

long-term strategy. By 2011 its ambition had grown to having a 9 per cent share of the global LNG market by 2020, increasing to 14 per cent by 2030 (Investor Day, 2011: 22), in effect taking the opportunity to develop stranded assets in remote offshore regions while building its expertise in a new technology (for Russia), with the additional benefit of accessing gas markets that had previously been closed to it for geographical reasons.

The Russian government shared the company's enthusiasm, seeing LNG as a path to achieving a number of objectives. These included expanding gas exports and thereby improving the country's trade balance and foreign currency income, catalysing industrial development in Russia, supporting the exploitation of remote resources in areas such as Sakhalin Island and the Barents Sea, encouraging the development of geopolitically important regions such as the Arctic and the Far East of Russia and expanding Russia's commercial (and therefore political) reach to new areas such as North and South America and North East Asia (Mitrova, 2013: 3). The Russian Energy Strategy that was published in 2009 also foresaw a rapid increase in Russian LNG output, with a plan to reach 15 per cent of the global total by 2030 (Energy Strategy, 2009), and the Russian government provided an incentive to reach this target by reducing the export tax on LNG exports to zero (compared to the 30 per cent rate for pipeline gas exports) (Mitrova, 2013: 13).

Shtokman

The enthusiasm of both Gazprom and the Russian government was sparked by the fact that the giant Shtokman field, which had been discovered in the Barents Sea in 1988, appeared to be an ideal candidate for a first large-scale LNG scheme (Moe and Jørgensen, 2000). With 3.9 tcm of reserves the field had the potential to support a multi-train (liquefaction facilities) development,¹ even though its location in Arctic waters more than 500 km from the Russian coast created logistical and technical difficulties.

After a protracted process involving several reorganizations and an aborted plan for an international consortium to develop the field, Gazprom in 2008 established a special purpose company (Shtokman Development AG (SDAG)), where Total and Statoil (now Equinor) would hold 25 and 24 per cent respectively, whereas the majority, 51 per cent, rested with the Russian company. The foreign firms would essentially work as technical partners, since they would not have a share in the licence and would also not sell the gas. Many oil companies found these conditions unattractive, whereas Total and Statoil prioritized the strategic benefits in getting ahead in the exploitation of promising Arctic gas resources (Moe, 2010). The new

7. LNG – globalization in another manner

INTRODUCTION

The commercial and political logic for a Russian move into LNG has been strong for some time. Gazprom has historically been keen to exploit new markets that could not be accessed by its pipes, particularly in North America and Asia, and was also eager to assert itself as a global gas major with a broad and flexible portfolio of supply options. From a political standpoint, the opportunity to expand geostrategic relations with a broader array of countries off the back of greater commercial relations is clear, and the Russian government is also keen to add LNG as a new area of technical expertise in order to catalyse industrial development in the energy economy. Initially, Gazprom was given the task of pursuing these goals as part of its existing monopoly over gas exports. LNG was seen as an opportunity for the company to expand its presence in international markets, and success in this field would also strengthen its domestic position as an indispensable currency earner for the government.

This chapter will analyse the progress that Russia has made pursuing its LNG strategy. In particular it will discuss the potential extent of Russia's future LNG output and whether it may even become a competitor to the country's pipeline exports, especially if new players such as Novatek and Rosneft are able to progress their planned projects as rivals to Gazprom. In this regard, it will examine whether these new competitors have different strategic drivers and operational approaches to Gazprom which may enable them to generate improved returns both for themselves and for Russia.

GAZPROM: EARLY ENTHUSIASM – AND DISAPPOINTMENTS

In its 2005 Annual Report Gazprom announced its first sale of an LNG cargo into the US market (Gazprom, 2006: 15), and over the rest of the decade it continued to give LNG an ever-increasing importance in its

project would include both an LNG plant near Murmansk and a pipeline to the Baltic Sea.

However, despite initial enthusiasm and much hard work from all those involved, the ultimate failure of the Shtokman project highlighted a number of key issues for Russia's LNG plans. Firstly, Gazprom was consistently reluctant to make firm decisions on foreign cooperation, and even when it had selected partners it did not fully utilize their potential, insisting on micromanagement, despite its own lack of expertise in LNG development (Loe, 2018). A complicating factor was that Gazprom had established a separate subsidiary to prepare for a second and third phase of Shtokman, whose proposed solutions were not harmonized with the partners for the first phase (Loe, 2018). Secondly, an inability to be definitive about the market for Shtokman gas and the means of export led to Gazprom missing a window of opportunity in the USA and Europe. But also the failure of the Russian government to provide any fiscal support to Shtokman, while offering it to other schemes, undermined the economics of the project (Moe, 2010: 233). Market conditions also played a significant role, with the unexpected rise of US shale production radically altering the outlook for Russian LNG exports. Ultimately, though, the challenging nature of the project led to cost estimates rising to a level (\$30 billion) that made it uneconomic, leading to de facto curtailment of the project in 2012 (Gazprom flags Shtokman gas shift, 2012).

Russia's disappointment over Shtokman was compounded by Gazprom's additional failure to secure the future of a second project, this time based on the Baltic Sea and appropriately called Baltic LNG. After an aborted attempt to create a 7 mt (million tonne) scheme in 1997, Gazprom announced a second attempt at the project in 2004 with a plan to liquefy gas brought by pipeline from West Siberia for onward sale into the Atlantic Basin market (Petro-Canada and Gazprom, 2006). Petro-Canada was brought in as a core partner, and Gazprom had plans to take a stake in a Canadian regasification asset as part of a swap deal (Petro-Canada, Russia's Gazprom, 2004). However, once again a combination of deteriorating market conditions, a shortage of funds following the economic crisis 2008–09 and a muddled strategy undermined an LNG project in Russia. Furthermore, the establishment of the Shtokman project created the perception that this field was Gazprom's priority LNG development. As a result, the concept of bringing gas more than 3000 km from the Yamal Peninsula to St Petersburg before liquefying it and shipping it to Europe (as the US market now had no need of more LNG) seemed less logical, especially as it would compete with Gazprom's own pipeline exports. Indeed, Gazprom itself expressed a preference for the Nord Stream pipeline as an export route through the Baltic, as this

could move both West Siberian supply and Shtokman gas at much lower cost (Gazprom drops Baltic LNG, 2008). This combination of factors led to the cancellation of Baltic LNG in 2008, much to the surprise of Petro-Canada who had to rethink their regasification plans in Canada, and Gazprom's involvement in them, at short notice (Kiselyova and Jones, 2008).

