May 2022

Analysis of Russian Gas Flows to Europe Amid the War in Ukraine

Report Produced by the Interos Inc. Business Analyst Team

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1.0 Executive Summary

In light of Russian-imposed natural gas disruptions in Europe, this report highlights trends in the flow of Russian natural gas to Europe through selected major pipelines; identifies major Russian producers of natural gas; and provides context to the Kremlin's recent cutoff of gas supply to Bulgaria and Poland with alternative sourcing prospects for both. This report concludes by highlighting other European countries wholly or significantly reliant on Russia for natural gas supplies and explores how a cutoff in natural gas to Germany would have significantly negative consequences for supply chains.

Key Findings

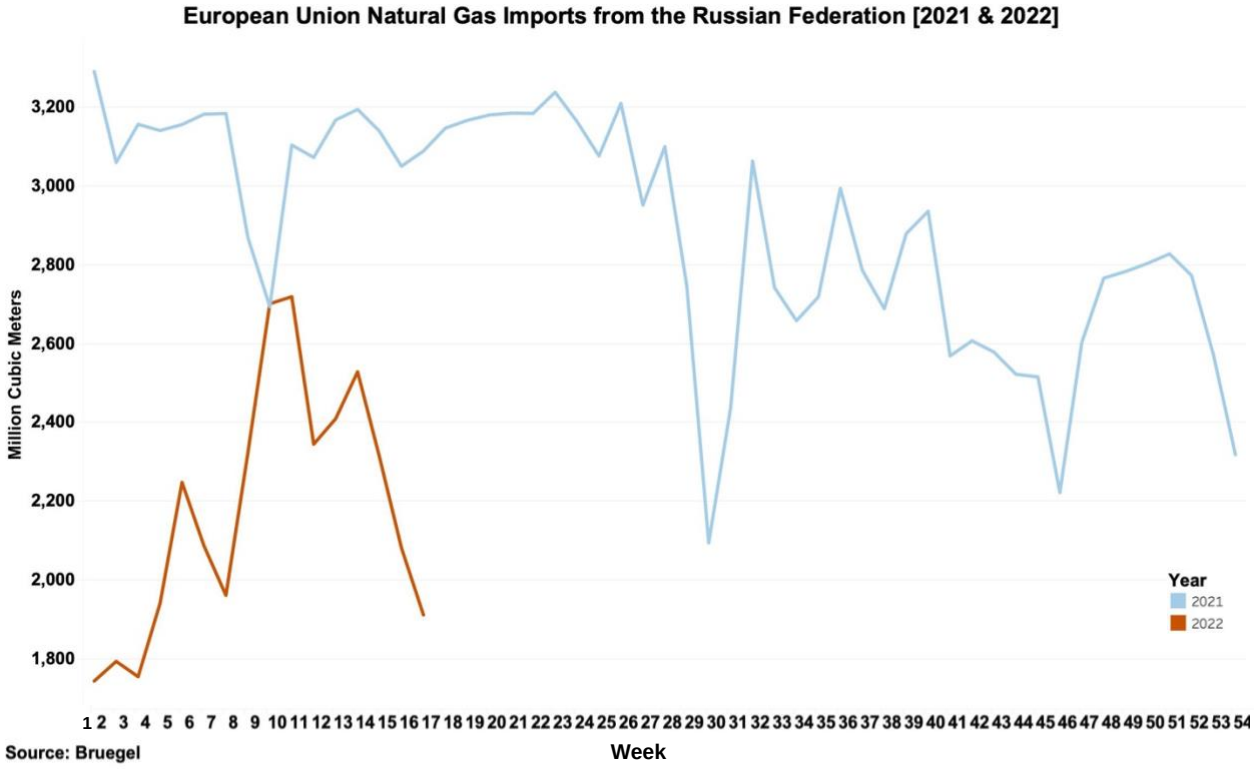
- Nord Stream 1 facilitated the most deliveries of Russian gas to Europe. Russia threatened unilateral flow cutoffs, while Ukraine has lobbied for European-induced flow cuts to increase Kyiv's leverage.
- If gas flows to Germany via Nord Stream 1 were cut, or if a major natural gas shortage occurs, significant supply chain disruptions to industries would be expected. Moreover, if Berlin is forced to augment current gas rationing measures, all German industries would suffer since priority will be given to households, and an economic recession in the country would be likely. The total effect this would have for global supply chains is unclear, but they would unquestionably be substantial.
- Ukraine continues to facilitate natural gas flows through the country despite the ongoing war. PJSC Gazprom has intermittently facilitated westbound gas flows through the Yamal pipeline, opting instead to book pipeline capacity at daily auctions as needed. Gas flows though TurkStream increased in the second half of 2021 despite an overall decrease of Russian gas arriving in Europe.
- PJSC Gazprom's cutoff to Bulgaria and Poland comes at a time when demand for natural gas is decreasing as temperatures rise and the need for heating homes drops off, and it comes against two countries which already signaled their intent not to renew contract deals with PJSC Gazprom after they expired at the end of this year. In essence, this move is seen as a "shot across the bow" as a warning to other countries contemplating similar moves to ween off Russian energy.
- As of 2020, North Macedonia, Moldova, and Bosnia and Herzegovina appear to have a 100% reliance on Russia for natural gas supplies, placing them in a potentially vulnerable position. Meanwhile in the Baltics, Lithuania has already ceased imports of Russian gas, and Estonia intends to do the same by the year's end.
- Bulgaria does not have any LNG import terminals, nor do there appear to be any plans to construct one in the country. However, Bulgaria will benefit from the construction of an LNG import terminal in Alexandroupolis in northern Greece when it comes online in 2023. A gas interconnector project will further link Bulgaria to Greece and bring additional supplies from Azerbaijan later this year.
- Poland has been increasing its natural gas supplies and tapping into supplies from Germany through flow reversal of the Yamal Pipeline to lessen purchases from Russia. Poland will also benefit from regional augmented deliveries from Norway via the Baltic Pipeline and an Estonian LNG terminal.

2.0 Russian Gas Flows to Europe Overview Analysis

This section highlights and briefly contextualizes significant developments in overall Russian exports of natural gas to Europe from the second half of 2021 to the present.

2.1 Analysis of Recent Flows of Russian Natural Gas to the European Union

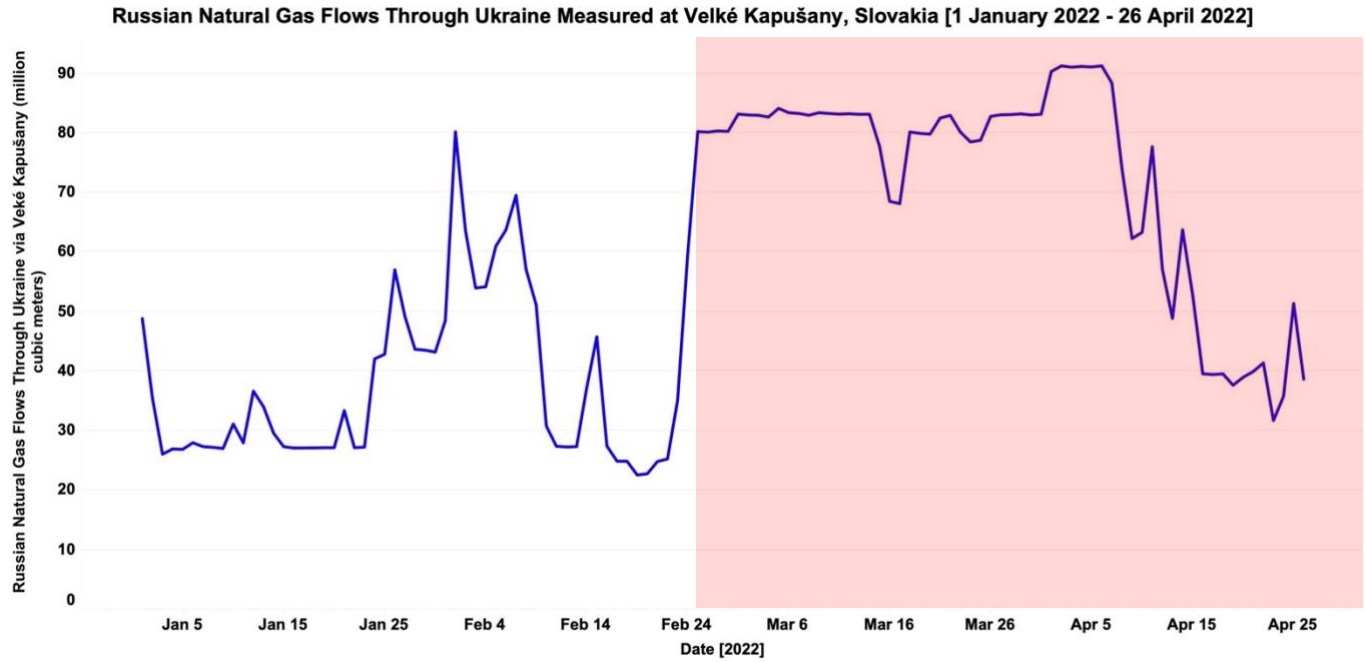
In 2021, the European Union imported 155 billion cubic meters of natural gas from Russia, accounting for around 45% of E.U. gas imports and close to 40% of its total gas consumption.[1] Europe is the largest regional importer of Russia's natural gas, accounting for nearly 75% of Russia's total natural gas exports. Germany, Turkey, Italy, Belarus, and France received most of that natural gas.[2] Halfway through 2021, there was a significant reduction in the amount of natural gas that was exported from Russia to the European Union. PJSC Gazprom was accused of intentionally decreasing gas flows as a coercion tool to facilitate the certification and operation of the newly constructed Nord Stream 2 pipeline in the Baltic Sea.[3] Meanwhile, PJSC Gazprom asserted that it was meeting contractual obligations while also opting not to book extra natural gas transit capacity[4] ahead of Russia's invasion of Ukraine on 24 February.[5]



Natural gas deliveries for the first couple of weeks in 2022 were consistently below even the lowest recorded level in 2021, week 30. A spike in deliveries at the start of Russia's invasion of Ukraine can be explained due to the structure of Europe's gas market and deals struck with PJSC Gazprom through which customers pay according to the price level at which gas was traded a month prior.[6] This dynamic gave companies an incentive to reach for maximum imports from Russia before prices rose. However,

there has been a reversal of that trend and now imports of natural gas by the E.U. from Russia have returned once more to deflated levels below 2,000 million cubic meters amid Western-imposed sanctions on Russian energy exports.

