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Oxford Energy Comment

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Introduction

On February 4 2022 China's President Xi Jinping and Russia's President Vladimir Putin met in Beijing ahead of the opening ceremony of the Winter Olympics hosted by China. The summit lasted for four hours and resulted in a joint statement on the situation in global international affairs whereby China and Russia expressed their alignment and joint support on the main issues of the current geo-political agenda.¹ It also ushered in a series of business deals, with new contracts for Russian oil and gas to China between Rosneft, Gazprom, and CNPC, each worth tens of billions of euros² in addition to a host of other contracts spanning sustainable and low carbon development.³ The gas deal is denominated in euros, highlighting the desire of both sides to stop using US dollars in their new bi-lateral gas trade agreements.⁴ For Russia, this was a message—drawing on lessons from the sanctions that took effect in 2014—to the US that sanctions are a double-edged sword, while from Beijing's perspective, this was another hedge against US dominance of the global financial system and an attempt to insulate its companies from potential sanctions.

This comment reviews how the new gas deal between Russia and China fits into their strategies, highlights the key implications of expanded gas cooperation between Russia and China and addresses some of the open questions in the deal. The main outcome of the agreement is a diversification of foreign trade options for both countries (See Figure 1). From China's perspective, the additional 10 bcm of gas comes at an opportune time, as the country faces rising gas demand and highly volatile global LNG prices, but these incremental flows are still unlikely to diminish China's appetite for imported LNG, nor should they be taken as a sign that an additional pipeline deal is imminent. Following the Russian invasion of Ukraine, Russia's growing international isolation could lead it to offer China an attractively-termed deal for an additional pipeline, and Beijing will likely be inclined to accept it. However the raft of uncertainties surrounding China's future demand in light of ongoing price volatility, as well as its willingness to conclude another large agreement with Russia now, may prompt it to hold off on an additional commitment for the time being.⁵

2022 Gas Deal: Extension of the Existing Framework Agreement

There are no quick fixes in the gas business. It took Russia and China over ten years to negotiate their first major gas deal: an intergovernmental agreement (IGA) on the construction of the Power of Siberia (PoS) pipeline and the matching pipeline infrastructure in China, plus a long-term Sales and Purchase Agreement (SPA) for the supply of 1 tcm of gas over a period of 30 years via PoS, with annual deliveries of 38 bcm per annum.⁶ The IGA was finalized and signed in October 2014 and was ratified by the Russian parliament in May 2015. PoS, in accordance with the IGA, was supposed to be commissioned four years after the signing, with a grace extension period of two years in case of construction delays. The construction of the first section of PoS to China's Heilongjiang province from the giant Chayanda gas field in Sakha (Yakutia) in Eastern Siberia was completed at the end of 2019 with first gas deliveries

- ³ Å full list of deals can be found on the Chinese Ministry of Foreign Affairs' website
- https://www.fmprc.gov.cn/zyxw/202202/t20220204_10638957.shtml (Chinese)

¹ See <u>http://en.kremlin.ru/supplement/5770</u> for the full text of the statement.

² See Rosneft's press-release regarding the new oil deal <u>https://www.rosneft.ru/press/releases/item/209333/</u> and Gazprom's press-release regarding the new gas deal <u>https://www.gazprom.com/press/news/2022/february/article547478/</u>. Both deals were signed with China's CNPC.

⁴ Reuters reported that the gas deal is going to be settled in euros, according to its sources. No specific information about the currency of the oil deal was given. See <u>https://www.reuters.com/world/asia-pacific/exclusive-russia-china-agree-30-year-gas-deal-using-new-pipeline-source-2022-02-04/</u>

⁵See also Michal Meidan, "The Russian invasion of Ukraine and China's energy markets". OIES comment, March 2022, https://www.oxfordenergy.org/publications/the-russian-invasion-of-ukraine-and-chinas-energy-markets/

⁶ The terms of the 2014 contract stipulated that gas supplies via Power of Siberia would be ramped up gradually and would reach 38 bcm in the fifth year from the start of deliveries, which commenced in December 2019. In 2020 these amounted to 4.1 bcm, and in 2021 – 9.9 bcm. It is expected that the 38 bcm threshold will be reached in 2025.



commencing in December 2019.⁷ Currently, PoS is being extended west to Kovykta,⁸ a super-giant gas field in the Irkutsk region, to bring the supply for PoS up to sufficient levels to allow annual deliveries to reach the contracted 38 bcm by 2025. About 70 per cent of the pipeline section between Kovykta and Chayanda had been completed at the time of writing and the whole section is expected to be ready by the end of 2022. Connecting Kovykta to PoS 1 not only ensures that the planned level of 38 bcm per annum would be reached by 2025 but also opens an opportunity for expanding deliveries to 44 bcm per annum, should China needs more gas. Gazprom has been planning for Chayanda and Kovykta each to produce 25 bcm per annum when their production plateaus.