Despite the failure of its first two LNG projects, Gazprom used the contacts it had made with major LNG players, and the incentive it could offer of future participation in Russian projects, to become involved in the LNG market. Specifically, Gazprom developed a presence in the global LNG market via its trading arm, Gazprom Marketing and Trading, which gradually developed a business based on gas produced in many countries. Gazprom's total LNG sales volume is still relatively modest though, reaching 3.34 mt in 2017, with almost half the volume coming from Sakhalin-2 (Gazprom in figures 2013–2017).

Sakhalin-2

Production from Russia's first successful LNG scheme, Sakhalin-2, started in the Far East of Russia in 2009. The project involved the development of the 600 bcm Piltun-Astokhskoye field offshore in the Sea of Okhotsk and the construction of a two train 9.6 mt capacity liquefaction plant at Prigorodnoye on the south end of the island in a bay with ice-free waters (Sakhalin II, n.d.). However, although Gazprom was by 2009 a 50 per cent plus one share partner in the Sakhalin-2 project it could hardly claim the credit for its success, as the development scheme had been managed by Sakhalin Energy, comprising Shell and its partners Mitsubishi and Mitsui, before Gazprom acquired its interest in 2006. The acquisition of the stake by Gazprom highlighted the governance risks for foreign companies investing in Russian energy projects, as it involved an elaborate use of government agencies to put pressure on the foreign partners at the field. A number of commentators have argued that the original Sakhalin-2 PSA (production sharing agreement), signed in 1994, was overly generous to Shell and its foreign partners (Krysiak, 2007: 22–4), but rather than attempt a formal renegotiation the Ministry of Natural Resources launched a series of investigations against Shell and its partners alleging a number of breaches of Russian law (Bradshaw, 2009: 8–10). The charges were not dropped until Gazprom was given a controlling stake in the project, paying only its share of past costs (\$7.45 billion) to enter as the dominant partner (Shell bows to Kremlin, 2006). Although Gazprom had secured its place in Russia's first LNG project, its actions and those of the Russian government had undermined the confidence of many investors

and customers alike, which would have implications for the development of future projects (Brooke, 2006).

Despite these difficulties with the partnership arrangement, and significant delays caused by both the technical challenges of operating in the icy offshore waters and the difficulties of securing rapid approvals from Russia's bureaucratic government structures, Sakhalin-2 reached a peak output of 10.8 mt in 2011, exceeding its design capacity and sending cargoes to a variety of markets of North East Asia, with Japan and Korea being the main buyers, providing Russia with its first diversification from the European market. It remains Gazprom's only producing LNG project as of 2019 and has the potential to expand its output through the addition of a third train at the Prigorodnoye.

However, nowhere is the confusion over Gazprom's strategy more evident than in the delay over what appeared to be Gazprom's most obvious next LNG project, the addition of a third train at the existing Sakhalin-2 site. The economics of the project would appear to be relatively robust, as adding a new train to an existing plant is cheaper than building a new greenfield liquefaction scheme. However, despite many promises, a final decision on the exact timing of an extended development had still not been taken by early 2019. One of the major concerns is the source of extra gas. The Sakhalin-2 fields are fully allocated to the existing two trains and although additional resources are available around the island, they bring their own difficulties. An obvious, but politically difficult, source is the Sakhalin-1 project, where 8 bcm of annual associated production is being reinjected into the oil reservoir and where development of gas reserves at the Chaivo field have been on hold for a number of years as the field partners look for an appropriate market. Gazprom has made a number of offers to purchase this gas for use at Sakhalin-2, but none have been acceptable for the Sakhalin-1 consortium (Gazprom offered, 2013), where the Russian partner is Rosneft, whose rivalry with Gazprom has encouraged it to develop its own LNG plans rather than cooperate with a fellow state-owned company (Gorst, 2014). Indeed, the Russian government has said that it may be the final arbiter concerning future developments on Sakhalin, although it remains to be seen whether it can force either company to accept an outcome which would see one of the state-dominated entities having to take a subordinate role.

Sakhalin-3

While domestic politics has undermined the availability of one source of gas supply, Gazprom's reluctance to encourage international partnership appears to have weakened the chances of a logical alternative being

developed. Gazprom itself holds significant gas resources in the Kirinskoye and South Kirinskoye fields on the Sakhalin-3 licence, south of Sakhalin-2, where it currently has a 100 per cent interest. Gazprom's preferred plan has been to develop the approximately 700 bcm of gas reserves at the two fields itself (Sakhalin III, n.d.), although this plan has been challenged by the fact that the geology is complex, the fields are offshore, where Gazprom has little experience, and also contain liquids, which complicate the development plan (Gazprom says Yuzhno-Kirinskoye, 2013). One obvious solution would be the expansion of Gazprom's partnership with Shell to include development of Sakhalin-3, and this has been under discussion for a number of years, as it would not only utilize Shell's offshore expertise but would also ensure that all the Sakhalin Energy partners are involved in the upstream and downstream parts of the development. An alternative scenario in which Gazprom alone would provide the gas to be liquefied by Sakhalin Energy at a third train of Sakhalin-2 would be unlikely to appeal to the foreign partners, as they would effectively just be tolling Gazprom's equity gas without being involved in production from the Sakhalin-3 licence.

Gazprom has consistently been cautious about sharing its upstream assets with foreign partners, no matter how much value the latter might bring, but finally came to the conclusion that it could not go it alone when it signed a strategic cooperation agreement with Shell at the St Petersburg Economic Forum in June 2015 (Royal Dutch Shell, 2015). Among a series of statements on partnership in the gas sector the two companies also agreed that Gazprom would commit to supply gas for a 5 mt third train at Sakhalin-2, and indeed preparation of documentation has been underway since early 2014 (Gazprom, 2014). The cooperation agreement also included plans for a series of asset swaps, and active discussion about Shell becoming involved in the development of the South Kirinskoye began shortly after the St Petersburg Forum ended (Miller: Gazprom to co-operate, 2015b). However, in August 2015 the US authorities provided a clarification of the technological sanctions which they had imposed on Russia in 2014, which prohibited the transfer of technology for Arctic developments, shale oil production or offshore fields that could produce oil from water depths greater than 500 feet.² They specifically singled out South Kirinskoye because of its oil reserves and the fact that some parts of the field are in deep water, and underlined that the field was included on the sanctions list (Chiacu, 2015). This appeared to rule Shell out as a potential partner for Gazprom, given the former's links to business in the US, but the two companies have apparently continued talks on how they could work together at the field without breaking the sanctions rules. Nevertheless, it would seem to be inevitable that the need for Shell to take a more cautious stance will at least delay the field development.

Therefore, even though a third train at Sakhalin-2 almost certainly would provide the most cost-effective source of new Russian LNG, plans for its realization are uncertain, and references to implementation of the cooperation agreement with Shell are vague (Gazprom and Shell, 2017). As a result, Gazprom would appear not to have optimized its opportunity with this project.

