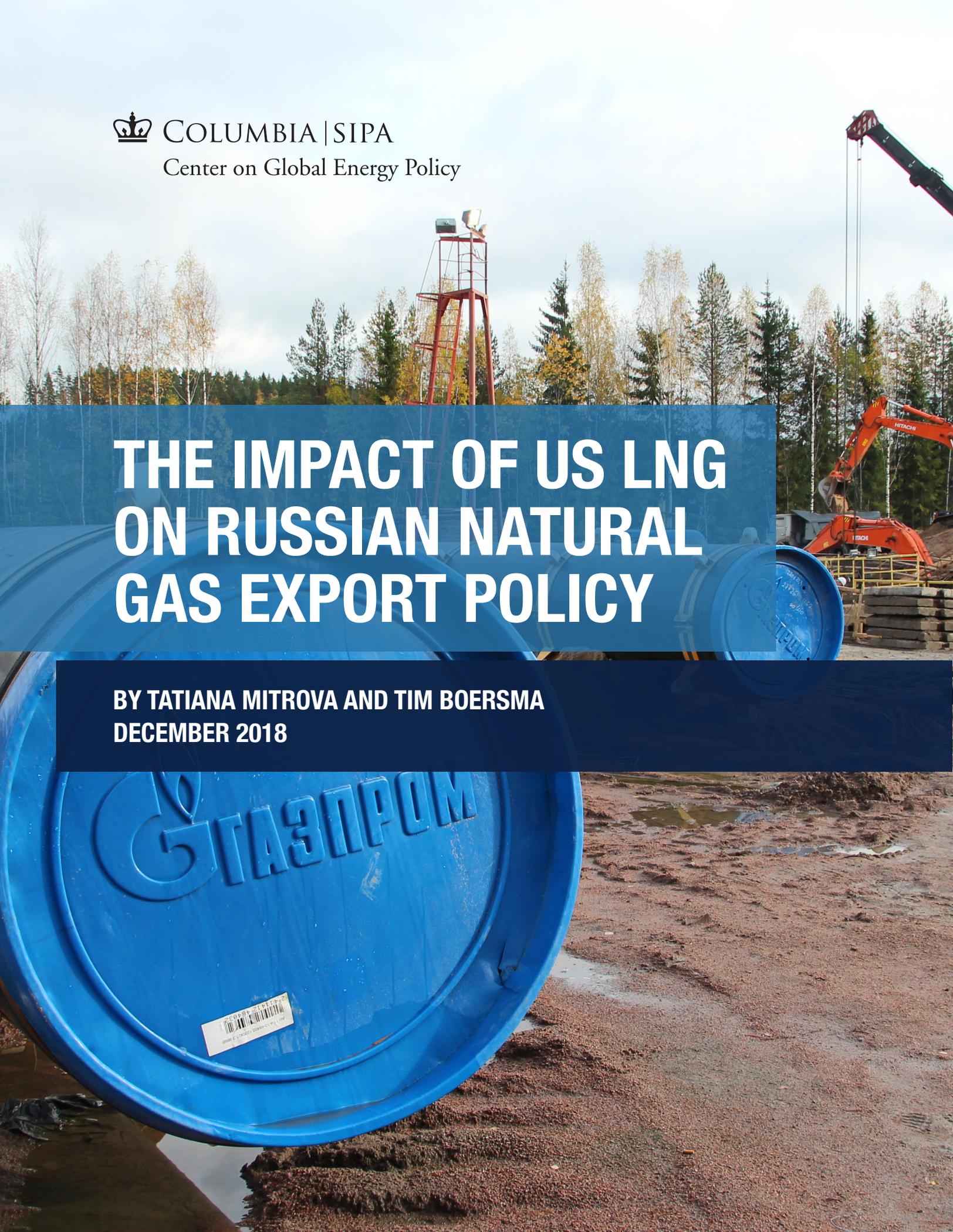


# THE IMPACT OF US LNG ON RUSSIAN NATURAL GAS EXPORT POLICY

BY TATIANA MITROVA AND TIM BOERSMA  
DECEMBER 2018



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1255 Amsterdam Ave  
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[www.energypolicy.columbia.edu](http://www.energypolicy.columbia.edu)

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## ABOUT THE AUTHORS

**Dr. Tatiana Mitrova** is a Fellow at the Center on Global Energy Policy and the Director of the SKOLKOVO Energy Centre in Moscow. From 2011-2012, she was the head of global energy at the SKOLKOVO Energy Centre, responsible for analysis of the global energy market and the Russian Federation's energy export and import policy. From 2006-2011, she was head of the Center for International Energy Markets Studies at Energy Research Institute of the Russian Academy of Sciences, and since 2011 she is scientific director at Oil and Gas Department, .

**Dr. Tim Boersma** is a Senior Research Scholar and Director of Global Natural Gas Markets at the Center on Global Energy Policy. Prior to joining CGEP, Boersma was a Fellow and Acting Director of the Energy Security and Climate Initiative at the Brookings Institution, and worked in the Dutch electricity sector.



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# EXECUTIVE SUMMARY

The United States and Russia have long been the world's largest natural gas producers, but they traditionally have not faced off in direct competition in that market. The United States was expected to become a net importer of natural gas, while Russia's state-owned Gazprom took a prominent position in the European market. The boom in US shale-gas production changed that. While the United States had been trading gas regionally by pipeline for decades, the shale boom allowed for the export of US liquefied natural gas, putting the two gas giants in competition. Even before the first molecule of US LNG shipped, rising US production had diverted LNG destined for the United States into the European Union. Facing increased competition pushed Russia toward a more market-oriented strategy, with Gazprom adjusting its long-term oil-linked contracts that had previously been the backbone of Russian sales to European customers to use more hybrid formulae.

This was just the beginning. After a slow start, the competition brought on by US gas is to a large extent shaping the Russian natural gas strategy in Europe and beyond. For Europe, rising gas competition from new suppliers has both economic and energy security implications. Globally, it is also raising questions about how Gazprom will compete in Asia, where demand is growing and gas suppliers are looking to place future production, as well as in other markets. Understanding how Gazprom will react to US gas is thus a critical economic and geopolitical question for LNG importers and exporters worldwide.