Figure 1: Plans for additional Russian gas supply to China

Source: Gazprom

Under the contract, the gas is priced at the Russia-China border crossing point near Blagoveschensk⁹ according to an oil-indexed formula with an estimated ~10 per cent slope and a nine month time lag.¹⁰ At the time of the 2014 contract signing, this gave Gazprom an export netback close to the export netbacks from gas supplies to Europe from Western Siberia. In 2020, the average border price of Russian gas (about USD4.4/mmbtu reported by Chinese customs) was higher than the price at which Gazprom was selling gas to its European clients. If a barrel of oil remains in the USD80-90 price range

⁷ Proven gas reserves at Chayanda under PRMC standards were estimated at 448.6 bcm as of 31 December 2020, according to Gazprom's latest report. According to Russia's classification of reserves, which is different from SEC or PRMC as they focus more on technical recoverability than on commercial recoverability at the time of the estimate, Chayanda has 927 bcm of A+B1+C1 reserves (roughly corresponding to 'proven and probable'). Total reserves, including possible, run as high as 1.2 tcm. Gazprom's planned peak production at Chayanda of 25 bcm per annum is going to be reached in 2024 and it will remain at plateau for the next 20 years.

^a Gas reserves at Kovykta amounted to 629.3 bcm as of 31 December 2020, according to PRMS standard, and 1,424 bcm according to Russia's A+B1+C1 standard. Total reserves are much higher, approaching 1.8 tcm. Gazprom expects peak production of 27.2 bcm at Kovykta in 2026 with plateau production for the next 25 years.

⁹ Two strings of the pipeline cross into China under the Amur River that demarcates the border.

¹⁰ The exact pricing terms are a commercial secret. Gazprom said that the contract is based on traditional oil indexation but did not provide any details. The estimates for the effective slope in the contract were done by applying the announced total value of the contract by Gazprom in the end of 2014 to total volumes and considering the oil price level in the end of 2014.



on average in the second half of the 2020s, the gas price in Gazprom's Chinese contract will be about USD8-9/mmbtu.

The new gas deal between Russia and China announced on 4 February 2022 coincided with rising geopolitical tensions and highlighted that both Russia and China were seeking to hedge their exposure to Europe (either as an export market or as a global LNG price maker), but in reality it has been under negotiation for years. The seemingly surprising speed with which the agreement was signed is due to the fact that this is merely an extension of the 2014 deal. Its basis was laid in December 2017 when a Heads of Agreement (HoA) was signed for Russian gas supplies to China via the 'Far Eastern' route. The HoA defined the key parameters of the future SPA, including gas volumes, start of deliveries, the schedule for their ramp-up, and the border crossing point.¹¹

According to Gazprom, the new contract signed with CNPC in February 2022 is a long-term SPA for supplying 10 bcm of pipeline gas per annum to China over 25 years from Russia's Far East, in addition to the 38 bcm via PoS over 30 years, and bringing the combined annual gas deliveries of Russian gas to China to 48 bcma under the two SPAs.¹² The pricing terms of the contract appear the same as in the 2014 agreement, with oil indexation and a ~10 per cent slope, making Russian gas supplies competitive against imported LNG in China's northern provinces and potentially further south, in the Beijing-Tianjin-Hebei area (see discussion below). But what is the 'Far Eastern route' mentioned in Gazprom's press release, and where will the gas come from?

Figure 1 demonstrates that there is an existing gas pipeline (Sakhalin-Khabarovsk-Vladivostok or SKV) that connects offshore gas fields on Sakhalin with Russia's mainland and runs down to Vladivostok via a long stretch of the Russia-China border. The availability of the existing SKV gas pipeline¹³ in addition to Sakhalin gas make this a relatively low-cost option for quickly ramping up Russian pipeline gas exports to China, although it will be necessary to add several compressor stations to increase the throughput capacity of the pipeline, and to build a short spur to China. Earlier, Gazprom was indicating that Dalnerechensk, a location at approximately the mid-point of the pipeline section between Komsomolsk and Vladivostok, could be a possible border crossing into China for this route. It will also be necessary to create the matching infrastructure in China to enable it to absorb Russian gas in this area.