Elevated levels of Russian natural gas flow despite the commencement of hostilities against Ukraine are demonstrated by the below visual of measured flows through a significant node in Slovakia which is an entry/exit point for gas flows from/to Ukraine.[7] The decrease shortly afterward is in line with the decrease overall of Russian natural gas flows to Europe.



Source: Eustream
The period in which Russia invaded Ukraine is highlighted in red.

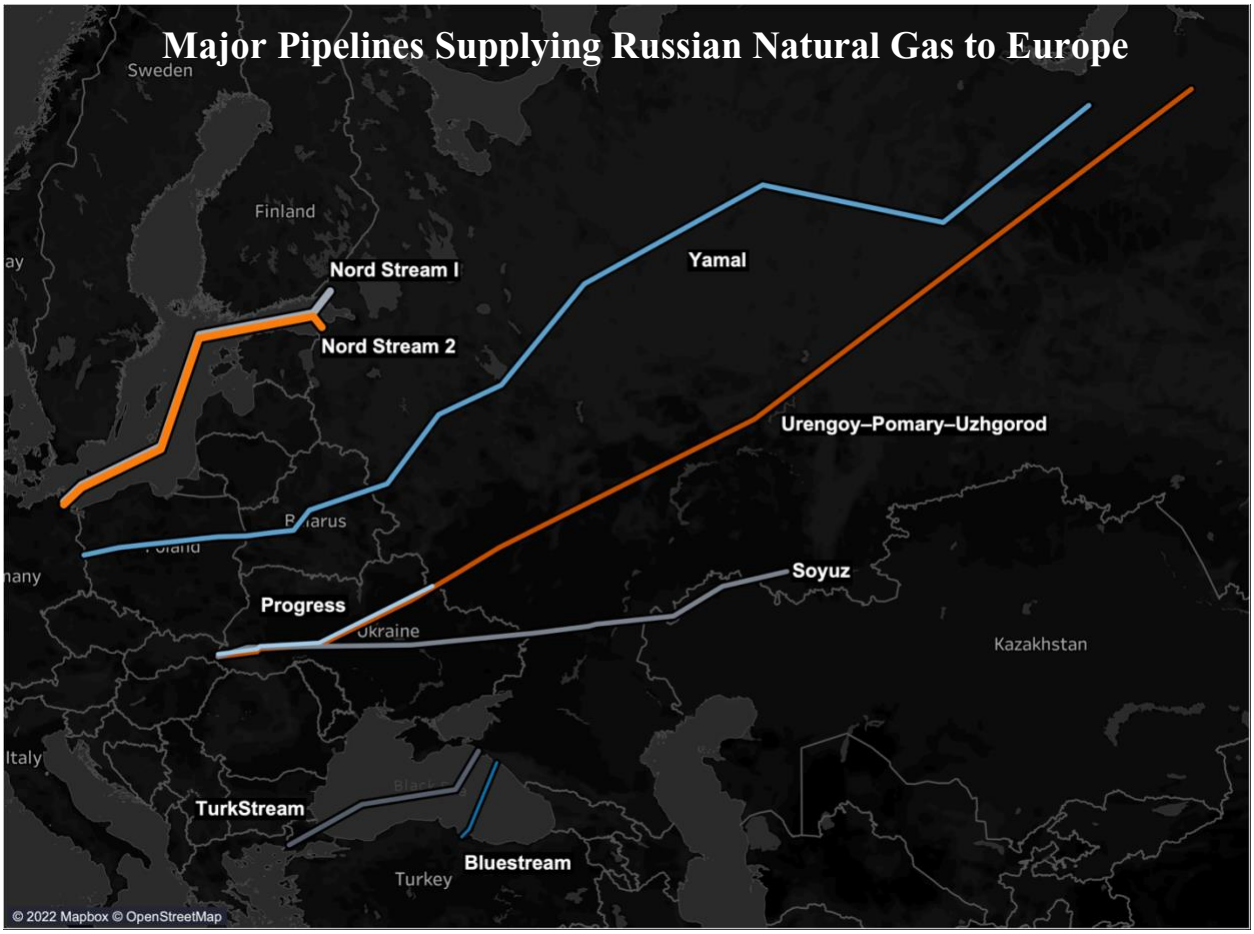
Although Velké Kapušany is just one node in the network connecting Russian gas to Europe, its capacity accounts for 2,288 Gigawatt hours per day (GWh/d),[8] or 72.2 billion cubic meters per annum (bcma), establishing it as a leading delivery point for PJSC Gazprom exports into Europe.[9]

Other European Natural Gas Nodes

Name	Location	Capacity[10,11]
Nord Stream 1	Baltic Sea from Russia to Germany	55 bcma
Baumgarten	Slovakia-Austria Border	1,539.2 GWh/d or 48.6 bcma
Mallnow	Poland-Germany Border	931 GWh/d or 29.4 bcma
Waidhaus	Czechia-Germany Border	903.7 GWh/d or 28.5 bcma
Isaccea	Ukraine-Romania Border	755.3 GWh/d or 23.8 bcma
Beregovo	Ukraine-Hungary Border	600.3 GWh/d or 19 bcma
Drozdovichi	Ukraine-Poland Border	133.4 GWh/d or 4.2 bcma

3.0 Arteries of Russian Natural Gas Flows to Europe

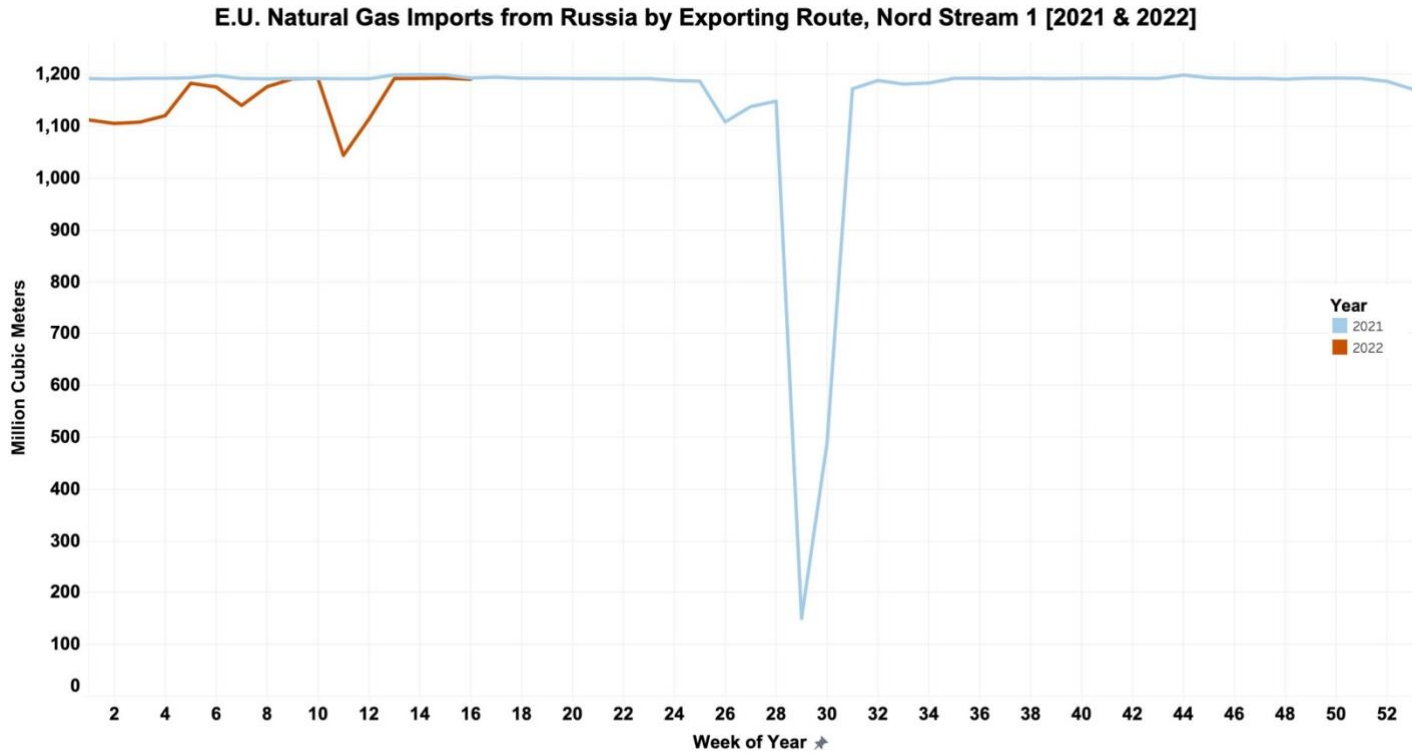
This section highlights and briefly examines flows for significant arteries of Russian natural gas exports of natural gas to Europe from January 2021 to the present. Examined pipelines include Nord Stream 1, the Ukraine Transit Network, Yamal, and TurkStream. An overview of Nord Stream 2 is given at the end of this section in light of recent developments surrounding the non-operational pipeline. Bluestream, from which Italy's Eni S.p.A. [(77) 210942de-5153-4b0c-a677-5c15d315b4a6] is planning to divest its stake due to the war in Ukraine,[12] is included in the below graphic but is not covered in this report.