In this paper the authors examine how Gazprom will maneuver in global markets under specific circumstances. It opens with a discussion of how the US and Russian gas sectors developed and interacted in the period before shale gas. The paper then examines how Gazprom's gas trade has been impacted by new US production and what changes may be coming as US exports continue to increase. It finds that the advent of US LNG has already reduced Russian gas revenue, undermined its oil-linked pricing model, forced contract renegotiations and accelerated domestic gas market liberalization and LNG development.

The authors argue that Russia is in a good position to defend its market share in Europe and looks at some of the strategies that could be pursued under various market scenarios, including the following:

- **High Asian demand and low oil prices:** If oil-linked gas prices were pushed below spot prices, Gazprom would not need to further adjust its pricing policy (as was the case in 2015–2017). In certain situations Gazprom might even limit supplies to drive prices up and increase its rent, becoming the price maker. Such a strategy would be utilized cautiously to avoid demand destruction and prompting new FIDs for new (US) liquefaction capacity.
- **High Asian demand and high oil prices:** In this scenario Gazprom's position would be well served in the short to medium term by strong revenues. In the longer term, however, high prices will attract more competitors to the markets (and prompt new FIDs), so it is important for Gazprom to keep its own prices competitive and to keep the margin of the



aggregators, which are supplying the European market, below their margin in Asia. There are already almost no “pure” oil-linked contracts left, and Gazprom in Europe mainly has hybrid pricing, but this scenario will require a more fundamental shift in the pricing, with the share of spot-indexed prices becoming dominant.

- **Low Asian demand and low oil prices:** Gazprom may be forced to keep prices for its long-term contracts below short-run marginal costs of US LNG. Gazprom might voluntarily move to completely spot-indexed prices, simultaneously trying not only to find new markets for its gas (both in Asia and in Europe) but also to stimulate new demand. The company would need more flexible and creative marketing, and it would seek to improve the efficiency of its operations, both internationally and domestically. Should Gazprom start to see its market share decline, Moscow could decide to liberalize the pipeline export monopoly, a decision that would make Novatek and Rosneft more powerful players.
- **Low Asian demand and high oil prices:** Russia would feel competitive pressure not only from the United States but also from all existing low-cost LNG suppliers like Qatar, which may have to switch to Europe and keep gas prices at a low level. Gazprom would have to engage in this price competition as well, flooding the market using spare capacities and driving the prices down to the level of its short-run marginal costs, which will disincentive US LNG aggregators to offtake their LNG. Gazprom has considerable underutilized upstream capacities and huge spare transportation capacities, allowing it to drive down European prices below the level acceptable for US LNG suppliers. This scenario hurts everyone on the supply side, and it is warranted to ask how long it could be upheld.

The study finds that even in scenarios where Gazprom sees gas revenues driven down to 2009 or 2016 levels, this should not prove catastrophic for Russia. For Moscow, facing more competition in Europe is a new situation that Gazprom and decisions makers in the Kremlin will have to deal with. Under normal circumstances, competition between various sources of supply can result in net benefits for the end consumer. In addition, this paper demonstrates that the changes in the global gas market have forced Gazprom to adjust its business practices. However, the increased politization of natural gas in the United States carries a risk of inflamed tensions between Moscow and Washington.



# INTRODUCTION

The impact of US LNG production on Russian natural gas policy recently became one of the most fascinating and hottest topics under discussion among energy analysts. Many observers all over the world are discussing the potential Russian answer to the United States' attempt to challenge Russia's prominence in the world's gas markets. This subject has become extremely emotional and politicized, as experts and journalists are trying to frame it in the overall tense relationship between the two countries by referring to the historical competition between the two systems during the Cold War.

Despite numerous publications,<sup>1</sup> US LNG exports still remain a relatively new, unexplored, and rather contradictory phenomenon that could surprise a global audience with unexpected developments. Similarly, Russia's gas export economics are not transparent, and its policy decision-making mechanism is also not very clear. So the objective of this paper is to summarize the previous analyses of the potential impact of US LNG on Russian natural gas export policy and to bring a balanced view of this complicated problem. In line with this objective, the main aims of the study include the following:

- Analysis of the main pillars of Russia's gas export policy
- Assessment of the impact that US LNG has created so far on Russian gas export policy
- Identification of the channels through which US LNG could affect Russian gas export policy in the future and evaluation of these potential new effects
- Examination of the potential Russian response to growing US LNG supplies affecting Russia's core markets in Europe and new markets in Asia

Methods used for this purpose include historical and comparative analysis, institutional analysis of the organization of these two completely different markets and cost assessments, and geopolitical analysis.

A common hypothesis is that rising US LNG exports will challenge Russia's position in Europe, provide European customers with diversity and security of supplies and thus decrease gas prices, and make international gas markets more liquid and globalized. Many experts are also discussing potential direct competition between US and Russian gas supplies—the term *price war* has been used, evoking the Cold War and historic confrontation between the two countries.

## Two Completely Different Types of Gas Market Organization

Historically, there has been a dramatic difference in the industrial organization of the Russian and US gas sectors. The Soviet (and later the Russian) gas industry was mainly state owned, with centralized management, a high level of state involvement even in operational issues, and highly concentrated assets. On the other hand, the US gas industry was private from the very beginning, with rather small fields and thousands of competing companies. Since

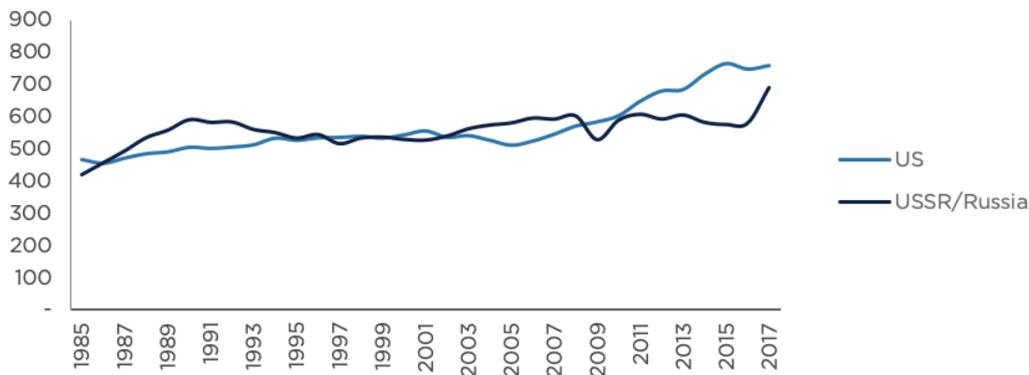


the liberalization of the US gas market in the 1970s and 1980s, the role of the state has been limited to setting the rules of the game.