Alternatively, Russia would need to build a new 580 km connector pipeline between SKV and PoS 1 at Blagoveschensk. In the latter case, the Chinese would only need to add additional compressor capacity to their existing receiving pipelines to accomodate additional Russian gas deliveries. Neither side has said which option is going to be realized at this point, so it remains an important point to look out for.

For Russia, connecting PoS 1 with SKV would mean access to pipeline gas for Russia's marine terminals on the Pacific coast and a possibility of building new LNG terminals there in the future. This is not something Russia is planning in the near term, since the costs of such a move are very high. The long-term value of the unification of the East Siberian and Far Eastern parts of the gas pipeline networks is huge, however, since it would be safeguarding against the threat of monopsony-type behaviour by China. Another important point related to Russia-China future gas plans is that an even bigger deal is still in the making, which might become a real game changer for the future of Russia's gas industry. For many years Gazprom has been trying to negotiate a deal on supplying gas to China from Russian gas fields in Western Siberia. However the Altai pipeline which was supposed to utilise some of the existing Russian pipeline infrastructure and add new sections to reach a short stretch of the common border between Russia and Western China hasn't taken off because of a lack of interest from China, which currently receives gas from Central Asia in this area. China's western provinces are large coal producers and consumers, and also have a large potential for renewable energy. Expanding the East-

¹¹ <u>https://www.gazprom.com/press/news/2017/december/article388463/</u> None of these parameters have been disclosed apart from very general information.

¹² No specific start date for gas deliveries via the 'Far Eastern route' was announced but the mismatch between the durations of the two SPAs suggest that they might start in 2024, since in this case both SPAs would end simultaneously in 2049.

¹³ https://www.gazprom.com/projects/skhv/



West pipeline infrastructure to accommodate higher volumes of gas imports to its westernmost provinces is therefore not an appealing proposition. Moreover, transporting piped gas to the largest consumer hubs along the eastern coast incurs transport costs estimated at USD3-4/mmbtu, with the gas also competing with LNG supplies.

At present, Gazprom is working on a new idea: to build a pipeline that would connect a new giant Russian gas province on Yamal with China via a transit pipeline through Mongolia (Soyuz-Vostok). This plan envisages annual deliveries of 50 bcm per year to China's northern regions. Russia and China continue to negotiate, and one important difference from earlier years seems to be a pragmatic acceptance by both sides of the possibility of including third-party transit (via Mongolia) into their plans. At the time of writing, Gazprom has completed negotiations with Mongolia and agreed a detailed transit route with approvals for right-of-way and also completed the feasibility study for the pipeline. On 28 February 2022, Gazprom reported that design and survey work had started on Soyuz-Vostok pipeline.¹⁴

For the project to move ahead a new significant SPA with China will be needed. The project remains a long shot but might for the first time introduce competition between Europe and China for Russia's gas reserves on Yamal and the Nadym Pur Taz region (NPT). Before the present conflict in Ukraine, Gazprom was probably considering the project as part of its gradual diversification towards China by the early 2030s when this would be a viable alternative to gas exports to Europe should gas demand there fall due to a fast energy transition. But now, when it has become clear that Europe is going to reduce its energy dependence on Russia as soon as possible, Power of Siberia 2 (PoS 2) is going to be the number one priority for Gazprom. Since the production base for the first stage of gas deliveries might be the established output from Yamal with possible links to the NPT area, this would give Russia a lot of room to offer price discounts to China which would speed up agreement on a new SPA that might fast-track construction of PoS 2. For Russia, the key technical elements seem to be within reach: Gazprom is highly motivated, Russia has both the capacity and capability to produce high-diameter pipes, and qualified labour, including top-notch welders, is available. More uncertain is the financing of the construction, and whether Gazprom is going to use free cash flow to finance PoS 2 or would seek Chinese funding (possibly in the form of pre-payment for gas deliveries). In any case, it takes two to tango, and the urgency on Russia's part may or may not be shared by China. This leaves us with uncertain timing for the completion of PoS 2: there is a chance that it could be finished by the middle of the 2020s if everything works in Gazprom's favour, but it could also be delayed by a few years if China is less enthusiastic.

The game of scrabble with Sakhalin gas resources: which fields are going to provide gas for China?