Vladivostok LNG – a Priority, a Bargaining Chip or a White Elephant?

One of the other reasons why the expansion of Sakhalin-2 has taken longer than expected is because gas from the Sakhalin-3 fields had also been allocated to the Vladivostok LNG project, which is 100 per cent controlled by Gazprom as well. The company announced plans for a 10–15 mt plant there in 2011 and took what it considered to be a final investment decision in 2013, with plans to send out a first LNG cargo in 2018 (Gazprom, 2013a). Furthermore, it also announced a cooperation agreement with a consortium of Japanese companies to conduct a feasibility study on the project, prior to making final commitments on financing and implementation as well as the signing of gas contracts (Gazprom, 2013b).

The project was part of a large-scale plan to create an integrated gas network in Eastern Russia (Mastepanov, 2015), but some commentators have conjectured that establishing a liquefaction plant at Vladivostok could also provide Gazprom with bargaining power in its negotiations with CNPC over pipeline exports from fields in East Siberia to north-east China, as suggested by, among others, Mitrova (2013: 19).

However, it soon became clear that the commercial logic behind this concept was flawed. Transporting gas 3500 km and then liquefying it involved considerable cost prior to export. Gazprom then suggested that the gas for Vladivostok LNG might come from Sakhalin instead via an existing pipeline (the Sakhalin–Khabarovsk–Vladivostok pipeline constructed in 2011, which has a current capacity of 5 bcm but which could be expanded to 30 bcm with extra compression), thus undermining its own plans for Sakhalin-2 expansion. The decision to switch gas supply also caused concern for possible foreign partners at Vladivostok and for potential customers, who became uncertain about the long-term viability of the project and therefore the security of any contracts that might be signed. One of the main issues for customers signing long-term (20–30 year) LNG contracts is security of supply, and therefore they are generally keen to know exactly where gas is being sourced and also that any project will be economically viable. Concerns over Vladivostok LNG were then magnified by the imposition of US sanctions, as they not only undermined the development of the Sakhalin-3 fields and impaired the ability of all

Russian companies to raise capital on international markets but also reduced the willingness of many Asian buyers to take on the extra risk of signing new contracts with any Russian energy companies.

The likelihood of Vladivostok LNG moving ahead on its original schedule was further compromised by Gazprom's pipeline gas export negotiations with China. Gazprom has suggested that gas from Sakhalin might be shipped to China by pipeline in the future, further undermining any LNG plans (Gazprom, 2015). Indeed, it would appear that Gazprom has reverted to its traditional role of pipeline exporter in the Far East and has put its LNG plans very much on hold. In 2018 Gazprom announced that it would adjust the plans for the Vladivostok plant to a smaller facility for production of LNG as bunker fuel for ships, in cooperation with Mitsui of Japan, apparently to be sourced from Sakhalin-2 (Klimenko, 2018). As a result, it would seem that Gazprom's ambitions have been significantly reduced, leaving both potential partners and customers in a state of some confusion.

'New' Baltic LNG – Return of Gazprom's Atlantic Basin LNG Strategy

As Gazprom's Asian LNG strategy appears to be diminishing in importance, the company has rekindled the idea of a Baltic LNG scheme, partly in response to competition from Novatek's Yamal LNG project (see below) but also because the company sees the opportunity to exploit an emerging LNG bunker fuel market in the Baltic Sea as well as more distant gas markets in South America (Gazprom Strategy Presentation, 2015). In addition, the company is also under pressure from the Russian government to supply LNG to the Russian region of Kaliningrad, which at present can only be accessed via a pipeline through Lithuania that is now regarded as a strategic risk. (A floating regasification unit was installed on the coast of Kaliningrad to receive LNG in January 2019 (Gazprom brings energy security, 2019)). Thus, there were several objectives for, and assumptions behind, the new 10 mt Baltic LNG project Gazprom launched in 2013. It would be based at Ust Luga, close to St Petersburg, and the initially outlined timetable saw first output in 2020 (Baltic LNG scheduled, 2015).

Ostensibly the project appears to be quite an attractive commercial proposition, taking cheap Russian gas and transporting it to markets where much higher prices are paid. The key question, though, is the cost of building the new liquefaction plant, which will determine the effective tolling fee that will need to be charged. An estimated total capital expenditure reportedly in the area of 700 billion roubles including the processing (Gazprom, 2019) (around \$10.5 billion at an exchange rate of

US\$1=RR65) appears very high compared to the full cost of a typical US LNG export project and implies a breakeven price higher than the current gas price in Europe. Despite such marginal economic prospects Gazprom and Shell started negotiations on potential cooperation to develop the scheme, and in 2017 signed a Heads of Agreement to establish a joint venture. However, by April 2019 Shell announced that it had withdrawn from the project, a setback for Gazprom's LNG ambitions (Shell exits, 2019). Gazprom said it would develop the project in cooperation with the Russian company RusGazDobycha and add gas processing (ethane, LPG) to an expected output of 13 mt of LNG per year (Gazprom, 2019). This was supposed to increase the commercial attractiveness of the project.