## Russian and US Production and Export Volumes

The United States and Russia have always been the two largest gas producers in the world (figure 1), with very similar gas production volumes almost since the industry's inception.

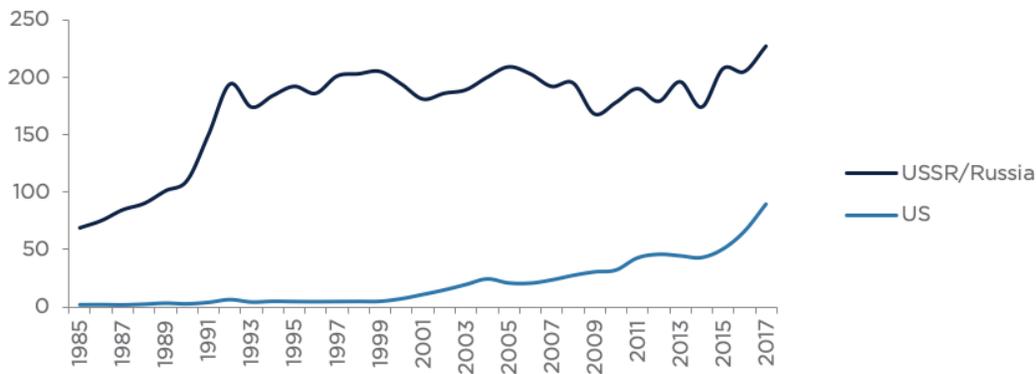
**Figure 1:** US and Russian gas production, 1985–2017 (billion cubic meters)



Source: BP Statistical Review of World Energy 2017, EIA US DOE, Russian Energy Ministry

Russia has been a much larger exporter of natural gas. The United States primarily supplied its domestic market, participating only in some regional trade with Canada and Mexico, while the Soviet Union (and later Russia) developed a huge transcontinental infrastructure network, allowing it to trade interregionally and to become the world's leading gas exporter (figure 2).

**Figure 2:** US and Russian gas exports, 1985–2017 (billion cubic meters)



Source: BP Statistical Review of World Energy 2017, EIA US DOE, Russian Energy Ministry



The Soviet Union’s gas export strategy, which was largely inherited by Russia, was based on the following few premises:

- The country focused on a single (European) market and had expectations of stable gas demand growth in this export market. (“Consumers will be happy to buy all the gas that we can produce.”)
- The USSR, and later Russia, had virtually the cheapest gas in the market and was interested in maximizing export volume, not price. (Given the serious deficit of hard currency, the country strove to increase gas exports to Europe to the maximum and not infrequently resorted to loss leading in order to enter new markets.)
- Next to significant domestic production, there were only a few competing suppliers in the European market, and market areas were clearly divided among them. (Algeria, for all practical purposes, controlled southern Europe, Norway was prominent in the northwest, and Russia controlled central and eastern Europe.)
- Gas was supplied solely on the basis of oil-linked long-term contracts with “take or pay” (TOP) and destination clauses, so the market risks were minimized. The contracts only arranged for gas delivery as far as the national borders of the European countries. These bilateral contracts were usually supported by intergovernmental agreements, and they were the only real legal basis for the regulation of deliveries.

Beginning in 2002 after the appointment of new management at Gazprom, this “traditional” strategy was supplemented with a number of new features:

- Irreconcilable conflicts with Ukraine and Belarus, resulting in suspension of gas supplies to European countries, led to the appearance of strategies to bypass the transit countries (Nord Stream, South Stream, and later TurkStream).
- The government decided that Gazprom had a good chance of becoming a national champion—that is, an international player representing Russian national interests globally. Gazprom started to position itself as a transnational energy company (instead of the national gas company it had hitherto been) and began globalizing its activities by developing a large number of joint ventures and involving itself in searching for European storage, transport, and distribution assets. So the strategy of moving downstream and gaining access to end users in European countries was announced.

For many decades Russia featured prominently the Eurasian (CIS) and European gas markets, while the United States was the main player in the North American gas market. There were nearly no gas flows between Europe and North America,<sup>2</sup> so these two markets were isolated from each other, meaning there was no direct competition between Russia and the United States in the gas sector.

Nevertheless, there were some episodes of conflict concerning gas exports: the United States tried to cancel the Gas-for-Pipes Deal<sup>3</sup> between the Soviet Union and the leading European economies in the 1970s. This accord served other European countries, and they in turn would sign supply agreements with the USSR in order to connect to German infrastructure. This East-West barter model was simple: the USSR needed Western currency and technology, while western



European countries—West Germany, France, Austria, Italy, and Belgium—were looking to diversify their gas supply and find new markets for their steel and equipment manufacturing industries.

This economic and energy agreement faced resistance and criticism from the United States, notably during the second series of contract negotiations between the USSR and German Ruhrgas. These settlements were reached at a time of high international tension: the end of the Brezhnev era, the arrival of President Ronald Reagan, the start of a new arms race, martial law in Poland, and the Soviet intervention in Afghanistan.