Nord Stream 1	55 billion cubic meters per annum (bcma)
Ukraine Transit Network	**120 bcma**
Progress	26 bcma
Urengoy-Pomary-Uzhgorod	**32 bcma**
Soyuz	32 bcma
Yamal	33 bcma
TurkStream	31.5 bcma
Nord Stream 2	55 bcma (non-operational)
Bluestream	16 bcma

3.1 Nord Stream 1

The Nord Stream 1 twin pipeline system through the Baltic Sea runs from Vyborg, Russia to Lubmin near Greifswald, Germany.[13] The pipelines were built and are operated by Nord Stream AG, a consortium of companies in which PJSC Gazprom is a majority stakeholder.[14] The first pipeline came online in 2011 with the second following shortly after in 2012, bringing the total transport capacity of the pair to 55 bcma.[15] Gas for Nord Stream 1 originates predominantly from the Bovanenkovo oil and gas condensate deposit on the Yamal Peninsula which lies on the Kara Sea in the north of the Russian Federation.[16]

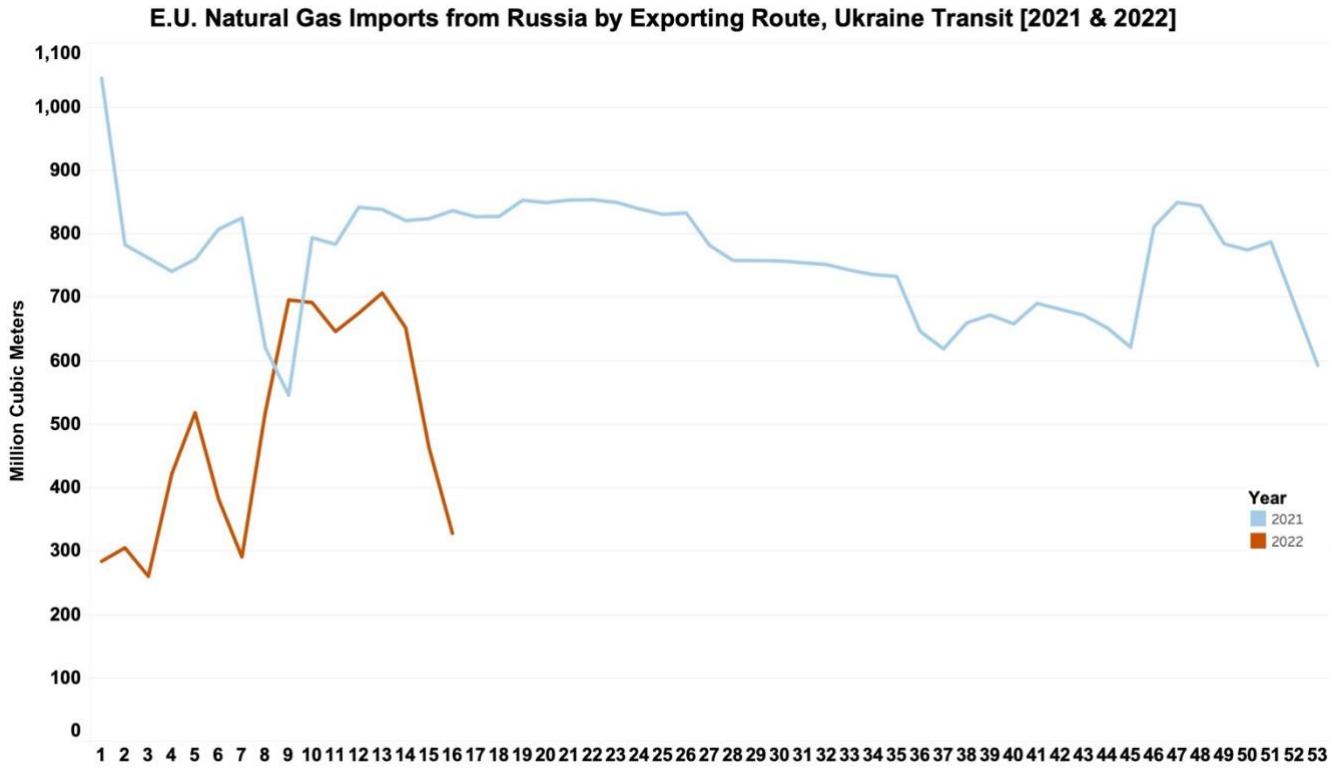


Source: Bruegel

Of the transit arteries captured in this report, Nord Stream 1 facilitated the most deliveries of Russian natural gas to Europe in both 2021 and thus far in 2022. Flows through Nord Stream 1 during 2021 were consistently in line with maximum levels. Though flows for the first several months in 2022 are marginally lower than those of the same time-period in 2021, current flow levels remain at – or are near – those maximum levels, indicating that the war in Ukraine has yet to have a significant impact on the quantity of natural gas arriving in Europe via Nord Stream 1. However, Russia has issued threats that it could leverage Nord Stream 1 by unilaterally halting flows in response to Western support for Ukraine.[17] Meanwhile, Ukraine has lobbied for cuts in flows through Nord Stream 1 to increase Kyiv's leverage.[18]

3.2 Ukraine Transit Network

The Ukraine natural gas transit network is an infrastructural legacy of the Soviet Union. This network, known as the "Bratsvo/Brotherhood Network" has a transit capacity of 120bcma, which is facilitated by several main routes. This includes Urengoy–Pomary–Uzhhorod (UPU)/Trans-Siberian Pipeline (32 bcma), Progress pipeline (26 bcma), and Soyuz (32 bcma).[19] The Bratstvo (Brotherhood) pipeline, which originates from the Urengoy natural gas field, crosses from Ukraine to Slovakia and splits into two directions to supply northern and southern European countries.[20] The Soyuz pipeline originates from the Orenburg natural gas field, linking to northern European countries such as Slovakia, Hungary, and Romania as it travels through the occupied Luhansk region.[21]