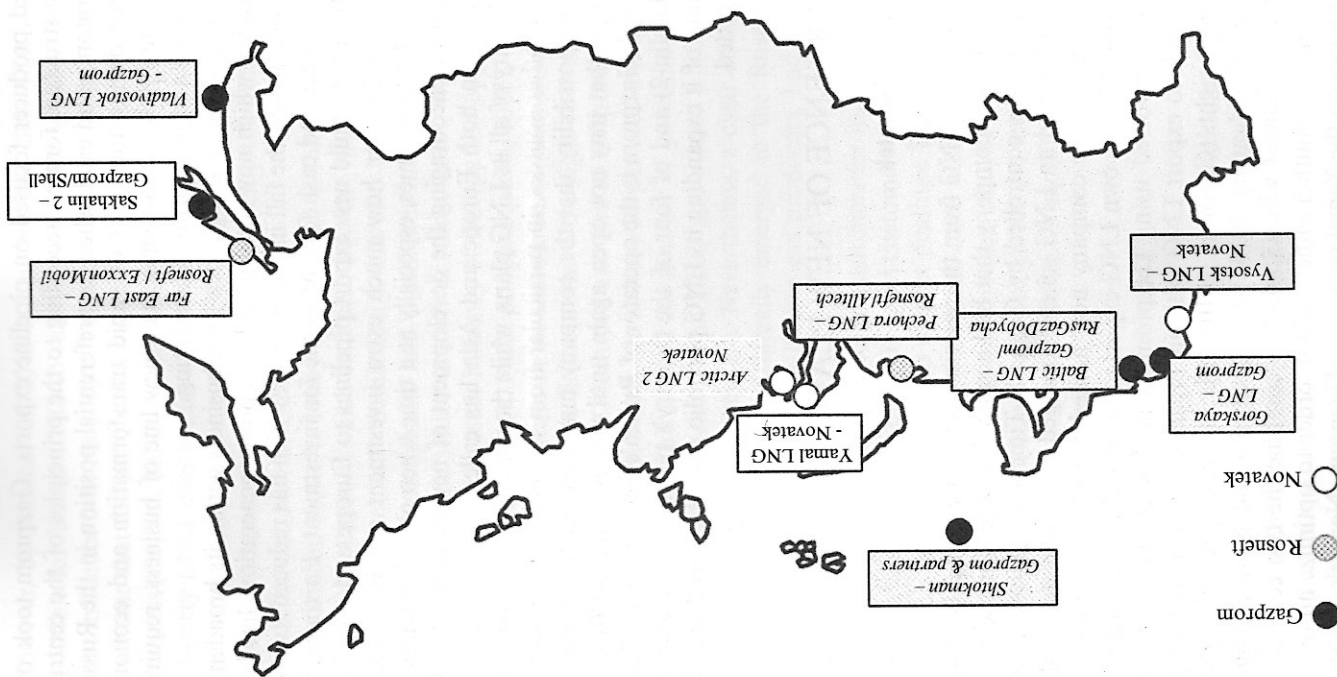
A level of scepticism seems warranted, however, given the departure of Shell and since it remains unclear how large the bunker market for LNG in the Baltic will be, and if Russian LNG from a new project can really hope to compete in South America with US LNG exports from the much closer Gulf of Mexico schemes. In addition, the possible arrival of gas from Baltic LNG in Europe could undermine Gazprom's own pipeline sales (Figure 7.1).

GAZPROM'S LNG STRATEGY – WHAT HAPPENED?

The development of Gazprom's LNG strategy since the termination of the Shtokman project has, beyond its involvement in the Sakhalin-2 project, been a series of apparently random moves. Gazprom's achievements in the LNG business are far from the goals it set for itself only a few years ago. Our review of each of the potential projects reveals that commercial, operational, political and governance issues remain problems in each of them, undermining their development chances.

- Most of the projects have been characterized by changing concepts and goals.
- In all the projects foreign companies play significant roles, but Gazprom has been reluctant to decide about partnerships and has wanted to limit the role of foreign companies.
- The two weaknesses discussed above are partly interwoven and they are both connected to a third problem: conflict or competition between the LNG projects and Gazprom's pipeline exports.

It seems plausible that these problems can, at least to some extent, be attributed to the general characteristics of Gazprom as a giant



Source: Map compiled by the authors

Figure 7.1 Schematic map of Russia's LNG projects

self-supplied producer focused on pipeline exports. Gazprom took over an industry structure formed according to the principles of the centrally planned economy and established its preferential position in the Russian energy sector during the years of rapid transformation and economic upheaval in the 1990s. LNG represents a new line of business, requiring new technologies and new forms of marketing.

The difficulty of establishing a new core business within its broadening energy portfolio, which now includes oil and power generation, has been further complicated by the fall in the oil price, which has reduced its existing export revenues and cash flow available for investment. Furthermore, the commitments to build new export pipelines to Europe and Asia have left question marks over how much extra investment can be made in expensive new LNG schemes, especially at a time when global commodity prices are hardly encouraging the development of new projects. The fall in the gas price in both Europe and Asia has called into question the economic viability of all its LNG plans, while the completion of new LNG capacity from other sources, in particular from the USA and Australia, has raised the possibility that the company may have missed a window of opportunity that may not open again until well into the 2020s. As a result, although Gazprom is the operator of Russia's first producing LNG project (Sakhalin-2) and of four of the country's potential new schemes, the probability of it expanding its LNG portfolio over the next five to ten years has receded.

THE EMERGENCE OF NEW PLAYERS

The Rapid Rise of Novatek

The original plans for LNG from the eastern side of the Yamal Peninsula were laid in 2005 by a company that had acquired licences for the South Tambej field and was controlled by Gennady Timchenko. However, the real momentum behind an LNG scheme emerged when Novatek took a controlling interest in the company now named Yamal LNG from 2009 and started to develop its own LNG export strategy (About us – History, n.d.). Initially it involved using Gazprom as an intermediary in order to allow Novatek to export LNG without breaking the state company's export monopoly rights (Gazprom, 2010). This relationship was then theoretically extended in January 2013, when Gazprom and Novatek signed a joint venture agreement which looked to combine the two companies' resources around the South Tambej field in order to optimize an overall LNG development on the Yamal peninsula (Gazprom, Novatek, 2013).

However, by summer of 2013 it had become clear that it would not be possible for Yamal LNG to raise bank financing unless Novatek had greater influence over the project's revenues, as no bank would lend money to a scheme that did not control sales of its output throughout the marketing process (Griffin, 2013). As a result, the role of Gazprom as an agent for third-party LNG sales became untenable and the joint venture agreement broke down, with Gazprom stating that it would pursue its own LNG interests on Yamal while Novatek would develop the South Tambej field alone (Gazprom, Novatek, 2013).

Novatek then began to lobby for a change in the gas export legislation, supported by Rosneft which had also become interested in establishing a gas business, not only domestically, but also in the global market (see Chapter 2). Both companies had significant influence with the Russian government via their senior executives and owners, with the result that by October 2013 the Russian Ministry of Energy had approved a new law liberalizing LNG exports (V. Putin podpisal zakon, 2013).

The law is rather specific in its definition of allowable LNG exports, though, restricting them to licences where the right to construct an LNG plant was already (by 2013) included and also to offshore licences that are operated by companies which are at least 50 per cent owned by the state (Federal Law, 2006). This limited the number of potential non-Gazprom projects to three: Novatek's Yamal LNG and Arctic LNG schemes and Rosneft's Far East LNG venture. Nevertheless, a clear consequence was that competition, which had already emerged in the Russian domestic market between Russia's three largest gas producers, had now spread to the export market.