The newly agreed SPA does not mention specific gas fields as sources of supply. But a review of the options available to Gazprom narrows the choice of options to the Sakhalin 3 project and, more specifically, to the South Kirinskoye field which is the only one with sufficient uncommitted gas reserves. (See Figure 2.)

Since the early 1990s, Sakhalin has emerged as a key area for oil and gas production in Russia's Far East. Two production sharing agreements (PSAs) signed with foreign investors enabled the launch of costly and technically challenging projects. The Sakhalin-1 PSA¹⁵ is primarily an oil development where large amounts of associated gas have been re-injected to maintain the reservoir pressure and some gas supplied to Russia's domestic market. As the oil phase of the project is approaching its end, the plans for producing and monetizing gas from Sakhalin-1 are gaining momentum. Rosneft has been promoting an idea for a 6.5 mt LNG plant, but no final decision has been taken. Now, with Exxon pulling out of Russia, the decision about the marketing of Sakhalin-1 gas is up in the air. If the plans for

¹⁴ https://www.gazprom.com/press/news/2022/february/article548560/

¹⁵ The partners in the Sakhalin-1 project are PJSC NK Rosneft with a 20 per cent share, ExxonMobil with a 30 per cent share, SODECO consortium consisting of Japanese companies with a 30 per cent share and the Indian state oil company ONGC Videsh with a 20 per cent share. The project operator is Exxon Neftegas Limited.



Rosneft's Far Eastern LNG are put on a back burner or scrapped altogether, Sakhalin-1 might potentially provide gas for deliveries to China via SKV.





Source: Gazprom

The Sakhalin-2 PSA¹⁶ production comprises mostly of natural gas that is transported to the liquefaction plant in the south of the island and marketed as LNG (mostly in Japan and South Korea). Shell's departure from the project might also create a different set of incentives for Gazprom with regards to finally building train 3 of the Sakhalin LNG plant.

¹⁶ Sakhalin-2 PSA (Sakhalin Energy) partners include Gazprom (50 per cent plus one share), Shell (27.5 per cent minus one share), Mitsui with a 12.5 per cent share, and Mitsubishi with a 10 per cent share.



Mobil and Texaco, the international companies who were exploring the offshore blocks that currently comprise the Sakhalin-3 project in the early 1990s, were also in line for signing a PSA but Russia's love affair with PSAs was short-lived. After spending about USD80 million on exploration and finding significant oil and gas reserves, the US companies failed to receive a production license. In 2008-09 the licenses for the Sakhalin-3 acreage were handed to Gazprom. These included three blocks (or sections) offshore Sakhalin: Kirinskoye (with three identified fields, Kirinskoye, Yuzhno-Kirinskoye, and Mynginskoye), Ayashskoye, and East Odoptu, with total combined gas reserves of 1.4 tcm.

The Kirinskoye field has been producing gas since 2013 with the use of an undersea manifold with deliveries to an onshore gas treatment facility and then into the SKV trunk pipeline. Gazprom lists the annual productive capacity for the field at 5.5 bcm.¹⁷

Actual output has been lower because of seasonal shut-ins due to a lack of regional gas demand during the summer. Mynginskoye is a relatively small field with estimated 19.9 bcm of recoverable reserves, but Yuzhno-Kirinskoye is a much more significant asset, the largest field discovered so far in the offshore Sakhalin acreage. According to Russia's Ministry of Natural Resources, its A+B1+C1 gas reserves equal 584.5 bcm (roughly corresponding to proven and probable reserves under international classifications). Gazprom reports that total C1+C2 reserves at the field comprise 711.2 bcm of gas, 111.5 mt of recoverable gas condensate and 4.1 mt of recoverable oil. The expected annual output for Yuzhno-Kirinskoye is 21 bcm.¹⁸

Bringing South Kirinskoye into production, however, became problematic after the US introduced specific sanctions against this project in 2015.¹⁹ The development plan for South Kirinskoye involved the same subsea technology that had been used at Kirinskoye (a remotely operated subsea manifold) and which was to be provided by US-based companies. The interruption of these supplies has resulted in a delay of at least three years while Gazprom tries to find ways to procure alternative technological solutions and offshore equipment which until recently was almost entirely imported.

At the time of writing, Gazprom's latest guidance for the start of Yuzhno-Kirinskoye is 2024.²⁰ But before the planned 10 bcm per year level is achieved, several hurdles must be overcome, related primarily to upstream challenges for additional gas production on Sakhalin.