Source: Bruegel

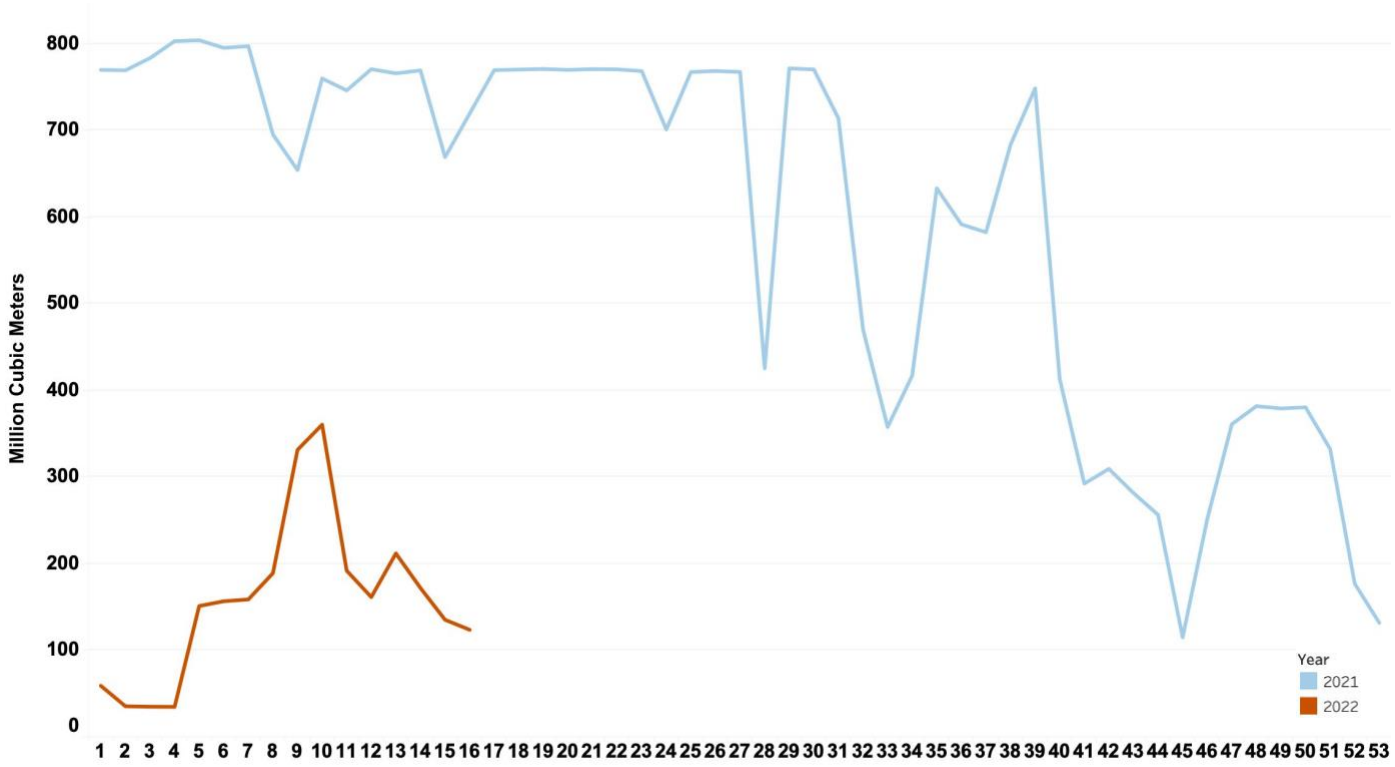
Even though the Ukraine transit network has a significantly higher maximum transport capacity than the next largest pipeline, Nord Stream 1, flows through Ukraine were significantly below flows through the Baltic Sea in both 2021 and 2022. Like the Yamal pipeline, flows through the Ukraine transit network appeared to decrease in the second half of the year, in line with an overall observed trend of decreased flows of Russian gas to Europe in 2021. Often cited as motivations for this decrease were Moscow's desire to deprive Ukraine of revenue from collected transit fees,[22] as well as concerted efforts to positively influence the certification and operationalization of Nord Stream 2.[23] PJSC Naftogaz [(60) d7759398-090e-4380-8e8d-092007499261], the largest state-owned enterprise in Ukraine, has continued to facilitate natural gas flows through the country despite the ongoing war.[24, 25]

3.3 Yamal Pipeline

The Yamal-Europe pipeline is a natural gas pipeline with a transit capacity of 33 bcma that begins in Russia on the Yamal Peninsula and runs across Belarus, Poland, and Germany.[26] Construction on the pipeline began in 1994 and it became operational in 2006.[27] The pipeline usually accounts for approximately 15% of Russia's westbound supply of gas to Europe and Turkey.[28]

For the first half of 2021, natural gas flows through the Yamal pipeline were consistently at or near maximum capacity levels until week 30. Between week 31 to week 39, flows had a downward spike despite relatively no change in capacity maximums. This was followed by a significant decrease from week 40 through the end of 2021. At the end of 2021, the level of flows arriving in Europe via the Yamal pipeline was just 17% of what flows were during the beginning of the year. This is in line with the overall decrease of Russian natural gas flows to Europe in the second half of 2021.

E.U. Natural Gas Imports from Russia by Exporting Route, Yamal Pipeline [2021 & 2022]

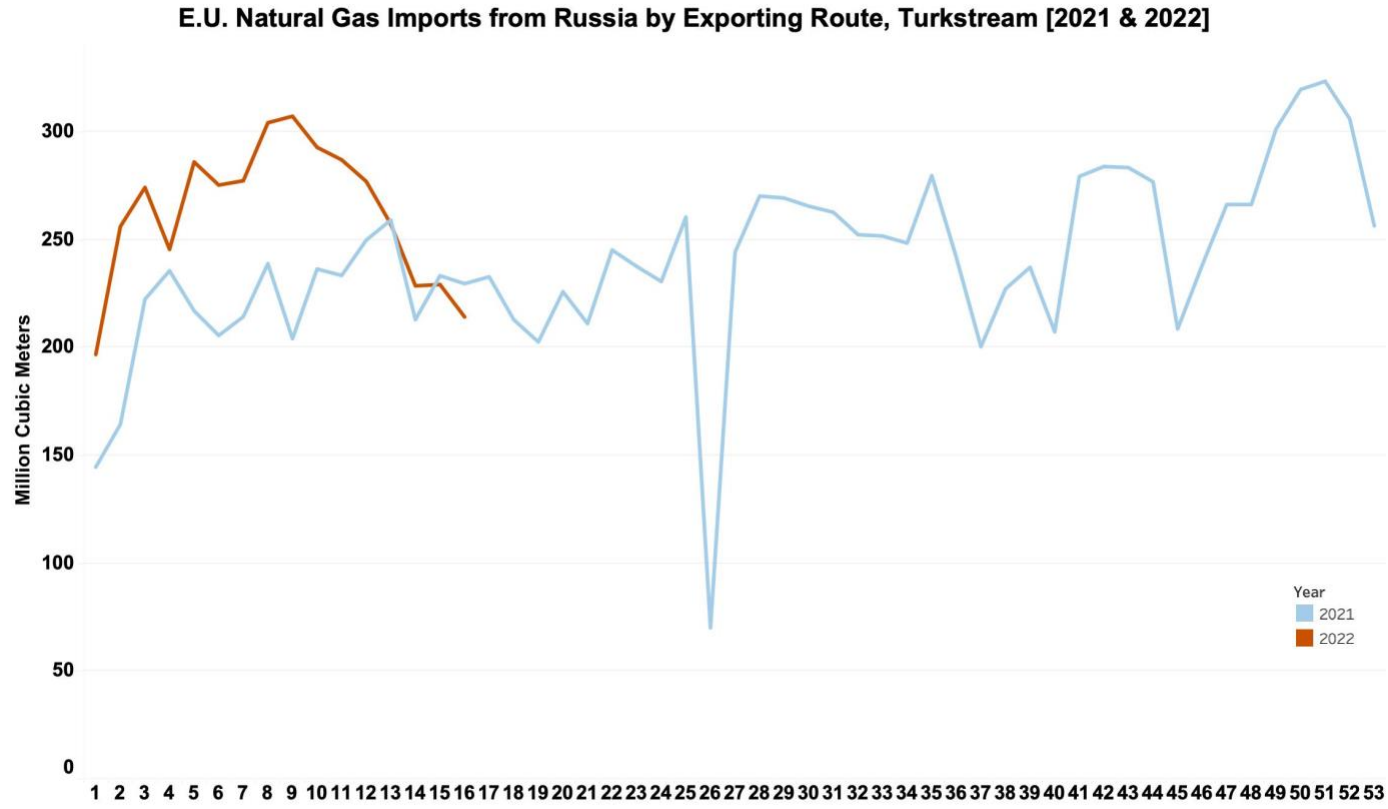


Source: Bruegel

Currently, flows through the Yamal pipeline are significantly below 2021 levels for the same time period. For week 16, 2022 levels were approximately 19% of what they were for the same week in 2021. This comes as PJSC Gazprom has only intermittently facilitated westbound gas flows amid Russia's invasion of Ukraine, opting instead to book pipeline capacity at daily auctions as needed.[29]

3.4 TurkStream Pipeline

The TurkStream pipeline connects Russia to Turkey through the Black Sea, and it has made Turkey the second-largest gas export market for Russian gas after the European Union.[30] This pipeline recently became operational on 1 January 2020,[31] and its transit capacity is 31.5 bcma, only 1.5 bcma less than the Yamal pipeline. The TurksStream project was a joint undertaking between PJSC Gazprom and BOTAS Petroleum Pipeline Corporation [(53) bd437a9e-4a07-42f4-b584-7c33c889e140], a Turkish state-owned enterprise.[32] TurkStream consists of two pipelines, each with 15.75 bcma transit capacity. One pipeline supplies natural gas to Turkey while the second extends into southeastern Europe.[33]



Source: Bruegel

TurkStream is unlike the other observed pipelines in this report. Natural gas flows increased in the second half of the year despite an overall decrease of Russian natural gas arriving in Europe during that time. Moreover, TurkStream is the only pipeline covered in this report where gas flows for the beginning of 2022 were consistently above those for the same time period in 2021. Moreover, data indicates that 2021 levels were consistently almost double the level of flows for the same period in 2020. Flows in 2022 did decrease after week 9, in line with a similar trend of all other observed pipelines which also decreased in week 9 or week 10.