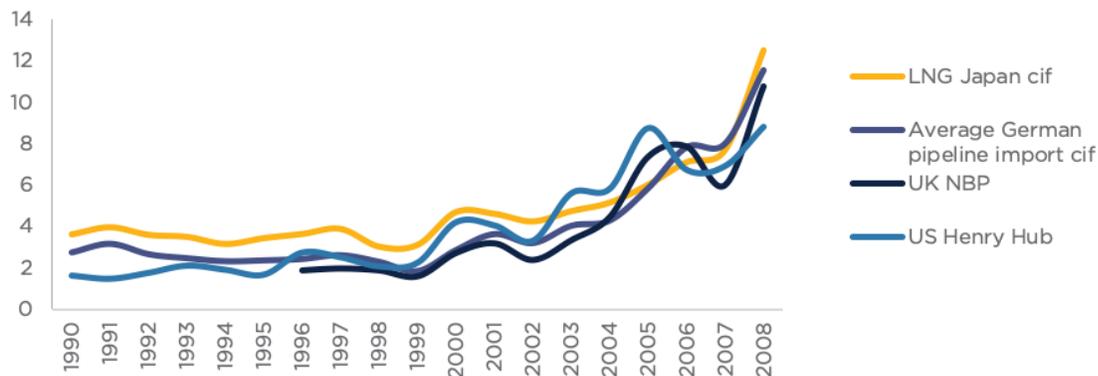
The Reagan administration resorted to using sanctions. During the ongoing negotiations to increase exports between the German gas monopoly Ruhrgas and the USSR, the CoCom<sup>4</sup> list banned the transfer of technology for one part of the compressor that was necessary in the gas chain, but the pipeline, operational since 1985, in fact used a mix of Soviet and Western technologies.<sup>5</sup> The new network doubled Soviet exports to the West (West Germany, Italy, France, Austria, Switzerland, Turkey, and Finland) from 1985 to 1991. The Reagan administration's sanctions proved ineffective, with a barter system having been set up.<sup>6</sup>

The collapse of the Soviet Union in 1991 ended this confrontation. In the 1990s Russia began increasing gas supplies to Europe, and the United States was focused on its domestic gas market agenda without any interest in European affairs.

## Russia's Role during the US Gas Deficit

In the early 2000s, the United States, following a period of liberalization that also saw increasing gas availability and low prices, experienced a gas deficit and growing prices. By 2003–2006 it became obvious that the United States would need additional gas supplies to cover a growing supply-demand gap. A rush toward LNG regasification began, with the submission of more than 40 applications for the construction of regasification terminals in the United States. Qatar, Algeria, and other LNG producers started to expand their liquefaction capacities in order to supply this growing, highly profitable market, which, in 2003–2005, had the highest prices in the world (figure 3).

**Figure 3:** Global gas price dynamics, 2000–2008 (USD/MBtu)



Source: BP Statistical Review of World Energy 2017



At this stage Russia was also regarded as a potentially significant supplier, and in 2003 Gazprom's leadership even announced that it would be ready to start supplying the United States with LNG from its Shtokman field by as early as 2010. In 2004 US officials visiting Russia also promoted this idea of targeting the new Russian LNG projects—Shtokman and Yamal—as a source for the US market, and joint development of these projects was discussed.

Gazprom invited foreign partners to participate in the first 15-million-ton phase of its flagship 45 million tons per annum (mtpa) Shtokman project.<sup>7</sup> In 2005 Gazprom began negotiations over developing Shtokman with 11 international oil and gas companies. However, after a long bidding process and with numerous short lists of potential participants being put together, US companies were not allowed to participate in Shtokman.<sup>8</sup> By the end of 2007, Gazprom finally signed two framework agreements for cooperation with France's Total (25 percent) and Norway's StatoilHydro (later Statoil, 24 percent) to develop the first phase of Shtokman.<sup>9</sup>

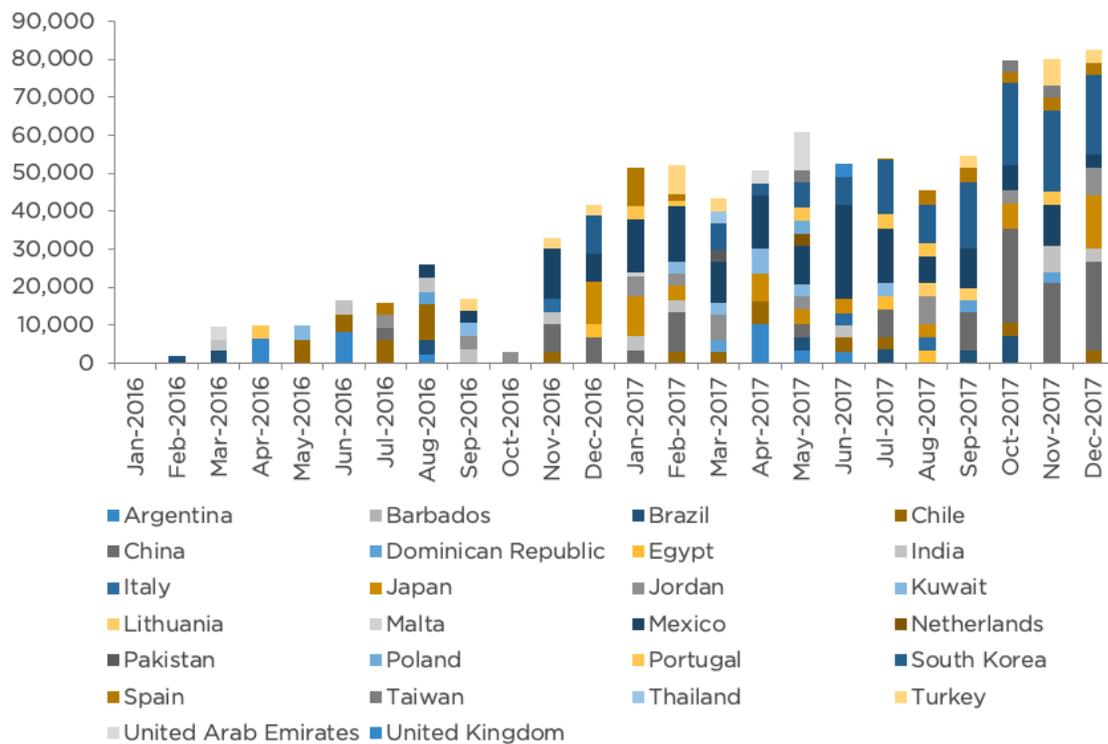
Still, the general perception of the United States as an attractive market for Russian gas persisted. In 2008, despite rising indigenous shale-gas production in the United States, Gazprom still aimed to capture as much as 10 percent of the US gas market.<sup>10</sup>



# THE CURRENT IMPACT OF US LNG ON RUSSIAN GAS EXPORTS

In 2016, Cheniere’s VP for strategy Andrew Walker concluded that the arrival of US LNG had disrupted the old gas order, and he was right.<sup>11</sup> Even before US LNG had physically entered the market, it had begun to compete with Russian gas in all Russian core export markets: in Europe, in northeast Asia, and even in CIS. So far the physical US LNG export volume was comparatively small (figure 4) and could not put pressure on Russian gas, but it had nevertheless catalyzed some other far-reaching consequences. In fact, US LNG started to affect Russian gas policy long before the first LNG cargo departed from Sabine Pass. Today one can identify several direct implications of the US LNG exports for Russia. However, it should be stressed that general market developments and the specific impact of the coming US LNG exports are very entwined.