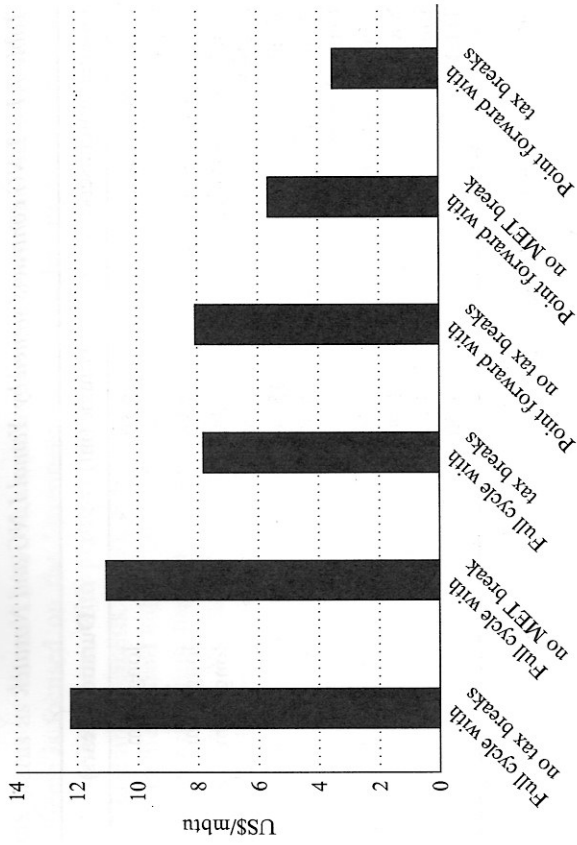
Novatek moved swiftly to sign up customers for its future LNG supply, effectively taking potential LNG export customers away from Gazprom by being more proactive in its gas market dealings. Furthermore, it enjoyed support from the Russian government once more, who encouraged the company both with financial support (see analysis below) and also with an effective blessing to compete in the global gas market in order to fulfil President Putin's desire to see Russia take a significant share of the LNG market.

Yamal LNG

The Yamal LNG project, which is located on the middle of the eastern side of the Yamal Peninsula, was designed to have a plateau production of 16.5 mmt of LNG from three trains, based on gas supply from the 900 bcm South Tambej field (Gyetvay, 2013). The project is located within the Arctic Circle, with ice a significant issue in the shipping lanes for many months

of the year and with the extreme cold and barren conditions increasing the cost of the large amount of new infrastructure that is required in this remote region. The government was ready to offer support, however, in the form of extra tax concessions and the equivalent of \$1.5 billion of funding for the construction of port facilities (Lunden and Fjaertoft, 2014). State financing of new nuclear icebreakers is also a prerequisite for the project (Moe, 2014) and the construction of 15 ice-breaking LNG carriers is taking place in Korea, to be owned and operated by three joint ventures (a Sino-Greek, a Sino-Japanese and a Sino-Canadian), with one ship being fully owned by Russia's Sovcomflot. A major objective for the Russian state has been to make Novatek's project a foundation for shipping in the Arctic, opening the shipping lane to Asia via the Northern Sea Route for more extensive use while under Russian control. The business plan was from the outset to send the ice-breaking LNG carriers westwards to Europe for reloading into conventional carriers in the 'winter season' (December to June) and eastwards in the 'summer season' July to November, when the ice situation is light.

Importantly, Novatek has differed from Gazprom by being keen to include foreign partners who can bring vital commercial and political attributes to the project. For example, Total acquired a 20 per cent interest in Yamal LNG as early as 2011 (Total buys 20% stake, 2011), contributing its significant expertise in the development of LNG projects around the world as well as a further underpinning of Russia's close relationship with France, while China National Petroleum Corporation (CNPC) acquired another 20 per cent in 2013, bringing access to the fastest growing gas market in the world plus an important geopolitical sign of Russia's diversification of its markets in the East (CNPC buys stake, 2013). This was confirmed in 2014 when CNPC signed a long-term contract to purchase 3 mtpa of LNG from Yamal (Novatek and China's CNPC, 2014). Another important development took place in September 2015 when Novatek reduced its stake in the project to 50.1 per cent by selling 9.9 per cent to the Chinese Silk Road Fund (China's Silk Road Fund, 2015). This move further consolidated the project's relationship with China and increased the motivation for China to conclude financing arrangements that would underpin the development. This became particularly relevant since Novatek was included in the list of companies sanctioned by the USA and prevented from accessing any debt in dollars with a duration of more than 30 days,³ complicating project finance from Western banks and creating the potential for a significant delay in the project. Two Chinese state banks stepped in with 15-year loans totalling the equivalent of \$12 billion (Farchy, 2016). Chinese manufacturers ended up supplying a substantial share of equipment.



Source: Authors' calculations

Figure 7.2 Yamal LNG breakeven economics

The economics of the project are relatively compelling, though, as shown in Figure 7.2. The graph shows the full-cycle economics assuming various levels of tax break and also the point-forward economics from 2018 (on the basis that the capex is effectively a sunk cost by then). As can be seen, full recovery of costs requires a gas price of \$7–8/mmbtu, while the current cash cost of delivering LNG from Yamal is well below \$4/mmbtu. This compares with an average gas price in Asia of over \$9.50/mmbtu in 2018 and an average price in Europe of \$7.70/mmbtu.

The economics have been enhanced by the fact that, contrary to many predictions, the project was brought on stream, on time and on budget in December 2017. At that point long-term sales contracts for almost all the gas had been signed (Table 7.1), and the project has been producing LNG at increasingly rapid rates as the three initial trains have been brought online ahead of schedule.

Long-term sales contracts include CNPC which bought 3 bcm for deliveries to China, Gazprom took 2.9 bcm for sales to India. Gas Natural Fenosa's contract for 2.5 bcm is primarily intended for Spain, but some of it may be sold in other markets. The remaining volumes have been sold to

Table 7.1 LNG contracts signed by Yamal LNG and Novatek

Original purchasers	Volume (mt)	Duration (years)
Gas Natural	2.50	long-term
Gazprom	2.90	20
Novatek Gas and Power	2.86	long-term
Total Gas and Power	4.00	long-term
CNPC	3.00	15
Total	15.26	
<i>Total capacity</i>	<i>16.50</i>	
Onward sales		
<i>Novatek Gas and Power</i>	<i>2.86</i>	
Shell	0.90	20
Engie	1.00	23
Total	1.90	

Source: Novatek, Yamal LNG

trading companies and may end up in different countries, depending on the market situation. Some cargoes have even reached the United States (Kirkman, 2018).

The sales contracts illustrate how the diversification opportunities of LNG exports and sales via traders reduce the risk for the producer. They also mean that LNG from Yamal may come to compete with other Russian gas exports, not under the flag of Novatek, but indirectly, via a trading company.

Indeed, the start-up of Yamal LNG has transformed the project from being a promising but uncertain proposition to one providing tangible evidence that large-scale energy projects in the Russian Arctic can be carried out successfully, which attracted understandable attention. The establishment of all three initial trains faster than planned has reinforced the impression of Novatek as an able project manager, while the addition of a fourth, smaller train based on Russian technology will take total capacity to 17.4 mt and will also establish Novatek as a technology leader in the LNG sector (Barsukov, 2019a).