3.5 Nord Stream 2

Nord Stream 2 consists of a pair of pipelines, bringing the total amount of pipelines connecting Russia to Germany through the Baltic Sea to four. Like Nord Stream 1, Nord Stream 2 has a transit capacity of 55 bcma, bringing the total of Nord Stream pipeline transit capacity to 110 billion bcma.[34] Furthermore, PSJC Gazprom owns a majority stake in Nord Stream 2 AG, a consortium company reportedly financed by PJSC Gazprom as well as several European companies: [35]

Entity Name	i-Score	Resilience ID
Engie SA	78	ae88735a-4b96-451e-9d29-337da235b8cb
OMV Aktiengesellschaft	85	a19b0063-26ec-435c-92e3-2c3f9661783a
Royal Dutch Shell plc	78	d607e2fe-75d9-49b8-a6ce-5bbbd25b216c
Uniper SE	83	78e28c84-a3eb-497d-a49b-752ca0e8d4f0
Wintershall Dea GmbH	81	6c25a40d-e7b2-49f7-b59c-c7239ceffc40

Concerns over the pipeline led to a divide in transatlantic alliances. Germany, the destination country was in favor of the project while the U.S. actively opposed the pipeline on the grounds of energy security, though the U.S. also had economic incentives to promote its own energy exports to the continent. The E.U. tried to address concerns of the ability of PJSC Gazprom to use the pipeline as a coercive tool with a Gas Directive in 2019, though this was ineffective at allaying international concerns.[36]

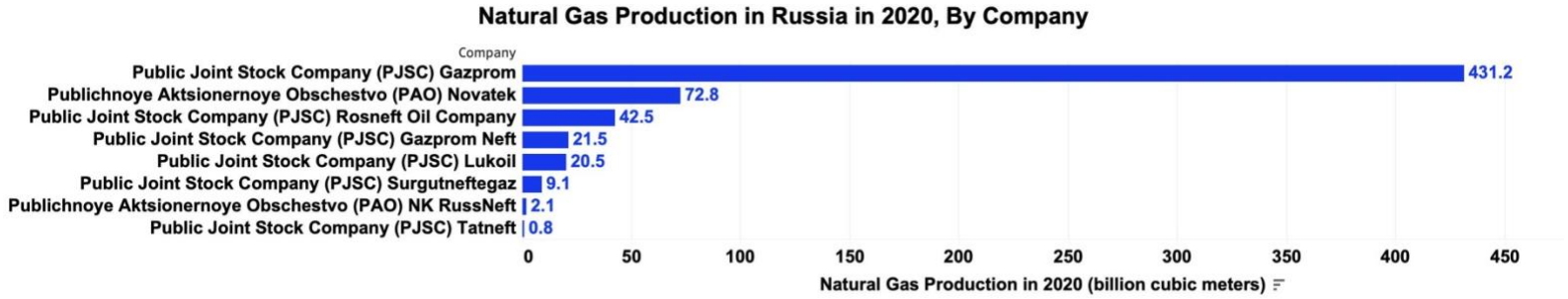
Though it is now complete, Nord Stream 2 is not an operational transit route. Two days prior to the start of Russia's invasion on 22 February 2022, the German government rescinded approval for Nord Stream 2 after Putin's recognition of independent republics in the Donbas.[37] The European Commission stated that it did not expect the continent's gas supply to be negatively affected by that move against Nord Stream 2 as the pipeline had not yet been made operational.[38] On 23 February, the Biden Administration announced economic sanctions on Nord Stream 2 AG.[39] Since then, European companies with investment ties to Nord Stream 2 already distanced themselves from the project by writing off loans or stopping payments to Russia.[40, 41, 42] In early March, Nord Stream 2 AG reportedly filed for insolvency[43] and fired more than 140 employees who staffed the company.[44] The ultimate fate of the already constructed pipeline is unclear, but for the time being it will remain untapped beneath the waters of the Baltic Sea.

4.0 Key Exporters of Russian Natural Gas to Europe

This section highlights notable producers of natural gas in Russia as well as persons of interest connected to those entities. Persons of interest consist primarily of members of company board of directors, as well as known Russian oligarchs. Additionally, this section provides firmographics of flagged entities for operationalization in the Interos Resilience platform to identify their sub-tier presence within ecosystems.

4.1 Notable Russian Entities Engaged in the Natural Gas Industry

The largest producer of natural gas in the Russian Federation is PJSC Gazprom, a state-owned enterprise of the Russian government.[45] In 2020, PJSC Gazprom produced more than two and a half times more natural gas than the combined total of the next seven largest Russian natural gas producers. Consequently, PJSC Gazprom is the most significant company to consider when analyzing the reliance of European countries on Russian energy exports.



Source: Statista

Note: Publichnoye Aktsionernoye Obschestvo (PAO) is indicative of a public stock company.

Gazprom was created in August of 1989 under the leadership of the Minister of Gas Industry Viktor Chernomyrdin.[46] After the Soviet Union's dissolution, Gazprom was privatized, retaining its Russia-based assets.[47] As it is known today, PJSC Gazprom operates as a state-owned organization that controls gas flows through the Nord Stream 1 pipeline, the Ukraine Transit network, the Yamal pipeline, the TurkStream pipeline, and, were it operational, the Nord Stream 2 pipeline. The energy company supplies Europe with an estimated 40% of its gas needs,[48] and is vertically integrated in every area of the gas industry. This includes exploration and production, refining, transport, distribution and marketing, and power generation.[49] Through state-owned enterprises like PJSC Gazprom and PJSC Rosneft Oil Company, the Kremlin uses its market dominance position in support of foreign policy goals, primarily in its immediate neighborhood but also further afield.[50] Additionally, Gazprom gained control of VKontakte Ltd. [(39) d996696f-11af-4b05-aae1-0c26bec665cb], Russia's largest social media platform, in December of 2021[51] via transactions made through affiliated subsidiaries of the organization's Gazprombank. Controlling shares were then transferred to Gazprom Media allowing the organization more than 50% of voting rights, effectively granting the state-owned conglomerate a controlling stake of VKontakte thus further extending the Kremlin's influence in cyberspace.

Entity Firmographics and Persons of Interest

Name: Public Joint Stock Company (PJSC) Gazprom

Resilience ID: b3324463-367a-4b19-99f6-c5e6c5635811

Resilience i-Score: (50)

Headquarters: 16 Nametkina Street Moscow, 117997 Russian Federation

Natural Gas Production (2020): 431.2 billion m^3

Persons of Interest:[52]

Name	Position
Gerhard Schröder[53]	Chancellor of Germany 1998-2005, Nominated to Join Board of Directors pending a vote during an annual meeting on 30 June 2022
Viktor Alexeevich Zubkov	Chairman of the Board of Directors
Alexei Borisovich Miller	Deputy Chairman & Chairman-Management Board
Vitaly Anatolyevich Markelov	Deputy Chairman & Chairman-Management Board
Nikolay Grigorievich Shulginov	Director
Vladimir Alexandrovich Mau	Director
Andrey Igorevich Akimov	Director
Mikhail Leonidovich Sereda	Director
Viktor Georgievich Martynov	Director
Alexander Valentinovich Novak	Director
Denis Valentinovich Manturov	Director
Timur Askarovich Kulibayev	Independent Director

Name: Publichnoye Aktsionernoye Obschestvo (PAO) Novatek

Resilience ID: be429117-815d-42bb-82eb-d3d600d40f3a

Resilience i-Score: (65)

Headquarters: Tarko-Sale, Yamalo-Nenets Autonomous District, 629850, Russian Federation

Natural Gas Production (2020): 72.8 billion m^3

Persons of Interest:

Name	Position
Sergey Protosenya[54]	Former Deputy Chairman, found Dead 19 April 2022
Gennady Timchenko[55]	Resigned from Board of directors 21 March 2022
Alexander E. Natalenko[56]	Chairman of the Board of Directors
Andrei I. Akimov[57]	Board of Directors Member
Arnaud Le Foll[58]	Board of Directors Member
Irina V. Gayda[59]	Independent Director
Emmanual Quidet[60]	Independent Director
Dominique Marion[61]	Board of Directors Member
Tatyana A. Mitrova[62]	Independent Board Member
Leonid V. Mikhelson[63]	Board of Directors Member
Aleksey V. Orel[64]	Board of Directors Member

Name: Public Joint Stock Company (PJSC) Rosneft Oil Company

Resilience ID: 5be3cfb7-0f36-451b-9fa4-600f60514db5

Resilience i-Score: (50)

Headquarters: 26/1, Sofiyskaya Embankment Moscow, 117997, Russian Federation

Natural Gas Production (2020): 42.5 billion m^3

Persons of Interest:[65]

Name	Position
Igor Ivanovich Sechin	Deputy Chairman, President, & CEO
Petr Ivanovich Lazarev	Finance Director
Andrei Polyakov	Vice President & Chief Geologist
Vadim Vladimirovich Salyayev	Project Manager, Deputy Director-Technical R&D
Vladimir Anatolyevich Pavlov	Head-Innovation, Technical Development & Expertise
Ural A. Latypov	Vice President & Head-Security Service
Yegor Filippov	Member-Management Board
Valentin Mamayev	Vice President
Andrey Nikolaevich Shishkin	Vice President-Informatization, Innovation & Localization
Didier Casimiro	First Vice President
Eric Maurice Liron	Vice President-In House Services
Zeljko Runje	Senior Vice President, Gas & Offshore Business Development

Name: Public Joint Stock Company (PJSC) Gazprom Neft

Resilience ID: 9254197a-5f07-4764-9f62-6ba2c37ae6af

Resilience i-Score: (52)

Headquarters: Saint Petersburg, Russian Federation

Natural Gas Production (2020): 21.5 billion m^3

Persons of Interest:[66]