**Figure 4:** US LNG exports by destination, 2014–2017 (million cubic feet)



Source: EIA, US DOE



## Death of Shtokman Project and Delay of Yamal-LNG

The inflow of shale gas from unconventional local sources meant that the North American premium market stepped back from cross-continental natural gas trade. Rising domestic gas production and market oversupply lowered gas prices in the United States. Ironically, by that time traditionally low and subsidized domestic gas prices in Russia had become higher than US prices.<sup>12</sup> So the first thing that the shale revolution did for Russia's gas export strategy was to cause the complete closure of the North American LNG import market, which Gazprom's Shtokman megaproject and Novatek's Yamal-LNG<sup>13</sup> had hoped to capture.

In 2012 the term of the partnership agreement between Shtokman shareholders expired. Urgent attempts to review the strategy for the field's development and enter into a new shareholders' agreement failed. In July 2012 Gazprom announced that the investment decision for the project would be postponed until 2013–2014, though in reality, the delay was indefinite. Now a realistic date for commissioning the field would not be before 2030–2035.

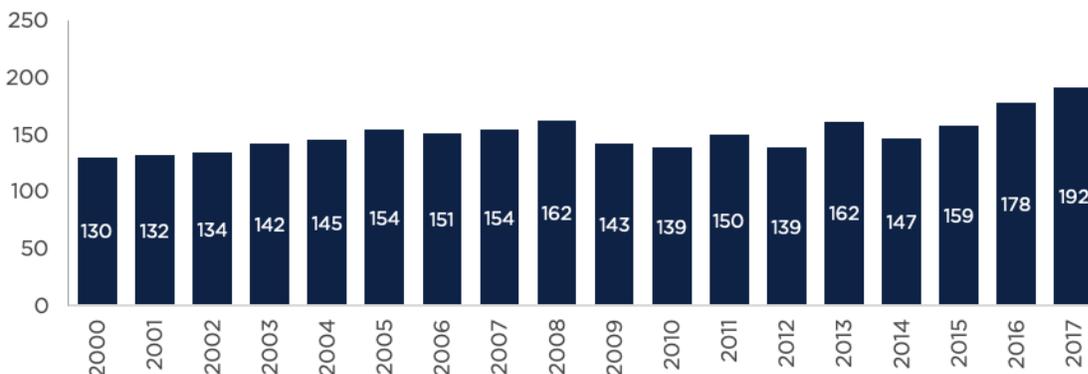
So the first and immediate result of the US shale boom is clear—after a painful period of market reassessment and negotiations with project partners, Russian projects targeted at the United States were postponed (Shtokman for an indefinite period and Yamal for at least five years with the change of the target market).

## The United States Creates Global LNG Glut

The unprecedented rise in North American gas production not only made Russian gas uncompetitive in this market, but many LNG producers (including Qatar, Algeria, Nigeria, and others) targeted the United States and made significant investments in order to increase their LNG output. This wave of new liquefaction capacities came on stream in 2008–2009, and as the United States was no longer interested in LNG imports, all this “homeless” LNG was redirected to other markets in Europe and Asia.

While in Asia the influx's effect was not very visible (though in fact the new flow helped to mitigate the consequences of Fukushima; otherwise, prices could have gone even higher), in Europe the new supply, coupled with economic crises and declining demand, led to significant gas oversupply and spot price drop. As a result, in the years between 2008 and 2012, Gazprom saw a significant decline in export volumes. In 2009 Russian gas exports dropped for the first time ever by a dramatic 12 percent (figure 5) and Russia's market share in Europe started to shrink (from 30 percent before the crisis to just 23 percent in 2009). Russian gas, indexed to expensive oil, became less attractive to European consumers from a commercial perspective (not to mention that after the Ukrainian crises in 2009 and 2010, Russian gas also became unattractive from a political point of view).



**Figure 5:** Dynamics of Russian gas exports to Europe (including Turkey), 2000–2017 (billion cubic meters)

Source: *Gazprom Export Annual Reports 2005–2017*

The dramatic shift in the European gas pricing model has probably been the most painful transformation of the European gas market for Russia. While in 2008 spot and hybrid-indexed gas supplies accounted for nearly 20 percent of total gas consumption, in the course of the last seven years, due to market oversupply, this share has reached 70 percent.<sup>14</sup> The hubs have become price benchmarks for the majority of market participants.

It was becoming obvious that the traditional Russian pricing strategy, which had worked excellently for half a century, had to adapt to the new reality. Russia was trying to preserve the traditional oil indexation, while all European stakeholders demanded competitive, spot-linked pricing.<sup>15</sup> But the very idea that there would be more LNG in the market in a few years due to the Australian and US projects gave more confidence to the consumers in their negotiations with the traditional suppliers. Starting in 2009, Gazprom began receiving official notices from European buyers demanding that their contracts be reviewed. Under growing client pressure and also because all other European suppliers were changing their contracts, Gazprom, wishing to maintain its market share, was also compelled to review its contracts in order to adjust to market conditions and improve the competitive advantage of Russian natural gas supplies.