It was with these goals in mind that, even before the opening of Yamal LNG, President Putin provided significant support for Novatek's ambitions to expand towards the licences that the company owns on the Gydan Peninsula (on the opposite side of the Ob/Taz Bay from Yamal). The first of these projects – Arctic LNG 2 – already had export status since licence had been given prior to adoption of the new export law, but President Putin also instructed the Russian government to allow the project the same

tax status as Yamal LNG (Novatek to export, 2014). The Arctic LNG 2 scheme is focused on the Utrenneye field which has proved reserves of almost 2000 bcm, with planned production of 19.8 mt annually (Arctic LNG-2 and Siemens, 2019). Novatek expected to take an investment decision in the second half of 2019 (Novatek to make, 2018), but preparations for a construction site in Murmansk, where the LNG plant will eventually be assembled, had already started in 2017 (Staalesen, 2017a). The LNG trains will be placed on gravity-based platforms and towed to their position on the coast of the Gydan Peninsula, with a total cost estimate of US\$ 25.5 billion. Total has again become a partner, taking a 10 per cent stake, with the possibility of increasing this to 15 per cent (Russia: Total Signs, 2019). Two Chinese companies, CNOOC (China National Offshore Oil Corporation) and CNOCD (China National Oil and Gas Exploration – a subsidiary of CNPC) agreed to acquire 10 per cent each (Two Chinese companies, 2019). Thus, the new project will have direct ties to an even broader spectrum of the Chinese petroleum sector than Yamal LNG.

Novatek also negotiated with Saudi Aramco, who signalled interest in a large share – 30 per cent, but the deal did not go through, possibly because such a large share was not available, but it has also been suggested that Aramco preferred a comprehensive deal with the US company Semptra instead (Toporkov and Petlevoy, 2019). Negotiations have also been held with Kogas from Korea (Murphy, 2019), but the remaining 10 per cent share for sale finally ended up with a Japanese consortium (Novatek, 2019), once more underlining the diversification opportunities that LNG provides. Given the successful implementation of Yamal LNG, start-up of Arctic LNG-2 by 2023–4 looks realistic, even though the development plan is very different from Yamal LNG and involves a much higher degree of local content, using less experienced manufacturers of equipment, which could delay implementation. Nevertheless, it certainly seems possible that Novatek's production from this area could reach almost 40 mt by the mid-2020s as its two major projects reach peak output. Furthermore, the company has announced longer-term ambitions to expand output capacity to 70 mt by 2030 (Novatek to revise, 2019). The expansion of the first two projects, plus the potential for Arctic LNG-3 (Novatek Spuds, 2018) and a new project called Ob LNG to be developed (Barsukov, 2019b), is underpinned by the resource base in the region, and although market conditions (in other words the demand for LNG) will be a key factor, it is absolutely possible that the output goal for 2030 can be reached.

Rosneft's LNG Ambitions

Prior to 2014 Rosneft was as keen as Novatek to challenge Gazprom as a gas exporter from Russia, with its hopes focused both on the possibility of putting gas into the Power of Siberia pipeline to China (see Chapter 6) and on the development of an LNG export scheme on Sakhalin Island, which it entitled Far East LNG. The former idea represented a significant challenge to Gazprom's export monopoly and became a topic of discussion at the Presidential Energy Commission (Rosneft challenges, 2014), but the latter was given government approval and concrete plans have been made. Following the announcement of its partnership in the Arctic with ExxonMobil in 2011, Rosneft managed to convince the US major to also invest in a 5 mt LNG scheme that would source its gas from the Sakhalin-1 fields (Rosneft and ExxonMobil, 2014), which have almost 500 bcm of proved gas reserves, for onward sale into the Asia-Pacific market. Indeed, with encouragement from the Russian government's lifting of Gazprom's export monopoly in 2013, Rosneft CEO Igor Sechin wasted no time in signing three provisional contracts to cover the entire 5 mt capacity of the project, while promising that the plant could be expanded to 10 mt if more gas was discovered in the company's licences around Sakhalin and in the nearby Sea of Okhotsk (Rosneft's Sakhalin, 2014).

However, the entire concept of a new single train LNG plant being built on Sakhalin Island in direct competition with an existing project (Sakhalin-2) that has room for expansion, with both being run by state-controlled energy companies, highlights the illogical commercial outcome that could emerge from the political competition that has developed between Rosneft and Gazprom. The Sakhalin-1 partners had long been frustrated by Gazprom's refusal to offer what they regard as a reasonable price for their gas (Gazprom offers, 2008), which could logically be used to supply the third train at Sakhalin-2. As Gazprom has declined such proposals in the hope that the Sakhalin-1 partners will ultimately agree to sell their gas at a relatively low price, Rosneft launched Far East LNG as an export option. However, Gazprom has also managed to put obstacles in the way of this plan, as Rosneft's preferred location for a liquefaction plant in the south of Sakhalin Island would require the use of Gazprom's pipeline to transport its gas, and the location had to be moved to DeCastrri on the Russian mainland.

Gazprom's case appeared to have been strengthened when a second issue concerning the commercial terms of the Far East LNG project also went against the Sakhalin-1 partners. They had argued that the LNG project should be included within the Sakhalin-1 PSA, which would have allowed the partners to reclaim the \$8 billion costs for the LNG plant as

well as the cost of developing the gas reserves (leading to a total project cost of around \$13 billion) against revenues from current oil production, improving the project economics. However, the Russian government was not happy to concede on this issue, having identified the potential loss of short-term revenue (Sakhalin-1 LNG plant, 2015), and the Energy Minister denied that the PSA terms will be changed, again potentially undermining the LNG plans (Option of including, 2015). As a result, the economics of the Far East LNG scheme appear questionable, with estimates that the breakeven gas price for the project could be in the range \$10–11/mbtu (Henderson, 2017: 10) compared with an average Asian LNG price in 2018 of around \$9.50/mbtu.

When the issues of Gazprom's intransigence and the high cost of the Far East LNG project are combined with the financial problems that Rosneft is facing because of both the low oil price and its inclusion on the US sanctions list, which has limited its ability to raise long-term financing, it is not difficult to see why this new gas project may have moved down the company's priority list, given that Rosneft's chief role is to maintain Russian oil production.

Despite this disappointment, however, Rosneft has continued to include the project in its long-term plans, and has been negotiating to bring in new partners, with a particular focus on its Asian partners in Sakhalin-1, SODECO of Japan and ONGC of India, in addition to ExxonMobil (Exclusive: Exxon, Rosneft, 2018). Nonetheless, it would seem most likely that Far East LNG will not proceed rapidly until Rosneft's financial situation improves as and when the oil price rises or sanctions on the company and on Russia are lifted. And, as noted above, one possible, and logical, outcome is for the Sakhalin-1 gas to be used instead to supply a third train at Sakhalin-2.