Gazprom has extended the deadline several times already, so the question remains whether this new date is realistic. The project has been delayed so many times that it seems hardly credible that it could start in less than two years. Whatever transpires, any news regarding Yuzhno-Kirinskoye will be an important signpost for estimating the timing of additional Russian gas deliveries to China.

It is worth noting that US sanctions have prevented Gazprom from acquiring subsea production technology and equipment since 2015. Gazprom has an agreement with Russian producers Almaz-Antey and Malakhit concerning the supply of the necessary undersea production equipment, but it remains to be seen if this plan will work. Additionally, low gas prices in 2020 and the first half of 2021 were not conducive for this high-cost project. A newly signed SPA with the Chinese for additional 10 bcm from Russia's Far East and the present price spike might give Gazprom's decision-makers a strong signal to go ahead with accelerating the Yuzhno-Kirinskoye project.

In conclusion, the apparent dedication of the South Kirinskoye gas reserves to the Chinese market narrows the options for other projects on Sakhalin. In particular, the expansion of the LNG plant now seems out of the question due to the lack of available additional supply. But could it also limit the options for meeting the gas needs of domestic consumers in Russia's Far East?

¹⁷ <u>https://www.gazprom.com/projects/sakhalin3/</u>

¹⁸ <u>https://www.gazprom.com/projects/sakhalin3/</u>

¹⁹ <u>https://www.federalregister.gov/documents/2015/08/07/2015-19274/russian-sanctions-addition-to-the-entity-list-to-prevent-violations-of-russian-industry-sector?utm_content=header&utm_medium=slideshow&utm_source=homepage</u>

²⁰ https://neftegaz.ru/news/shelf/675422-gazprom-otkladyvaet-razrabotku-yuzhno-kirinskogo-mestorozhdeniya-na-shelfe-o-sakhalin/



Can Russian domestic demand interfere with export plans?

In September 2020, a representative of Russia's Ministry of Energy, speaking at a large industry conference on Sakhalin, presented the official view on how the gas resource base of Sakhalin compares with the expected growth in demand in Russia's Far East. (See Figure 3.)

According to the Ministry of Energy's projections, gas consumption will increase robustly in the Primorsk and Khabarovsk regions during 2020-2025, leaving a relatively small surplus available for exports. The situation could improve with the growth of gas output by 2030 but then gas consumption at Sakhalin jumps (probably assuming the start of the third liquefaction train at the LNG plant by 2030 according to the Ministry of Energy's calculations). Now it appears that there is a clear choice to be made between another 10 bcm of pipeline gas to China or an expanded Sakhalin-2 LNG plant. It will be difficult to do both, and pipeline gas to China is now the favoured option.

The commitment to deliver gas from Sakhalin to China might also slow down some of the new gasintensive projects that were planned for Russia's Far East, such as a fertilizer plant at Nakhodka and massive gasification in Primorsk and Khabarovsk.

	2020	2021	2022	2023	2024	2025	2030	2035
Resource base (gas production)								
Sakhalin-1 project (Chayvo)	2.8	2.8	2.8	2.8	2.8	9.5	7.7	8.9
Sakhalin-2 project (Lunskoye)	16.2	16.2	16.2	16.2	16.2	16.4	15.4	8.6
Sakhalin-3 project. including	2.6	5.5	5.5	6.3	10.5	12.2	23.1	26.9
Kirinskoye gas condensate field	2.6	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Yuzhno-Kirinskoye gas condensate field	0	0	0	0.8	5.0	6.7	15.4	19.2
Mynginskoye gas condensate field	0	0	0	0	0	0	2.2	2.2
Rosneft Projects (North Chayvo, Veninsky Block)	0.4	0.3	0.3	0.4	0.6	0.7	1.9	1.7
Total:*	21.98	24.78	24.78	25.68	30.08	38.77	48.09	46.08
Gas consumption								
Sakhalin Region	15.00	15.22	15.39	15.52	15.57	15.88	23.39	23.39
Primorsk Krai	1.64	1.98	2.72	4.10	4.97	6.86	11.33	12.13
Khabarovsk y Krai	3.21	3.43	3.57	4.52	4.57	4.90	4.93	5.12
Total:	19.8	20.6	21.7	24.1	25.1	27.6	39.7	40.6