Gazprom conducted negotiations on an individual basis, depending on the historical relationship and strategic significance of a given buyer. With many companies, Gazprom did not just hold contracts but also had joint projects and joint ventures in the downstream sector. Hence, Gazprom's policy with regard to contract review was based on the principal of delaying for as long as possible before providing the minimum discount acceptable to the buyer under the terms of "special" bilateral agreements with various client countries.

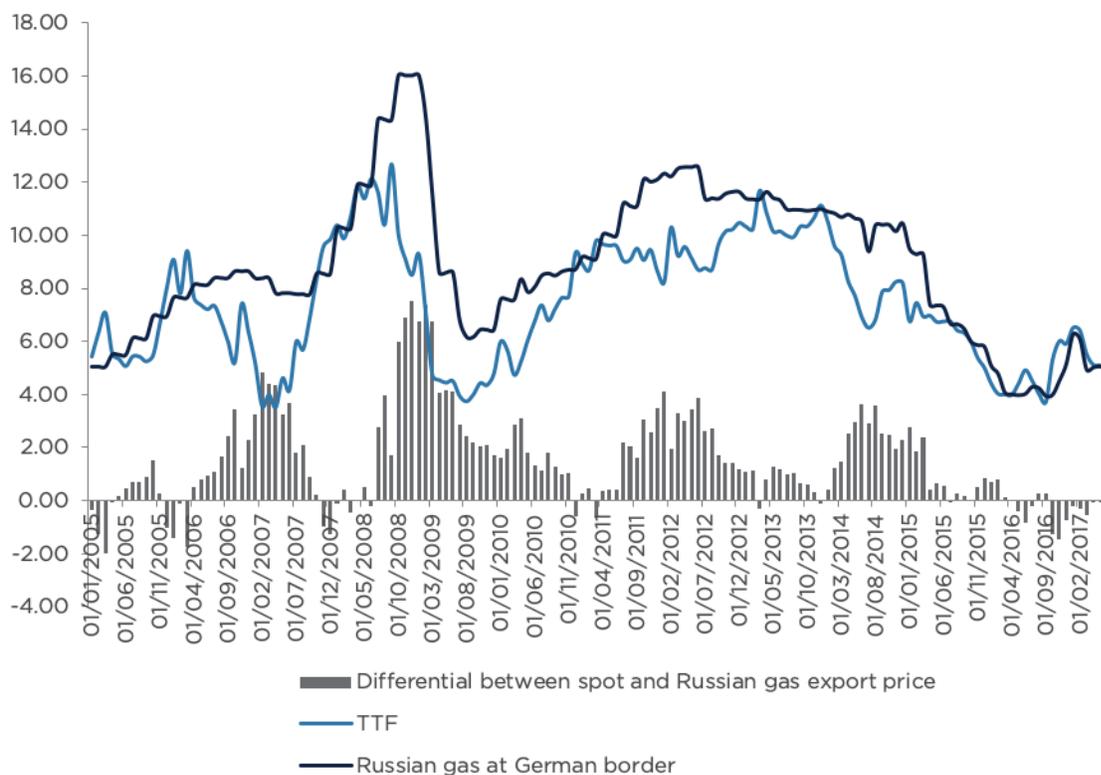
Despite Gazprom's strident rhetoric in favor of traditional oil indexation, in actual fact numerous adjustments and contract reviews have already been made in the course of the last eight years. Analysis of Gazprom's official reports demonstrates a much more flexible negotiating position than has commonly been thought to be the case. In 2013 Gazprom started to implement a new price discount model with so-called retroactive payments, which



actually provided customers with partial compensation of the gap between spot and oil-linked prices. During the period from 2009 to 2015, nearly all gas supply contracts were reviewed with approximately 40 clients, providing price discounts, introducing spot component into the price formula, and easing TOP obligations. Calculations using Russian Customs Service statistics, Gazprom’s reports, and the Nexant World Gas Model (which allows the assessment of contractual prices based on the prices of oil products) show that by 2015 Gazprom had already provided nearly a 25 percent average discount to its European customers compared to its pre-crisis traditional oil-linked price formulas.<sup>16</sup>

Accompanied by the major oil price decline in 2014–2016, this led to much lower Russian gas export price levels and a decrease in Gazprom’s revenues and the Russian budget, but at the same time it allowed Gazprom to provide its customers with very competitive prices (figure 6). After 2015 Russian contractual prices became extremely competitive in Western Europe.

**Figure 6:** European hub price vs. Russian gas export price, 2005–2017 (USD/MBtu)



Source: IMF, EIA, NetConnectGermany



## The US LNG Argument Became a Tool to Obtain Better Prices from Gazprom

General market developments and the specific impact of the coming US LNG exports were entwined. The option for buyers in general to choose between suppliers (not only the United States and Russia) created a different playing field. In Europe most of the countries where Russia had traditionally been the dominant supplier (like in the Baltics and in Central and Eastern Europe) looked for alternatives in order to have an argument in their negotiations with Gazprom. There were increasing expectations for US LNG in particular to “come to the rescue” and to lessen dependency on Russian gas. Though, to be frank, in the majority of the cases, consumers were not prepared to switch completely from Russian gas supplies to LNG imports but rather preferred to have at least some choice (even though the LNG option was more expensive) in order to limit Gazprom’s monopolistic power and its inclination to abuse it. This approach worked relatively well in the case of Lithuania with its FSRU and in Poland with the Świnoujście regasification terminal. Even very limited “symbolic” potential US LNG supply volumes to the Baltic states (as well as to Poland and maybe even Ukraine) put real pressure on Russian pipeline gas prices, and, more importantly, they are a very strong political signal.