Rosneft's Speculative European LNG Project

A second Rosneft-related project is Pechora LNG, which was initially proposed as a private venture by Alltech Group – a private Russian investment company. A joint venture with Rosneft was established at the end of 2015 (Rosneft and Alltech, 2015). The LNG plant would be based in Nenets Autonomous District in north-west Russia and would have a capacity of 4 or 8 mt, based on production from two nearby gas fields. There would appear to be some commercial logic for a plant to be located close to gas production and with relatively easy access to Atlantic markets, but Pechora LNG did not have export approval, as its licence was issued after 2013, thus breaking one of the conditions in the Gas Export law from 2013. A proposal to move the eligibility date to July 2014, which would have

been sufficient to encompass Pechora LNG, was rejected by the Duma in February 2018 (Komitet, 2018). After this Rosneft saw no future for the project and pulled out in September 2018 (Rosneft abandons, 2018).

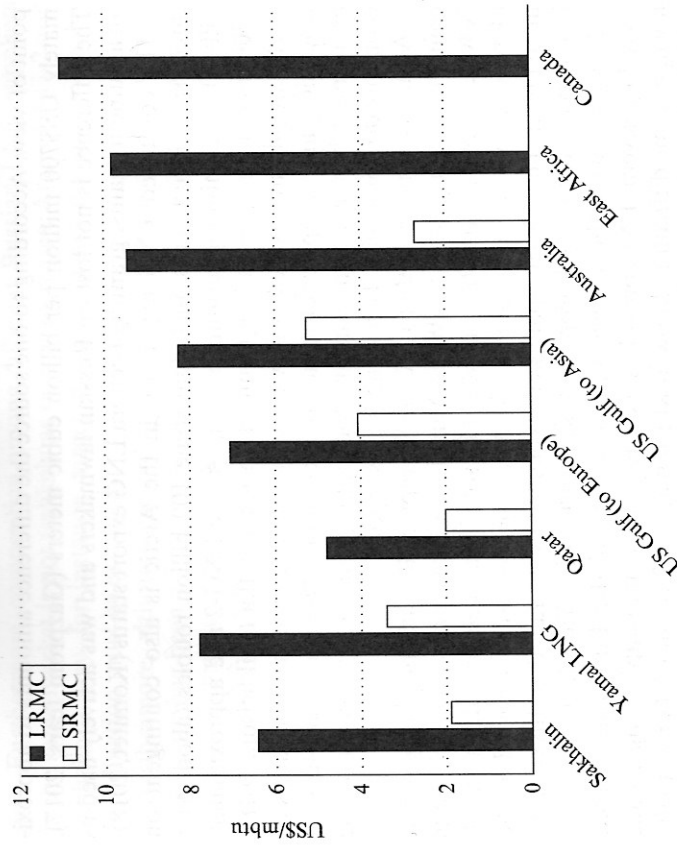
RUSSIA'S LNG OFFENSIVE – POLITICAL SUPPORT AND ANXIETIES

Around 2012 an implicit and sometimes explicit competition between Gazprom, Novatek and Rosneft began as the three companies sought to establish themselves as the leader of the country's push into this new technological area. The companies had their own commercial drivers but also the Russian government was keen not only to establish a more robust presence in the global LNG market but also to create a domestic LNG design and manufacturing industry that can reduce its reliance on foreign technology (Yamal, Russia, 2014). This became especially important to Russia at a time when the impact of the US and EU sanctions on the country was felt by the oil and gas industry, with the threat of further sanctions which could include a ban on the transfer of LNG technology being considered a real risk.

As has been depicted in this chapter, the following years were marked by setbacks for Gazprom, inconclusiveness for Rosneft and success for Novatek. By 2017, though, it had become clear that Russia had found a new national champion in the LNG realm – Novatek. This was perhaps a surprising outcome, given Gazprom's export monopoly and resource base, plus experience in the LNG trade, but it has demonstrated how a smaller and more entrepreneurial company with political support can challenge Russia's state champions.

The rise of Novatek to become Russia's leading LNG company has been swift and impressive. Development of the projects in the Yamal/Gydan/Ob Bay region will in itself mean a globalization of Russian gas, with the establishment of new and more extensive trading relationships with several countries, most likely with an emphasis on North East Asia.

Indeed, it is certainly possible given the relative economics of Russian LNG (especially from the Arctic), that Russia can become a major player in the LNG market in the early to mid-2020s. On both a short-run and long-run marginal cost basis (SRMC and LPMC in Figure 7.3) Russian gas can be competitive with most other sources of global LNG supply, suggesting that it can expand its global reach in the next few years. While it is difficult to know whether the country's specific market share aspirations are realistic, as much will depend on global demand, it certainly seems likely that the Russian Arctic will join the USA, Australia, Africa and



Source: Authors' estimates, data from IEA (2014), Ledesma (2013)

Figure 7.3 Comparative cost of Russian LNG in a global context

Qatar as one of the 'Big 5' LNG-producing regions by the end of the next decade, with each of these areas having the potential to produce 70 mtpa or more of LNG by then (BP Energy Outlook, 2019).

However, while the resource base is sufficient and the technical obstacles surmountable, there are some uncertainties in the institutional framework. As noted earlier, the Russian government gave strong support for the development of Yamal LNG, bestowing it with infrastructure, zero export tax and mineral extraction tax, and other financial breaks. Much of the same conditions will be provided to Arctic LNG-2. The reasoning behind this treatment is partly to fulfil Russia's ambitions of becoming a major LNG producer, but also, importantly, to spur development of the Russian Arctic and particularly the Northern Sea Route.

While this generous treatment provides a clear incentive to get the projects started, it also means that the state's direct income – or share of the resource rent – is smaller than in other hydrocarbon projects. It also means that export of pipeline gas is much more attractive from a state budget

point of view. According to one source the difference amounts to approximately US\$700 million per billion cubic meters (Gazprom fears, 2017). The difference is not lost on Russian lawmakers and was actively used as an argument against granting Pechora LNG export status (Komitet, 2018).

The continued LNG expansion in the Arctic is also contingent on direct state investments, including some 100 billion roubles (about \$1.5 billion) for a shipping terminal serving Arctic LNG-2 and approximately \$500 million for a reloading terminal on Kamchatka (Mikhelson, 2018). Such expenditures as well as new tax concessions to the manufacturers of machinery and equipment for the production of LNG may create tension at a time when state finances are constrained, and other sectors of the economy do not receive such significant support.