Figure 3: Expected gas production and consumption in Russia's Far East

Source: Russia's Ministry of Energy

surplus/deficit

China looks for new supplies

For China, happiness is multiple supply sources. Following the surge in gas demand in 2021 – with implied demand up by a staggering 62.4 bcm year-on-year – plus the power crunch in September-October 2021 and with the Chinese leadership's assessment that its external environment is rapidly deteriorating, the issue of supply security is rising rapidly up the political agenda. Concerns about supply

3.10

1.54

4.98

11.13

8.43

5.44

2.14

4.15



*in*security are wide ranging and include both physical curtailment of flows as well as price volatility. The response is therefore to increase and diversify all sources of energy supplies (including coal and gas, but also renewables),²¹ increase gas storage capacity, and enhance the flexibility of the domestic gas market. Historically, China's leaders have sought to limit their import dependence by developing domestic resources, while maintaining a balance between seaborne and land-based flows of gas. Since 2017, however, LNG imports have risen rapidly with pipeline supplies failing to keep up (Figure 4), so new pipeline flows are a welcome addition.



Figure 4: China's gas supplies, bcm

Source: NBS, China Customs

What is more, the Power of Siberia (PoS or 'the China-Russia Far East Route' as it is known in China) has become China's lowest cost gas at the border and is competitive in northeastern China on a delivered-cost basis because of low transportation costs. In February 2020, the National Development and Reform Commission (NDRC) set transport tariffs for the northern section of the pipeline at 0.1825 yuan/m³ (or USD0.79/mmbtu) per 1000 km. Pipeline transportation tariffs range between 0.11 yuan/m³ (USD0.48/mmbtu) to 3.4 yuan/m³ (USD15/mmbtu) per 1000 km. On the eastern sections of the West-East pipeline, for instance, the rate is 0.24 yuan/m³ (USD1.13/mmbtu) per 1000 km and 0.40 yuan/m³ (USD1.78/mmbtu) for the Myanmar-China pipeline.²²

China's Northeastern provinces of Heilongjiang, Liaoning, and Jilin are among the more price sensitive in China and in 2019 they consumed 15 bcm of gas in total, according to China's National Bureau of Statistics.²³ Of that, only 7 bcm was supplied by domestic production and with few alternative import options – the closest LNG import terminal is located in Dalian (Liaoning), with an annual capacity of 6 million MT/year²⁴ – gas demand growth has been constrained by the lack of cost-competitive supplies to the region. The northern section of the the China-Russia Far East Route runs for 1067 km linking it directly to these provinces and providing supplies which underpin future demand growth.

²¹ See for instance, "The rice bowl of energy must be in one's own hands" (Chinese), People's Daily, 7 January 2022, http://www.nea.gov.cn/2022-01/07/c_1310413762.htm

²² NDRC prices for the Sino-Russian pipeline here

https://www.ndrc.gov.cn/xxgk/zcfb/tz/202003/t20200313_1223061.html?code=&state=123 and a list of PipeChina tariffs is available here https://www.pipechina.com.cn/gpkf/gkxx/1172.html, an earlier list of tariffs can be found here "Thurshte on the second tariffs for petural are simplined", (Chinage) - Sheathei Petural are and Content of the second tariffs for petural are simplined."

[&]quot;Thoughts on the operations and tariffs for natural gas pipelines" (Chinese), Shanghai Petroleum and Gas Exchange, 7 March 2020, https://www.shpgx.com/html/xyzx/20200307/2759.html

²³ Available here - https://data.stats.gov.cn/easyquery.htm?cn=E0103

²⁴ The Liaoning terminal also helps meet demand in other Northern provinces in China and is not specifically earmarked to supply Northeastern provinces



But since the north-eastern provinces are unlikely to absorb 38 bcm of gas, let alone 48 bcm, the domestic pipeline infrastructure is being extended. The northern section of the domestic pipeline runs from Heihe to Changling, and was completed in 2019. The middle section starts in Jilin province and runs through to Hebei province in Central China (Changling-Yongqing). Construction began in mid-2019 and was completed in late 2020, with the line passing through Jilin, Inner Mongolia, Liaoning, Hebei, and Tianjin, before reaching Beijing. Indeed, the Beijing-Tianjin-Hebei area (also known as Jing-Jin-Ji market)²⁵ consumed 46.5 bcm in 2019,²⁶ and it is better supplied than the north-eastern provinces, with over 10 million MT/year of regas terminals. The middle section connects with domestic pipelines (the Shaanxi-Beijing pipeline system) as well as to the Tangshan LNG terminal and gas storage in Liaohe. But with transmission tariffs from the border to Beijing estimated at around USD2/mmbtu, Russian pipeline gas is not necessarily the lowest cost option, compared to LNG. Nonetheless, with high gas demand in the region – as this has been a focal area for the government's coal-to-gas switching – and high winter demand, LNG imports will still provide a significant source of flexibility in the Jing-Jin-Ji market, even with additional pipeline flows.