Name	Position	Term
Alexey Miller	Board of Directors Chairman	October 2005 -
Sergei Kuznets	Member of the Board	September 2019 -
Famil Sadygov	Member of the Board	September 2019 -
Vitaly Markelov	Member of the Board	September 2019 -
Sergei Menshikov	Member of the Board	September 2019 -
Alexey Medvedev	Member of the Board	June 2019 -
Kirill Seleznev	Member of the Board	October 2005 -
Elena Mikhailova	Member of the Board	June 2012 -
Alexander Dyukov	Member of the Board	November 2007 -
Vladimir Alisov	Member of the Board	June 2009 -
Mikhail Sereda	Member of the Board	December 2013 -
Valery Serdyukov	Member of the Board	December 2012 -
Gennady Sukhov	Member of the Board	June 2020 -
Andrey Dmitriev	Member of the Board	June 2018 - June 2020

Name: Public Joint Stock Company (PJSC) Lukoil

Resilience ID: 9a04733d-911c-4043-ab94-0b7881705f93

Resilience i-Score: (50)

Headquarters: 11, Sretensky bul., Moscow, 101000, Russian Federation

Natural Gas Production (2020): 20.5 billion m^3

Persons of Interest:[67]

Name	Position
Vagit Alekperov[68]	President and Member of the Board of Directors until resignation April 21, 2022
Roger Mannings[69]	Charmain of the Russo-British Chamber of Commerce, Board of Directors Member until resignation 17 March 2022
Toby Gati[70]	President of TTG Global, LLC, Board of Directors Member until 17 March 2022
Wolfgang Schussel[71]	Chancellor of Austria from 2000-2007, Board of Directors Member until resignation 17 March 2022
Leonid Arnoldovich Fedun	Director & vice President-Strategic Development
Sergey D. Shatalov	Director
Boris N. Porfirev	Director
Lyubov Nikolayevna Khoba	Director, Chief Accountant & Vice President
Victor Vladimirovich Blazheev	Vice-Chairman
Pavel Mikhailovich Teplukhin	Director

Name: Public Joint Stock Company (PJSC) Surgutneftegaz

Resilience ID: 972238df-d70e-4ec9-8936-aac6ade9c271

Resilience i-Score: (48)

Headquarters: ul.Grigoriya Kukuyevitskogo, 1, bld. 1, the city of Surgut, Tyumenskaya Oblast, Khanty-Mansiysky Autonomous Okrug – Yugra, Russian Federation

Natural Gas Production (2020): 9.1 billion m^3

Persons of Interest:

(Information Current as of 31 December 2021)[72]

Name	Position	Term
Bogdanov Vladimir Leonidovich	Board of Directors Member	June 2021 -
Bulanov Alexander Nikolaevich	Board of Directors Member	June 2021 -
Dinichenko Ivan Kalistratovich	Board of Directors Member	June 2021 -
Erokhin Vladimir Petrovich	Board of Directors Member	June 2021 -
Krivosheev Viktor Mikhailovich	Board of Directors Member	June 2021 -
Matveev Nikolai Ivanovich	Board of Directors Member	June 2021 -
Egorov Valery Nikolaevich	Board of Directors Member	June 2021 -
Usmanov Ildus Shagalievich	Board of Directors Member	June 2021 -
Mukhamadeev Georgy Rashitovich	Board of Directors Member	June 2021 -

Name: Publichnoye Aktsionernoye Obschestvo (PAO) NK RussNeft

Resilience ID: a9800fdc-aed0-4722-96bb-5c88714e15cd

Resilience i-Score: (43)

Headquarters: 69, Pyatnitskaya st., Moscow, Russia, 115054, Russian Federation

Natural Gas Production (2020): 2.1 billion m^3

Persons of Interest:[73]

Name	Position	Term
Evgeny Viktorovich Tolocheck	President	November 2016 -
Olga Evgenievna Prozorovskaya	Senior Vice President for Economics and Finance	January 2010 -
Alexander Sergeevich Malyshev	Vice President for Oil and Gas Production	October 2016 -
Magomed-Ali Sulambekovich Evloyev	Vice President for Commerce	September 2015 -
Andrey Valeryevich Dokhlov	Vice President for Economy and Budgeting	January 2006 -
Evgeny Vladimirovich Pitsyura	Vice President for Geology and Development	August 2020 -
Dmitry Vyacheslavovich Romanov	Vice President for Corporate Relations	January 2010 -
Alexey Igorevich Fedoseev	Vice President for Security	September 2019 -
Aleksandr Sergeevich Permyakov	Vice President for Capital Construction	May 2016 -
David Guramovich Avalishvili	Vice President Director of Department for Promising Projects	May 2017 -

Name: Public Joint Stock Company (PJSC) Tatneft

Resilience ID: 2a1b24a0-c8da-4d8a-95a9-a70f1980ccb1

Resilience i-Score: (54)

Headquarters: 75, Lenina Street, Almetyevsk Tatarstan 423450, Russian Federation

Natural Gas Production (2020): 0.8 billion m^3

Persons of Interest:[74]

Name	Position
Rustam Nurgalievich Minnikhanov	Chairman of the Board of Directors
Nail Ulfatovich Maganov	Chairman-Management Board & Director
Rustam Khamisovich Khalimov	Director & Deputy General Director-Oil & Gas
Nurislam Zinatulovich Syubayev	Director
Fanil Anvarovich Agliullin	Director
Larisa Yuryevna Glukhova	Director
Albert Ildarovich Nafigin	Director
Radik Raufovich Gayzatullin	Director
Rais Salikhovich Khisamov	Directo & Deputy General Director-Chief Geologist
Rafail Saitovich Nurmukhametov	Director & Member-Management Board
Valeriy Yurievich Sorokin	Director
Shafagat Fakhrazovich Takhautdinov	Director
Rene Frederic Steiner	Independent Director
Gerech Laszlo	Independent Director
Yury Livovich Levin	Independent Director

5.0 Russian Gas Flows Halted to European Countries

On 7 March 2022, Deputy Prime Minister of the Russian Federation Alexander Novak issued a statement in which he threatened Russia's ability to "place an embargo on gas transit via Nord Stream 1" in response to European support for Ukraine in the ongoing war.[75] While Russian energy coercion as a foreign policy tool does not itself present anything new,[76] developments since that statement have introduced potentially significant supply chain disruptions.

At the end of March, Russia demanded natural gas exports be paid for rubles else natural gas flows could be cut off to "unfriendly" states. European countries quickly noted this ultimatum violated existing long-term contracts,[77] 97% of which stipulated payments would be made in USD or euros.[78] Ignoring those objections, PJSC Gazprom stipulated taps could be turned back on if payments are made in rubles.

As recently as 22 April, communications from the European Commission stated that the sanction regime in place does not prohibit companies from opening accounts with JSC Gazprombank [(42) 51dcfbff-33ad-40b5-9005-4da3bfebbb5e] or engaging with the bank to attempt to seek a solution, though this guidance did specify that payments in rubles would constitute a breach of sanctions. This Commission guidance alluded to avenues that may potentially be available in which companies could comply with E.U. sanctions and continue to pay for Russian gas in USD or euros. Companies can alter considerations in which contractual obligations are complete when USD or euros are deposited into a bank prior to their conversion into rubles;[79] however, E.U. countries have pressed for clarification on whether sending euros to Gazprombank that would then be converted into rubles by a Russian bank would amount to a breach of sanctions.[80] According to Bloomberg, as of 27 April, at least four European countries have already made payments in rubles, and at least 10 have set up the necessary accounts in Gazprombank.[81]

On Wednesday 27 April 2022, Russia announced its first cut offs based on a refusal to pay for natural gas in rubles. Both Bulgargaz EAD [(81) d41d4f31-710a-4be2-be5a-66db8e92950a] in Bulgaria and Polskie Górnictwo Naftowe i Gazownictwo S.A. (PGNiG) [(83) 4f75a58a-6fd9-4b3c-b72f-6063abd1aa2e] in Poland were cut off from exports of natural gas,[82] becoming the first of perhaps several other major gas companies in European countries to experience a manifestation of Russia's threat.

Bulgaria and Poland are members of both the E.U. and NATO, and while Poland has actively supported Ukraine during Russia's invasion of the country,[83] military aid to Ukraine from Bulgaria comes in the wake of this energy cutoff.[84] Importantly, this cutoff comes at a time when demand for natural gas is decreasing as temperatures rise and the need for heating homes drops off, and it comes against two countries which already signaled their intent not to renew contract deals with PJSC Gazprom after they expired at the end of this year. In essence, this move is seen as a "shot across the bow" as a warning to other countries contemplating similar moves to ween off Russian energy.[85] Some analysts have even gone so far as to label this a "thinly veiled threat to Germany and all of Europe."[86]

5.1 Bulgaria

Import Reliance on Russian Gas

In 2020, 77% of Bulgaria's natural gas supply was reliant upon purchases from Russia,[87] reflecting a significant vulnerability given the current cutoff decision from Moscow. Some estimate this this current figure to be even higher at 90%, as gas supplies arrive in the country via the TurkStream pipeline under a supply contract signed in 2012[88] that expires at the end of 2022.[89] As recently as 19 March 2022, Bulgaria signaled that it would not hold talks with PJSC Gazprom to renew its natural gas purchase deal amid Russia's invasion of Ukraine, and that the country would be seeking alternative suppliers.[90]

Alternative Sources

As of 27 April, Bulgaria's gas storage of 550 million cubic meters is only 17.6% full.[91] Bulgaria does not have any liquefied natural gas (LNG) import terminals, nor do there appear to be any plans to construct one in the country. However, Bulgaria will benefit from the regional diversification of supply introduced by the construction of an LNG import terminal in Alexandroupolis in northern Greece.[92] However, the LNG terminal in Alexandroupolis is not expected to come online until some point in 2023,[93] meaning it will not pose an immediate alternative solution for Bulgaria to address the next winter season at the end of this year.