A further concern is that LNG might replace Russian pipeline gas in a competition for customers. When Yamal LNG was granted export status Novatek promised that the gas would be sold in markets outside the reach of pipeline gas from Gazprom, and Asian markets were regarded as the main target. The sales to Spain were explained by the fact that this country is not connected to the European pipeline grid (First Yamal, 2018).

However, with the increasing integration of the European market, including several LNG providers, new terminals and swap arrangements, it will become difficult to know in which markets Russian LNG is actually sold. In general, destination clauses for LNG shipments are on their way out and can also be circumvented by reloading LNG back to tankers after they first have discharged their cargo (and it makes commercial sense to send the gas on to other terminals) (Will European LNG, 2013). Logically, in such a situation Russian LNG will only be one more source of supply to the European market and will not directly replace Russian pipeline gas more than any other source of supply will do. Nevertheless, if the Russian authorities accept that Russian LNG can indirectly reach customers all over Europe, the next step may be to condone that it is also sold directly to the same customers on the argument that it increases total Russian gas exports. Gazprom will probably maintain that LNG sales are replacing its own gas, but it will be difficult to prove. In the Chinese market a collision between Russian pipeline gas and Russian LNG is also looming. If China ends up taking less than its full allocation when the Power of Siberia pipeline is finished and simultaneously increases imports from Yamal LNG, the suspicion will be that there is a trade-off.

The question is how such conflicts will play out politically. It is possible that there will be strong voices arguing against the enormous expansion of LNG capacity if it is framed as undercutting state revenues, or at least that there will be support for measures to prevent the problems described above – which in turn may reduce the commercial attractiveness of expan-

sion. Furthermore, competition among different Russian LNG suppliers in the same market is not unlikely as output increases. Arctic LNG-2 and Sakhalin 2 may, for instance, target the same Asian markets. Calls for coordination must be expected.

Furthermore, although the political goal of developing the Northern Sea Route has been a blessing for Yamal LNG, a downside is becoming increasingly visible. A strong priority for the Russian government over several years has been the revival of the ailing Russian ship-building industry. This policy goes hand in hand with import substitution, an overarching policy objective after the introduction of Western sanctions of Russia post-2014. A proposal to reserve transportation of hydrocarbons out of the Russian Arctic for Russian flagged ships was put on the table in 2015, but at the time was not taken seriously by many, since it conflicted with the expressed Russian desire to increase the use of the sea route by international shipping. Nevertheless, it became law from 1 January 2018, although the carriers of gas from Yamal were immediately granted an exemption, since none of the ship-owners would or could reflag their vessels (Staalesen, 2017b).

However, an even stronger restriction on foreign users was proposed in early 2018. Transportation of hydrocarbons would be reserved for vessels built in Russia (Vedeneeva and Barsukov, 2018). The proposed changes were supposed to take place from 1 January 2019, and these restrictions obviously constituted a challenge to Novatek, firstly related to the carriers for Yamal LNG under construction in Korea and secondly for the plans for a new series of carriers to serve Arctic LNG-2. Novatek's CEO Mikhelson protested publicly that 'it is just a harmful idea', although he did pledge support for the development of Russian yards (Barsukov, 2018a). His point was that getting permission to use contracted foreign-built ships as a special exception from the law was not good enough to convince creditors, and giving orders for the next series of LNG carriers to a yard which had never built such ships before, and which in fact was not finished itself, would be too risky and might jeopardize plans for Arctic LNG-2.

The finalization and implementation of the law was delayed, but the pressure to build at Russian yards, especially the new giant Zvezda yard under construction near Vladivostok, is growing. Zvezda was initially intended to become Russia's main yard for offshore platforms, but due to the collapse in the offshore market has had to look for other sources of orders. Filling up its order book has become a national priority. Furthermore, the yard is controlled by Rosneft and the pressure to place orders there may have affected the relations between Novatek and Rosneft negatively. At the end of 2018 Novatek surrendered and agreed to order 15 Arc 7 ice-breaking carriers from Zvezda, for delivery between 2022 and

2025, but only for a price similar to the cost of building in Korea, \$315 million per carrier (Vedeneva et al., 2019). The company requires and expects subsidies for the difference in cost, which at Zvezda is expected to be significantly higher. The terms of the subsidies are not clear, but in any case, the project will depend on active infusion of budget money into the yard. The obligation to use a Russian flag on the new carriers stands and may impact the conditions shipping groups are laying down for participation. The biggest uncertainty comes from the implementation schedule, as was pointed out by Mikhelson in his initial reaction to the new law.

As a result, although the Russian authorities have given LNG development high priority and actively supported the Arctic projects, it is clear that other concerns may run counter to LNG expansion. Partly they are connected to the outcome of possible reforms in the whole gas sector, as discussed in Chapter 2, and partly they are related to priorities in other industrial sectors, notably ship-building, but the continued strong emphasis on developing indigenous LNG technology at least provides some positive evidence that LNG is supporting the domestic economy. As a result, even though further development of Russian LNG production may encounter some political obstacles, over the longer term it is hard to imagine that Russia will forgo the opportunities offered by its resource base, as long as international market developments are positive.

RUSSIA AS A GLOBAL LNG LEADER

The ambitions set by Gazprom for Russian LNG exports will be reached, but not by Gazprom. Both the rapid increase in output and the fact that it is not led by Gazprom are surprising, given the outlook less than ten years ago. The Russian authorities are discovering the inherent flexibility of LNG compared to the dependence on single customers established by pipelines. In a seller's market this dependence tends to favour the producer, but in a buyer's market the customer has the upper hand, and so LNG offers not only diversification but also gives Russia the possibility to expand its customer base.

It is evident that LNG is the more dynamic segment of international gas markets. Total international LNG trade in 2018 amounted to 319 mt and Shell expects an average annual increase of 4 per cent until 2035 (Shell LNG Outlook, 2019). With the projects now under development Russia will with a high level of probability become one of the global LNG leaders by the end of the 2020s. Thus LNG will be an essential part of the continued globalization of Russian gas. However, the LNG business differs significantly from the traditional and still dominant method for sales of

Russian gas. It would seem that the larger the non-Gazprom LNG sector becomes, the higher is the probability that the market principles for LNG will reflect back to reforms in the domestic sector.

NOTES

1. LNG projects involve the liquefaction of gas via a deep cooling process that takes the temperature down to -160 degrees centigrade, at which point the gas is in liquid form (liquefied natural gas), and can be transported in smaller volumes via tanker. The liquefaction process is carried out in a series of 'trains', or industrial plants. The more trains at any one site, the greater the volume of LNG that can be produced.
2. For details on US sanctions against the Russian oil industry, refer to US Department of the Treasury (2014, 12 September).
3. See US Department of the Treasury website: <http://www.treasury.gov/resource-center/sanctions/OFAC-Enforcement/Pages/20140716.aspx>.