Figure 5: Gas prices at the border, USD/mmbtu

Source: China customs

The southern section of the domestic pipeline infrastructure began construction in January 2021 and is expected to be completed in 2025.²⁷ This final section will connect the PoS with Shandong, Jiangsu, and Shanghai, some of China's largest gas markets which had a combined demand of 58 bcm in 2019. Transmission tariffs will, however, be higher into the southern section and Russian pipeline gas will face stiffer competition from a variety of sources, including the West-East pipeline and LNG imports.

The PoS infrastructure in China is designed to carry up to 50 bcma of Russian pipeline gas, so the additional 10 bcma is already factored into the domestic outlook.

²⁵ "The middle section of the Sino-Russian pipeline (Changling-Yongqing) was put into operation" (Chinese), National Pipeline Network Group, 29 December 2020, https://www.ndrc.gov.cn/xwdt/ztzl/nybzgzzl/gnjnybz/202012/t20201229_1260778_ext.html
²⁶ According to China's National Bureau of Statistics

²⁷ "Construction of the southern section of the Power of Siberia pipeline has begun", (Chinese), 6 January 2021,

http://www.xinhuanet.com/fortune/2021-01/06/c_1126953382.htm





Figure 6: Domestic pipeline infrastructure for the China-Russia eastern route²⁸

What do additional Russian volumes mean for LNG demand?

The additional 10 bcma of Russia pipeline supplies have, to a great extent, already been factored into China's own future balances and as a result, are likely to have limited impact on LNG demand growth. Notwithstanding the potential for further dramatic price spikes through 2022, in the coming years, pipeline volumes in the Jing-Jin-Ji area may compete with LNG on a price basis, but they are unlikely to significantly diminish China's appetite for imported LNG. This is because gas demand in China has historically been constrained by supplies and if cost-competitive and reliable supplies become available, local governments will be able to incorporate more gas into their economies. Moreover, LNG demand is set to grow as liberalisation efforts continue, allowing new entrants to capture market share. China's decision makers will want to ensure a variety of supply sources and will not be averse to a seeming oversupply of gas that will allow the country to fill storage, meet peak demand, and use any potential excess for trading purposes

Gas is widely seen as a clean fuel, and therefore part of the country's low-carbon transition. Its role both in the power sector and in phasing out coal for residential and commercial use continues to support demand growth. Second, the liberalization of China's gas market, which remains underway, is creating

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²⁸ Map source: <u>https://www.sohu.com/a/335872516_120182408</u> English names added by the author



more opportunities for new buyers, who will look to secure LNG contracts and terminals as they seek to gain a foothold in this growing market, even at the risk of creating oversupply post-2030.

Estimates of China's future gas demand vary widely given the uncertainties surrounding the pathway to China's 30-60 targets (Beijing's pledge to peak carbon emissions before 2030 and reach net zero by 2060). For instance, the National Energy Administration, China's de-facto Energy Ministry, forecasts that demand will reach 550–600 bcm by 2030, before peaking at an undisclosed volume in 2040. PipeChina, the newly-created midstream company, reckons demand will reach 650 bcm in 2035, while China National Petroleum Corporation (CNPC) expects gas use will reach 535–600 bcm in 2030 and peak at 650 bcm in 2040. Tsinghua University pegs China's gas demand on the higher end of the spectrum, at close to 600 bcm in 2030 but expects a steep decline thereafter (Figure 7).



Figure 7: Chinese gas demand estimates, bcm

So even the lowest estimates foresee an incremental 175 bcm of demand through 2030. Most forecasts for China's domestic production converge at around 300 bcm in the 2030s, suggesting that around half of new demand will be met with domestic output. But this still leaves around 90 bcm of additional import requirements. With Russian pipeline flows reaching 10 bcm in 2021, they are now set to add 38 bcm through 2025-2027. This, then, suggests a supply gap of over 50 bcm, which LNG imports are likely to fill and even exceed.