A 182-km long gas interconnector project will link Stara Zagora in Bulgaria and Komotini in Greece to bring additional gas transmissions into Bulgaria.[94] This pipeline will have a reverse flow function and will deliver approximately 3 bcma of natural gas to Bulgaria, with an approximate maximum of 5 bcma.[95] This pipeline will also be used to supply natural gas from Azerbaijan to Bulgaria after it is expected to be come into service in July of this year.[96]

5.2 Poland

Import Reliance on Russian Gas

In 2020, 40% of Poland's natural gas supply was reliant upon purchases from Russia.[97] However, for the past several years Warsaw consistently stated did not intend to continue buying any Russian gas after 2022, when a long-term contract with PJSC Gazprom would expire.[98] To that end, PGNiG, a Polish state-owned enterprise, stated it would not seek an additional long-term contract with PJSC Gazprom.[99]

Alternative Sources

Poland had already taken steps to fill its stores of gas in preparation for the end of the contract period.[100] As of 27 April, Poland's gas storage is 76% full, approximately double its level a year ago.[101] Given Warsaw's long-term goal to establish alternative suppliers to Russian gas by the end of 2022, the country built up a degree of resilience that will help mitigate negative consequences stemming from the current shutoff through the Yamal pipeline.

Moreover, Sections of the Yamal pipeline can be made to flow in reverse, allowing for natural gas flow in both directions. This capability has been used by Poland since 21 December 2021 to draw from gas storage in Germany rather than pay high spot prices for natural gas from Russia.[102] A link with Lithuania and an interconnector via the Czech Republic will offer further alternatives, providing capacities of 2.5 bcma and 1.5 bcma, respectively.[103]

The European Commission recently moved to bolster energy security through underground gas storage requirements intended to avoid seeing those reserves depleted amid Russian energy coercion tactics in the future. The Commission unveiled a legislative proposal requiring underground gas storage across the E.U. to be filled to at least 80% of its capacity from 1 November this year, with elevated 90% levels for subsequent years.[104, 105] Although moves by the Commission reportedly have the potential to reduce E.U. demand for Russian gas by two-thirds by the end of this year,[106] elevated requirements for gas storage will be a challenge to meet with reduced imports of natural gas from Russia.

A gas storage law in Germany goes further than the Commission proposal. This law stipulates that underground caverns for gas storage must be 80% full by 1 October and 90% full by 1 November this year, and that those reserves retain 40% capacity or above as of 1 February the following year. The law will be in effect for the next three years after it kicks in on 1 May 2022.[107] Currently, Germany's gas storage capacity is approximately a third full.[108] Although this will add resilience for countries like Poland that have a reliance on German gas storage, the long-term viability of this alternate source method is unclear.

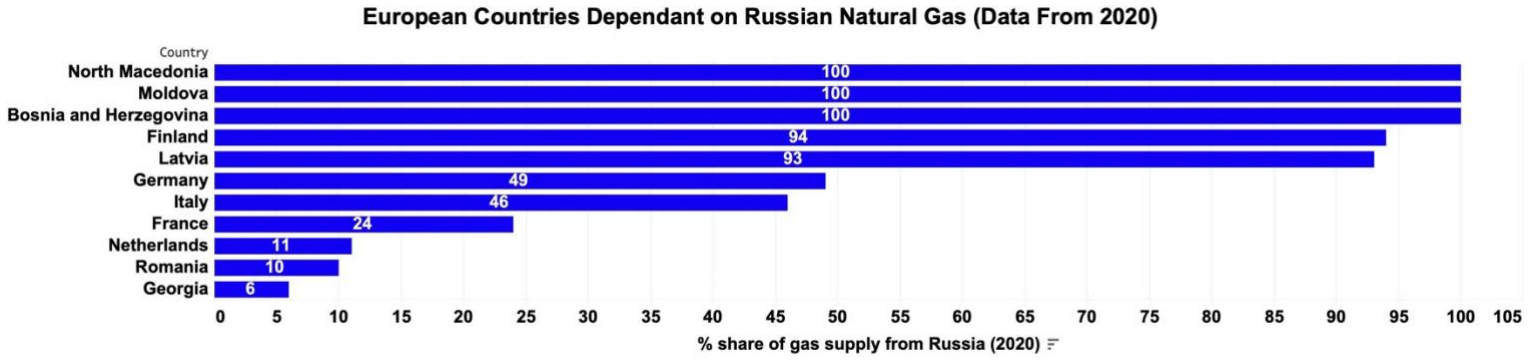
LNG poses an alternative to Russian natural gas, and though countries like Germany have signaled intent to expand LNG import terminal capacity, the time it takes to construct new terminals will inhibit LNG's ability to make up for reduced imports from Russia. Poland has a single LNG import terminal in Swinoujscie, and it is currently undergoing an expansion to increase its capacity to 8.3 bcma by 2023, up from 5 bcma.[109] In March 2022, Poland's LNG terminal received shipments from a record level of five LNG tankers. One of those shipments came from the LNG tanker Celsius Carolina, a vessel that exports specifically from the U.S. Sabine Pass and Corpus Christi facilities.[110] This highlights the potential for the U.S. to serve as an alternate energy supplier in the form of LNG, and this comes amid collaborative talks between the U.S. and European countries to increase shipments of U.S. LNG to the continent.[111]

Additionally, Poland will benefit from expanded capacity for natural gas from Norway to reach other European countries with the completion of the Baltic Pipeline which is set to be fully operational by 1 October 2022.[112] Other moves in the Baltic region to augment energy security include the commissioning of the regional LNG terminal in Paldiski, Estonia as part of the Three Seas Initiative.[113, 114]

6.0 Concluding Remarks

Recent signals from the Kremlin indicate a desired pivot of energy exports to Asian markets away from European markets.[115] For example, in October of last year Gazprom supplied its first LNG shipment to GAIL (India) Ltd. [(68) 1cd07986-dec5-41fd-bbb5-98fc6716b302] as part of a long-term, 20-year gas contract.[116] The Kremlin's desire to secure long-term markets comes amid European efforts to both decrease reliance on Russian energy and increase reliance upon renewable energy sources. Meanwhile, China is seeking to decrease its reliance on Western-supplied natural gas which comes mostly in the form of LNG.[117] In February, Russia agreed a 30-year contract to supply an additional 10 bcma of natural gas to the China National Petroleum Corporation [(61) 88b5951a-8319-410a-b667-4e17abffc74f] through the construction of a new pipeline.[118] Unfortunately for Russa, existing pipeline infrastructure connecting to Europe is more extensive and advanced than the network that connects to Asian markets, indicating that this pivot will take several years to accomplish. Furthermore, Russian exports of LNG to additional markets in Africa or Latin America faces significant problems such as sanctions on Russian vessels and restrictions from maritime insurers.[119]

If Russia's move to cut off natural gas supplies to Bulgaria and Poland is understood as a warning for other European countries, it is important to note which countries are most vulnerable. After their current deals expired at the end of this year, Poland and Bulgaria will not enter into further contractual arrangements with PJSC Gazprom. However, other countries may not have the opportunity to strategically assess their energy security situation with years of advanced notice.

