 1968. Up to 2009, Russian gas exports were entirely dependent on the European market (with the exception of sales to CIS countries through pipelines inherited from the Soviet Union). The inauguration of Sakhalin 2 LNG in 2009 heralded a new era of serving Asian customers, primarily Japanese and Korean companies at the start.

US sanctions have sped up Russia's pivot to Asia. The shift to China has been particularly beneficial for Russia's energy industry (Paik, 2015). Specifically, economic sanctions accelerated Russia's negotiations with China on the Power of Siberia pipeline, which had previously dragged on for years. Today, gas is transmitted from eastern Siberia to northeastern China. The Power of Siberia pipeline allows Russia to deliver a considerable amount of gas to its fastest growing market, and even increase market share in China. The planned Power of Siberia 2 pipeline, which will run from Yamal

peninsular to China through Mongolia, has reached the pre-investment stage. Its feasibility study is currently being conducted.<sup>21</sup>

The changing global gas market has also contributed to market diversification. While European import volumes are expected to grow over the short and medium term (due to falling European domestic production), the long-term demand outlook for the European market is stable at best as the market embrace of renewables is fairly strong. It makes sense for Russia to increase gas sales volumes in Asia and the LNG market, especially given the demand of its huge neighbour and the rapid growth of the global LNG market, which is being led by countries in the Asia Pacific region. Russia's gas export policy thus must adapt on multiple fronts to deal with these new realities. Regional diversification gives Russia opportunities to more flexibly react to changes in the main European, Chinese and LNG markets.<sup>22</sup>

## 5. Conclusions

Sectoral sanctions on Russia's energy sector have so far had limited impact on the gas sector. However, expanding sanctions raises the spectre of investor risk and complicates project preparations and risk-management. US sanctions on Nord Stream 2, for example, were implemented surprisingly late in the project, sending a signal to investors that a project at any stage of development could be targeted. Some investment slack in the Russian gas sector has been taken up by Asian investors and companies, but not entirely. Western energy majors still possess critical technologies and have proven track records in successfully executing world-class energy projects.

The Russian gas industry faces the possibility of an intensified sanction regime, low commodity prices (including oil & gas) resulting from increased competition and demand shocks (e.g. the Covid-19 pandemic), as well as uncertainty in long-term demand caused by Europe's fast-changing energy environment. In Russia, these factors have spurred companies to master key technologies and produce equipment locally to protect projects from external risks and to facilitate export diversification and development of LNG export projects. Although export markets for Russian gas continue to diversify and Russia has achieved a certain level of success in substituting foreign LNG technologies with local innovations, sanctions show no signs of easing and the business risks facing investors show no signs of abating.

---

<sup>21</sup> Gazprom: <https://www.gazprom.com/press/news/2020/march/article502475/>.

<sup>22</sup> Konoplyanik (2015).



---

## References

- Aker Arctic (2018). Design of an LNG icebreaking ship. <https://akerarctic.fi/en/publications/design-lng-ice-breaker-ship/>.
- Barseghyan (2019). Sanctions and counter-sanctions: What did they do? BOFIT Discussion Paper 24/2019.
- BP Statistical Review of World Energy 2020. <https://www.bp.com>.
- Danish Energy Agency (2020). Nord Stream 2 AG may use pipe-laying vessels with anchors. Press release.
- EU Council Decision 2014/512/CFSP.
- EU Council Decision 2014/659/CFSP.
- EU Council Decision 2014/872/CFSP.
- Financial Times (2018). *Russia's Novatek shows resilience despite sanctions*. <https://www.ft.com/content/3f638d74-956d-11e8-b67b-b8205561c3fe>.
- Fjaertoft and Overland (2015). Financial Sanctions Impact Russian Oil, Equipment Export Ban's Effects Limited. *Oil and Gas Journal*, 113(8), 66-72.
- Gazprom (2020). Gazprom instructed to proceed to pre-investment phase in Power of Siberia 2 project. Press release. <https://www.gazprom.com/press/news/2020/march/article502475/>.
- Gazprom Export website (2019). The first Russian gas sent to Mongolia. Gazprom Export News. <http://www.gazpromexport.com/en/presscenter/press/2406/>.
- Gazprom Export website (2020). Transportation. <http://www.gazpromexport.ru/en/projects/transportation/>.
- Guliyev (2015). Energy policy of Russian oil and gas companies in response to the sanctions. *Vestnik Novosibirsk State University of Economics and Management (NSUEM)*, 2015(2), 283-290.
- Gurvich and Prilepskiy (2015). Impact of the financial sanctions on the Russian economy. *Russian Journal of Economics*, 1(4), 359-385.
- Henderson and Yermakov (2019). Russian LNG: Becoming a global force, Natural Gas Research Programme #154, Oxford Institute for Energy Studies.
- Interfax Russia (2020). Якутия к 2022г планирует вернуться к росту экономики за счет проектов Газпрома, А-Проперти, Колмара, Polymetal и Nordgold. <https://www.interfax-russia.ru/far-east/news/yakutiya-k-2022g-planiruet-vernutsya-k-rostu-ekonomiki-za-schet-proektov-gazproma-a-properti-kolmara-polymetal-i-nordgold> .