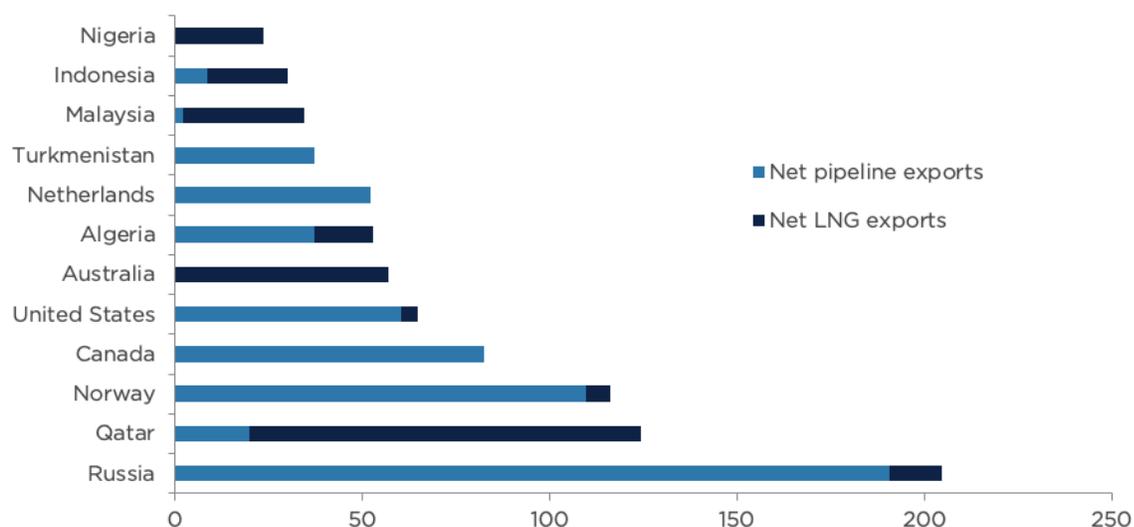
Russia also faced virtual competition in Asia with US LNG. Through discussion of the future price of new LNG and pipeline gas exports with Japanese, Korean, and Chinese customers, US LNG suppliers already have a portfolio of approximately 50 mtpa<sup>17</sup> long-term contracts with the Asian buyers. So the United States is targeting the same market niche in Asia as Russia is with its 38 bcma long-term contract for pipeline gas supplies to China and a total of 23 mtpa long-term contracts for LNG supply to Asia from the Sakhalin-2 and Yamal-LNG projects. Starting from 2013 negotiations to sell new gas in Asia turned out to be more difficult for Russia, as Asian buyers refused 100 percent oil indexation and referred to the variety of LNG indexation options, including US Henry Hub-linked LNG.<sup>18</sup> So US LNG has already impacted (not really physically, but more psychologically) Russia’s price-negotiating position for all its new contracts in Asia—any proposal is now compared to the Sabine Pass contract price.

Thus, US LNG served as an accelerator of the changes in pricing models and contract terms both in the Atlantic and the Pacific basin.

## Growing Pressure on Russia to Speed Up the New Pipeline Projects

Russia is consistently ranked first in the world for gas exports (figure 7). It provides for nearly one-quarter of the global cross-border gas trade, supplied to its foreign customers mainly through pipelines (93 percent) and, to a lesser extent, as LNG (7 percent). It remains the dominant supplier both for the European and the CIS gas markets, but this exclusive position in the global gas market is becoming more and more threatened by the expanding competitors—Qatar, Australia, and now the United States.



**Figure 7:** Major gas exporters in the world, 2016 (billion cubic meters)

Source: BP Statistical Review of World Energy 2017

In 2016 US total gas exports (both pipeline and LNG) constituted only one-third of the Russian total export volume, but already in 2017 US LNG exports have increased three times. The dynamics of this growth and its secondary consequences are too important to be ignored by Russian leadership. Russia feels the urgency to speed up its new export projects ahead of the competition from US LNG (both in Europe with the construction of TurkStream and Nord Stream 2<sup>19</sup> and in Asia with the “Power of Siberia” development).

The Russian government and Gazprom discussed export gas market diversification for a very long period of time, but the first real steps were finalized only in 2013–2014 with LNG export liberalization (which made the Yamal-LNG project possible) and with the conclusion of a megadeal with China on the “Power of Siberia” gas pipeline. Stagnant European gas demand versus booming demand in Asia, Europe’s increasing rhetoric against dependency on Russian gas versus Asia’s desire to diversify their LNG import portfolios with more pipeline gas supplies from Russia, and sanctions against Russia adopted by the European Union in 2014 all played a role. But there was also the consideration that it was important to hurry to secure the niche in the growing markets before US LNG became a reality.

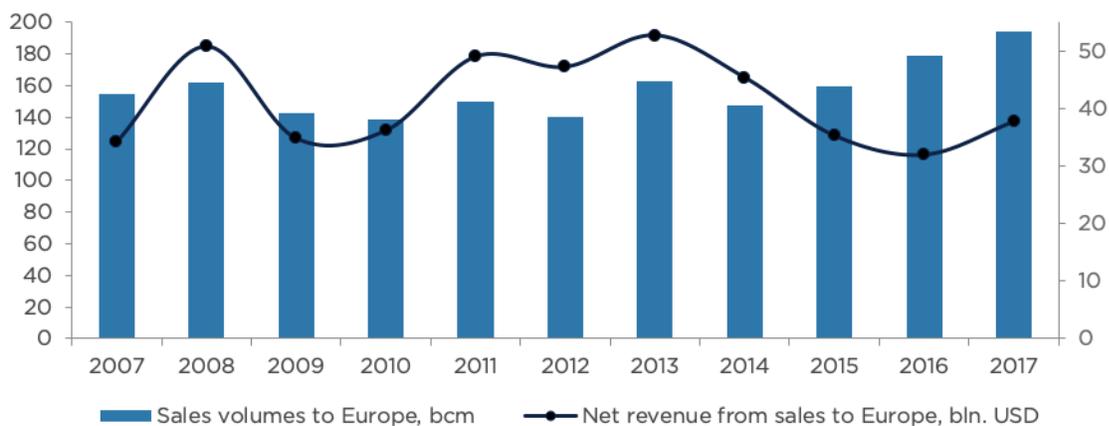
The amazing expansion of the US LNG industry pushed Russia to develop its LNG export projects, especially Yamal-LNG. On December 25, 2017, right after the start of the first line of this 15 mtpa project, President Putin issued the “List of Orders for the Development of LNG Projects,”<sup>20</sup> which included a long list of measures required to “ensure the entry of the Russian Federation in the medium term into the number of world leaders in the production and export of LNG”—so Russia has made its longer-term LNG ambitions clear.