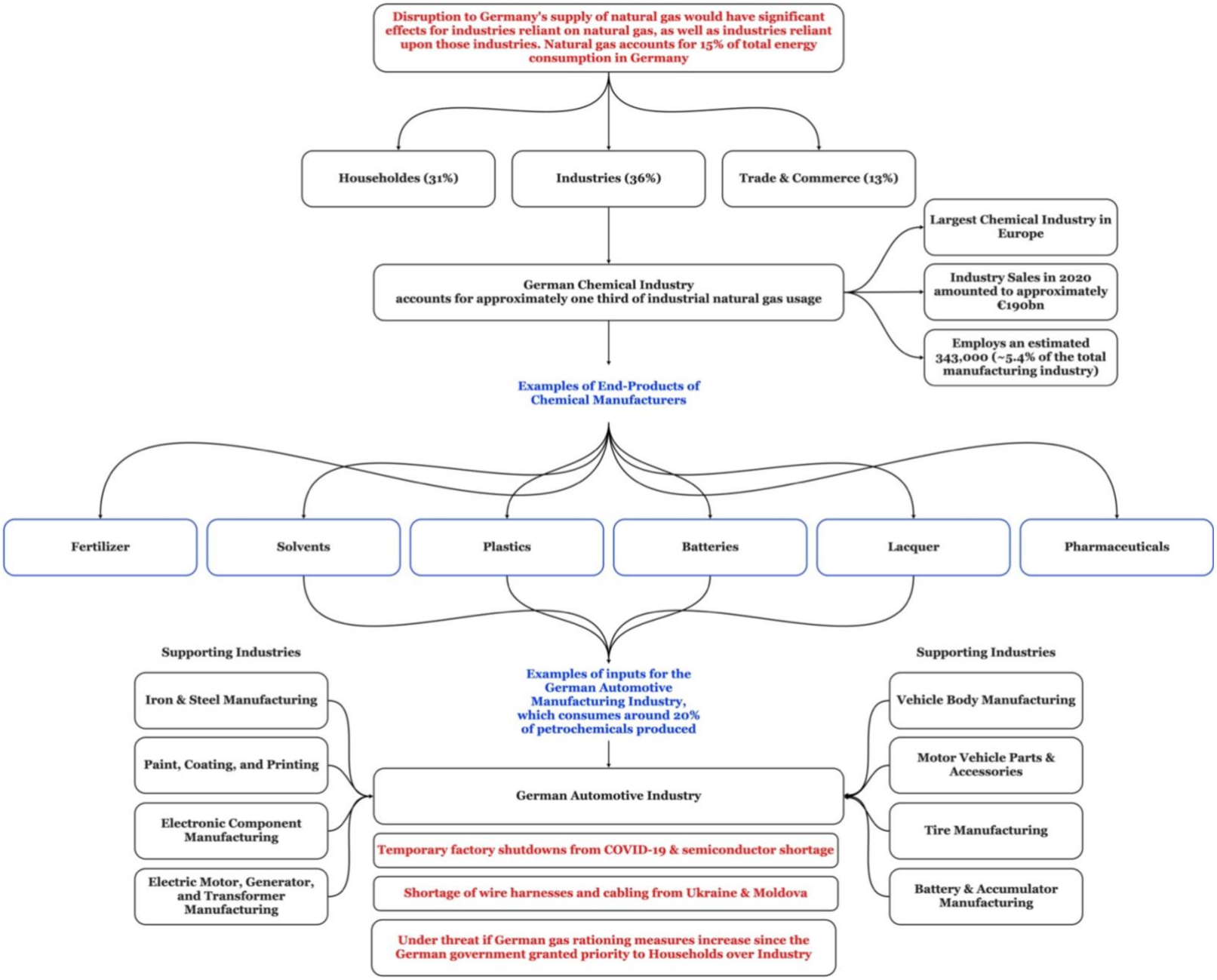


Source: Statista

According to 2020 data, North Macedonia, Moldova, and Bosnia and Herzegovina all have a 100% dependency on Russian natural gas imports. Northern European countries such as Finland and Latvia also have high reliance on Russian natural gas, though perhaps the highest economy of concern listed in the above the above chart is Germany. Disruptions to gas flows in any of the above listed countries would have negative ripple effects in global supply chains, but disruptions to the German manufacturing industry would yield the most significant consequences.

Natural gas accounts for approximately 15% of Germany's total energy consumption,[120] and it is predominantly used by industries (36%), households (31%), and trade and commerce (13%).[121] The chemical industry uses approximately a third of industrial natural gas to make everything from plastics and fertilizer to fibers and solvents.[122] Germany's central bank indicated that were gas supplies to be cut and the country was not adequately prepared, the country's total economic output could drop by as much as 5%.[123]

Impact of Potential Disruptions of Natural Gas to German Supply Chains



Germany's chemicals industry is the largest in Europe, with sales of more nearly €190 billion euros in 2020, including pharmaceuticals.[124] Germany's automotive industry, an export-intensive sector which acts as a catalyst for the other manufacturing sectors to thrive in the country, consumes around 20% of petrochemicals produced[125] as carmakers depend on chemical products for products such as batteries and lacquer.[126] As a result, disruptions to Germany's chemical industry could have significant downstream effects on the German automotive industry, which in turn would negatively affect other supporting industries. Other industries supporting the German automotive industry includes, but is not limited to, iron and steel manufacturing; paint, coating, and printings; electronic component manufacturing; vehicle body manufacturing; motor vehicle parts and accessories manufacturing; tire manufacturing; electric motor, generator, and transformer manufacturing; as well as battery and accumulator manufacturing.[127] Meanwhile, the German automotive industry is already under pressure and facing temporary factory shutdowns due to a global shortage of semiconductors used in electric vehicles,[128] as well as a reduced supply of wire harnesses from Ukraine and neighboring Moldova.[129]

Germany has taken steps to secure alternative energy sources and diversify its base of non-Russian suppliers. At the war's outset, Germany relied on Russia for approximately 55% of its natural gas demand. Now, that figure has been reduced to approximately 35% through augmented LNG imports and canceled contracts, and by the year's end Berlin aims to rely on Russia for less than a third of demand.[130] Although new LNG terminals will bring additional sources, those projects will take time to construct.

In the meantime, Berlin seized control of PJSC Gazprom's subsidiary in Germany, Gazprom Germania GmbH [(88) 4ac98129-24e8-4745-af2b-8c222123c5b7], a trading, storage and transmission business, and placed the company under a trusteeship until 30 September 2022 to secure supplies.[131] Additionally, Berlin activated its early warning gas supply plan amid supply source fears.[132] The second stage of this plan would be the alarm phase, which is implemented when disruption to supply or high demand upsets the usual balance but can still be corrected without intervention.[133] The third stage is an emergency, when market-based measures have failed to remedy shortages and Germany's gas network regulator would be forced to decide how to distribute gas supplies across the country.[134]

If Germany is unable to secure gas supplies to meet demand and storage requirements for this fall, Berlin will prioritize households over industry, while hospitals, care facilities, and other public sector institutions with special needs would be among the last to be affected by any disruption.[135] Such a step could cost Europe's largest economy tens of billions of euros and may plunge Germany into an economic recession. Union leaders in Germany have warned that hundreds of thousands of jobs would be at risk in this emergency.[136] The German chemical industry alone employs 343,000 people, or approximately 5.4 percent of all employees in the manufacturing industry.[137]

Currently, European countries are crafting sanctions on Russian oil exports to further punish the Russian economy for the country's invasion of Ukraine.[138] Germany now appears on board with this move, as Berlin struck a deal with Poland that will enable imports oil via the Baltic Sea port of Gdansk.[139] This comes in the wake of E.U. sanctions on Russian coal exports to the continent.[140]

While efforts are underway to ween off Russian energy it is unclear if Russia's threat to cut supplies from additional "unfriendly" states will materialize or be uncovered as a bluff. Progress on reducing reliance on Russian energy can already be seen in the Baltic States; Lithuania has already been able to completely abandon imports of Russian natural gas through LNG alternatives,[141] and the Estonian government has aimed to stop importing Russian gas before the end of 2022.[142] However, several European countries are not similar position to achieve this reliance reduction, so organizations around the world should maintain awareness of ongoing developments surrounding Russian energy supplies to mitigate ensuing supply chain disruptions. The Interos Resilience platform offers unparalleled visibility into organizations' sub-tier ecosystem, enabling continuous monitoring and the application of supply chain risk management tools to reinforce operational resilience.

7.0 List of Mentioned Entities

The following is an alphabetical list of companies that were specifically mentioned during this report:

Entity	i-Score	Resilience ID
BOTAS Petroleum Pipeline Corporation	53	bd437a9e-4a07-42f4-b584-7c33c889e140
Bulgargaz EAD	81	d41d4f31-710a-4be2-be5a-66db8e92950a
China National Petroleum Corporation	61	88b5951a-8319-410a-b667-4e17abffc74f
Engie SA	78	ae88735a-4b96-451e-9d29-337da235b8cb
Eni S.p.A.	77	210942de-5153-4b0c-a677-5c15d315b4a6
GAIL (India) Ltd.	68	1cd07986-dec5-41fd-bbb5-98fc6716b302
JSC Gazprombank	42	51dcfbff-33ad-40b5-9005-4da3bfebbb5e
OMV Aktiengesellschaft	85	a19b0063-26ec-435c-92e3-2c3f9661783a
PJSC Naftogaz	60	d7759398-090e-4380-8e8d-092007499261
Polskie Górnictwo Naftowe i Gazownictwo S.A.	83	4f75a58a-6fd9-4b3c-b72f-6063abd1aa2e
PJSC Gazprom	50	b3324463-367a-4b19-99f6-c5e6c5635811
PJSC Gazprom Neft	52	9254197a-5f07-4764-9f62-6ba2c37ae6af
PJSC Lukoil	50	9a04733d-911c-4043-ab94-0b7881705f93
PJSC Rosneft Oil Company	50	5be3cfb7-0f36-451b-9fa4-600f60514db5
PJSC Surgutneftegaz	48	972238df-d70e-4ec9-8936-aac6ade9c271
PJSC Tatneft	54	2a1b24a0-c8da-4d8a-95a9-a70f1980ccb1
PAO NK RussNeft	43	a9800fdc-aed0-4722-96bb-5c88714e15cd
PAO Novatek	65	be429117-815d-42bb-82eb-d3d600d40f3a
Royal Dutch Shell plc	78	d607e2fe-75d9-49b8-a6ce-5bbbd25b216c
Uniper SE	83	78e28c84-a3eb-497d-a49b-752ca0e8d4f0
VKontakte Ltd.	39	d996696f-11af-4b05-aae1-0c26bec665cb
Wintershall Dea GmbH	81	6c25a40d-e7b2-49f7-b59c-c7239ceffc40

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