- International Energy Agency (2019). The role of gas in today's energy transitions.  
<https://www.iea.org/reports/the-role-of-gas-in-todays-energy-transitions>.
- Japan Oil Gas and Metals Corporation (JOGMEC) (2019). Final Investment Decision for Arctic LNG 2 Project in Russia. Press release.  
[http://www.jogmec.go.jp/english/news/release/news\\_15\\_000001\\_00002.html](http://www.jogmec.go.jp/english/news/release/news_15_000001_00002.html).
- Klimentyev, Mitrova, Sobko, Rodichkin, Talipova, Sung, Tkachenko, Karasevich, Kirilkina and Ishmuratova (eds.) by Klimentyev, Mitrova and Sobko (2018b). Mid-scale LNG in Russia: Between the sky and earth (monograph). SKOLKOVO.
- Kommersant (2020). Обскому СПГ вставят иностранную турбину.  
<https://www.kommersant.ru/doc/4227287>
- Konoplyanik (2015). Russia's evolving gas export strategy, issue. 408, October, Platts Energy Economist.
- Korhonen, Simola and Solanko (2018). Sanctions, counter-sanctions and Russia: Effects on economy, trade and finance. BOFIT Policy Brief 4/2018.
- Ministry of Energy, Russian Federation (2019). Import replacement at fuel and energy sectors.  
<https://minenergo.gov.ru/node/7693>.
- Mitrova, Gruvshenko and Malov (2018a). The future of oil production in Russia: Life under sanctions. (monograph). SKOLKOVO.
- NOVATEK (2019). Yamal LNG Increased Shipments to the Asian Pacific Markets via NSR. Press release.  
[http://www.novatek.ru/en/investors/events/archive/index.php?id\\_4=3465&afrom\\_4=01.01.2019&ato\\_4=31.12.2019&from\\_4=2](http://www.novatek.ru/en/investors/events/archive/index.php?id_4=3465&afrom_4=01.01.2019&ato_4=31.12.2019&from_4=2).
- Paik (2015). Sino-Russian Gas and Oil Cooperation: Entering into a New Era of Strategic Partnership? OIES Paper: WPM 59.
- RosBusinessConsulting (RBC). The largest companies in Russia. <https://www.rbc.ru/rbc500/>.
- Samsung Heavy Industry (SHI) (2019). SHI to take part in Arctic LNG 2 project for cooperation in Arctic LNG carriers. Press release.  
[http://www.samsungshi.com/Eng/Pr/news\\_view.aspx?Page=1&Seq=1125&mac=cd427d67430a6b389026b70801032204](http://www.samsungshi.com/Eng/Pr/news_view.aspx?Page=1&Seq=1125&mac=cd427d67430a6b389026b70801032204).
- Silk Road Fund (2015). Silk Road fund and Novatek sign binding definitive agreements regarding Yamal LNG. Press release.  
<http://www.silkroadfund.com.cn/enwap/27389/27391/31799/index.html>.
- Simola (2019). Effects of external shocks on Russian economy. BOFIT Policy Brief 4/2019.

---

TASS (2017). Gazprom to launch Yuzhno-Kirinskoye field in 2023.

<https://tass.com/economy/961912>.

TASS (2020). New US sanctions will not have serious impact on TurkStream.

<https://tass.com/economy/1179067>.

TASS (2020). One more structure of Gazprom received right to export LNG.

<https://tass.ru/ekonomika/9984947>.

US Congressional Research Service (CRS) (2020). U.S. sanctions on Russia.

US Department of State. CAATSA/CREEIA Section 232 public guidance. Key topics. Bureau of energy resources.

US Department of the Treasury (2020). Sanctions on Ukraine and Russia.