In 2021 and early 2022, Chinese buyers signed over 30 Mt of new import deals, most of which span at least ten years. Of these new contracts, close to 14 Mtpa are set to begin deliveries in 2022, with an additional third taking effect in 2023. Almost one-third of those deals are for US LNG, coinciding with a thawing of bilateral ties and the end of the 'phase one' deal between Washington and Beijing.

With PipeChina continuing to develop a regulatory framework for third-party access in the domestic market, tier-two buyers are increasingly securing term contracts and looking to invest in import terminals. Indeed, China's regas capacity could double over the next 5-7 years, with tier two players accounting for the majority of new terminals. Assuming a growing share of spot volumes, the low-case demand outlook seems to be well supplied, allowing China to add and fill new storage tanks to provide a buffer for seasonal variations. So, up until 2030, China's gas market is likely to be adequately supplied, especially with the additional 10 bcma factored in.²⁹ But beyond 2030, the supply picture is

Source: CNPC ETRI 2060 Energy Outlook, 2021; Tsinghua ICCSD, State Grid Energy Research Institute, OIES

²⁹ Should the current Russia-Ukraine crisis lead to sharp increases in European LNG demand due to a curtailment of Russian pipeline supplies, the impact of higher prices would likely lead to slower gas demand in growth in China.



not as clear. If Chinese demand reaches around 550 bcm in 2030 and peaks at around these levels, Beijing may not need an additional supply deal with Russia, assuming that buyers sign additional LNG term deals over the coming years.³⁰ But if the appetite for long-term contracts wanes (which it shows no sign of doing in the current high price environment) or if demand growth were to rise more rapidly and the consensus estimate in China was for consumption to reach 600 bcm or even exceed it – which it isn't currently – there may be a clear-cut case for an additional pipeline route from Russia (through Mongolia).

That said, even though the liberalization efforts and flexibility of LNG supply contracts suggest rapid increases in LNG flows to China, they inevitably lead to higher import dependence on seaborne flows, a source of strategic vulnerability that Beijing has long sought to mitigate. The latest agreement with Russia is a signal that Beijing is looking to hedge against price volatility and seaborne import dependence, even though the deal does not materially alter the near-term LNG demand outlook. That the project will be settled in euros, rather than USD (but also not in Chinese renminbi or in Russian rubles) highlights the geopolitical significance of the deal, and also caution between Moscow and Beijing. Russia's invasion of Ukraine offers Beijing potential opportunities but is not risk free. Beijing has profited from sanctions imposed on Russia and also stands to benefit from its growing isolation. Already, American and European sanctions imposed in 2014 have benefited Chinese banks and companies. But Beijing remains mindful not to flout Western sanctions in a way that would limit China's access to Western markets and financial systems or lead to the imposition of secondary sanctions on its companies. Beijing's desire to advance the Chinese currency in global financial systems, create an alternative payments network to SWIFT and facilitate more yuan-denominated transactions are a response to these vulnerabilities. Finally, partly as a result of international sanctions in 2014. China and Russia agreed on the Power of Siberia pipeline. Should the terms and conditions be appealing enough, another agreement (in principle at least) cannot be excluded. Beijing may want to wait for a few more years before committing to another large pipeline project which would leave it dependent on Russia. In addition, it will be watching developments in global LNG markets as the vast majority of its legacy term LNG contracts are set to expire after 2030. Its LNG exposure will be determined by the additional deals Chinese buyers sign over the next 3-5 years.

Conclusion

The 10 bcma supply deal signed on 4 February 2022, before the Russian invasion of Ukraine, heralded a deepening of Sino-Russian energy ties. While the deal does not materially impact short-term balances, it allows a greater diversification of foreign trade options for both countries. The conflict in Ukraine has created a new reality in which Europe is going to reduce its energy dependence on Russia as soon as possible. Russia must therefore accelerate its Pivot to the East. From China's perspective, the additional 10 bcm comes at an opportune time, with rising gas demand in China and in the context of highly volatile global LNG markets, but these incremental flows are still unlikely to materially dimish China's appetite for imported LNG, nor should they be taken as a sign that an additional pipeline deal is imminent. What is clear, however, is that China is a clear winner, since it would be able to use its leverage to secure Russian oil and gas at discounted prices. Russia will now need the Yamal-to-China route more than ever. And if they cannot wheel the gas back and forth between Europe and China, Russia's leverage is reduced to nothing.

³⁰ An estimated 15 Mtpa of LNG term contracts are set to expire before 2030.