Wärtsilä (2020). Wärtsilä to equip 5 LNG gas-carriers with fully integrated bridge systems under Arctic LNG-2 project. Press release: <https://www.wartsila.com/media/news/16-07-2020-wartsila-to-equip-5-lng-gas-carriers-with-fully-integrated-bridge-systems-under-arctic-lng-2-project-2747275>.

- 2017 No 1 Jouko Rautava: Kiinassa talouspolitiikka ei pysy maan muutosten vauhdissa  
 No 2 Heli Simola: China's growing role in global production boosted by strong competitiveness – evidence from international input-output tables  
 No 3 Heli Simola ja Laura Solanko: Katsaus Venäjän öljy- ja kaasusektoriin  
 No 4 Heli Simola: Chinese production chains rely increasingly on domestic services  
 No 5 Heli Simola and Laura Solanko: Overview of Russia's oil and gas sector  
 No 6 K.C. Fung, Nathalie Aminian, Iikka Korhonen and Keith Wong: The Chinese yuan: Influence of interest groups examined  
 No 7 Päivi Määttä: Meeting the challenges of impact measurement  
 No 8 Caroline Stern, Mikko Mäkinen and Zongxin Qian: FinTechs in China – with a special focus on peer to peer lending  
 No 9 Iikka Korhonen and Riikka Nuutilainen: Breaking monetary policy rules in Russia  
 No 10 Andrei Yakovlev, Lev Freinkman, Sergey Makarov and Victor Pogodaev: In response to external shocks: How advanced Russian regions react to changes in federal policies – Experience of Tatarstan
- 2018 No 1 Ivan Lyubimov and Maria Lysyuk: Schooling ain't learning in Russia either: High level of student employment as an indicator for slow human capital accumulation  
 No 2 Jouko Rautava: Intian nopea kasvu ei vähennä reformien tarvetta  
 No 3 Eeva Kerola: Hongkongin talous on vahvasti kytkeytynyt Manner-Kiinaan  
 No 4 Iikka Korhonen, Heli Simola and Laura Solanko: Sanctions, counter-sanctions and Russia – Effects on economy, trade and finance  
 No 5 Andrei Yakovlev, Lev Freinkman and Nina Ershova: Channels of dialogue between international businesses and national governments: The implications for domestic reforms and international relations in the case of Russia  
 No 6 Helmut Wagner: Structural change, rebalancing, and the danger of a middle-income trap in China  
 No 7 Wing Thy Woo: A U.S. perspective on China's external economic disputes in the past 40 years and in the coming 40 years  
 No 8 Nigel Gould-Davies: Economic effects and political impacts: Assessing Western sanctions on Russia  
 No 9 Jouko Rautava: Kiina ja Venäjä – eripariset talouskumppanukset  
 No 10 Sergey Vlasov and Mariam Mamedli: Russia's pension system in the context of world experience and expected trends  
 No 11 Riikka Nuutilainen: Juanin kansainvälistyminen ei etene suoraviivaisesti
- 2019 No 1 Mariya Hake and Alice Radzyner: Western Balkans: Growing economic ties with Turkey, Russia and China  
 No 2 Iikka Korhonen: Sanctions and counter-sanctions – What are their economic effects in Russia and elsewhere?  
 No 3 Carsten Sprenger and Srdjan Todorović: Corporate Governance of the Largest Russian Banks  
 No 4 Heli Simola: Effects of external shocks on Russian economy
- 2020 No 1 Laura Solanko: From reforms to stagnation – 20 years of economic policies in Putin's Russia  
 No 2 Riikka Nuutilainen and Jouko Rautava: Russia and the slowdown of the Chinese economy  
 No 3 Le Xia: Lessons from China's past banking bailouts  
 No 4 Heli Simola: CO2 emissions embodied in EU-China trade and carbon border tax  
 No 5 Jouko Rautava: Protektionismi ja uudistusvastaisuus estävät Intian nousun keskeiseksi globaaliksi taloustoimijaksi  
 No 6 Heli Simola and Laura Solanko: Domestic and global economic effects of corona containment measures - Russia in international comparison  
 No 7 Heli Simola: Venäjän talous koronan kourissa  
 No 8 Christian Alexander Belabed and Thomas Theobald: Why the Chinese recovery will slow – some lessons from sectoral data  
 No 9 Risto Herrala: Capital controls in an integrated world: A review of recent developments, policies and the academic debate  
 No 10 Vesa Korhonen: Chasing developments in Russia's government budget  
 No 11 Heli Simola: Climate change and the Russian economy  
 No 12 Jinsok Sung: Implications of sectoral sanctions on Russia's gas sector