## Implications for the Domestic Russian Gas Market Framework

As a result of the poor market conjuncture in Europe, Gazprom has demonstrated a significant loss of export revenues (by more than 30 percent), first in 2009–2010 and then again—due to lower oil prices—in 2014–2016 (figure 8). Not only Gazprom was hit by these developments; the impact was felt by almost every other gas exporter.

**Figure 8:** Gazprom's sales volumes to Europe and net revenue from sales to Europe (after export and excise duties), 2007–2016 (left axis, billion cubic meters; right axis, billion USD)



Source: "Gazprom in Figures 2007–2011," "Gazprom in Figures 2012–2016," Gazprom IFRS consolidated financial statements 2017

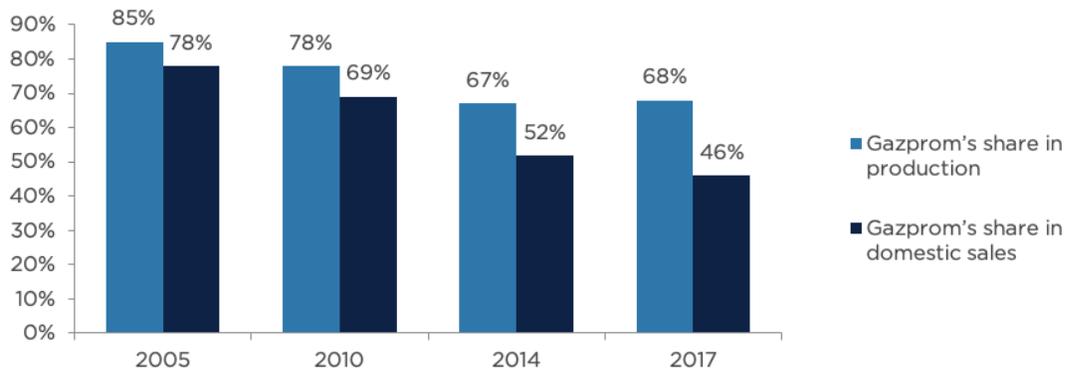
But Gazprom's failure to adapt to the dramatic market change in Europe and to deliver positive financial results has created increasing criticism not only among domestic industrial consumers (which had, for a certain period of time, to pay more for gas than their American colleagues) and independent gas producers but, most importantly, among the establishment.

As a result, the government, and in particular the Federal Antimonopoly Service, became much stricter regarding any violation of third-party access. Pressure on Gazprom was increasing, and the monopoly started to lose its position domestically—its share in gas production decreased from 85 percent in 2005 to 68 percent in 2017, while sales in the domestic market by non-Gazprom producers exceeded 50 percent. Moreover, Gazprom's export monopoly was broken—on December 1, 2013, a law on LNG export liberalization came into legal force.<sup>21</sup> During the last few years, there has been increasing pressure from Novatek and Rosneft to unbundle Gazprom and to liberalize all gas exports.<sup>22</sup>

At the same time, exports are becoming more crucial for Gazprom than ever, as it is steadily losing its domestic market to independent producers (figure 9).



**Figure 9:** Gazprom's share in Russian gas production and domestic market sales)



Source: CDU TEK, ECM

The situation is becoming critical for the company, as it is now facing increasing challenges both abroad and domestically. If it fails once again to deliver substantial revenue for the budget, this failure will be immediately used by its counterparties to obtain pipeline export liberalization. So the stakes are high: Gazprom has no margin for error.



# THE FUTURE IMPACT OF GROWING US LNG SUPPLIES ON RUSSIAN GAS EXPORTS: COMMERCIAL, GEOPOLITICAL, AND INSTITUTIONAL COMPETITION

With the rise of US LNG, the Russian gas industry is facing, for the first time, real global challenge and competition from an equal rival, and now, whether the Russian leadership admits it or not, US LNG will initiate a stress test of Gazprom's gas export strategy. Moreover, this rivalry, which has both commercial and geopolitical dimensions, will shape Russia's entire gas export policy to a large extent.

## Direct Commercial Competition

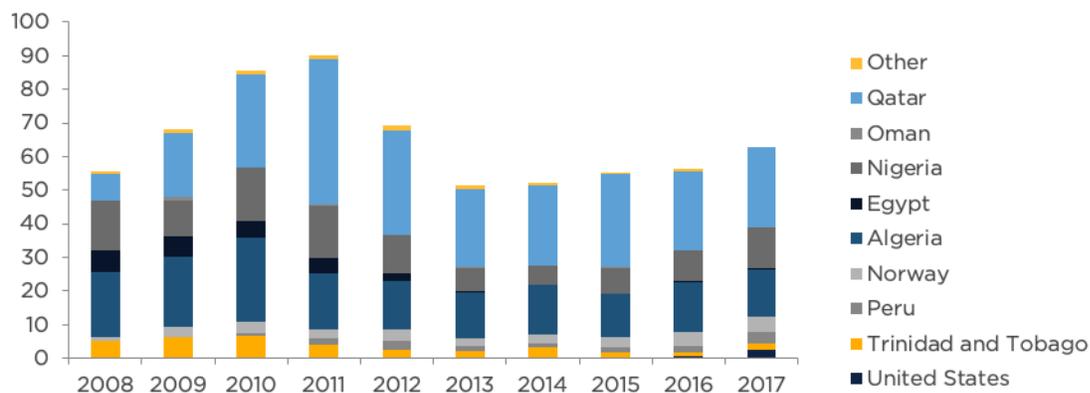
There are two dimensions in this arising competition between Russian gas and US LNG: purely commercial and geopolitical. The first part of this chapter will focus on the comparative economics of these two suppliers, while the second part will focus on an analysis of their geopolitical rivalry.

### European Market

#### Expectations of LNG Oversupply in Europe

In April 2016 the first shipment of US LNG from Cheniere's Sabine Pass reached Europe, launching the direct competition with Russia that had been discussed in the market for five years. Europe has been frequently viewed as the "market of last resort" where all LNG seeking a home will come. This occurred in 2008–2011, when European LNG imports rose from 55 billion cubic meters (bcm) in 2008 up to 90 bcm in 2011 (but then dropped back to 52 bcm after 2013; see figure 10). The common expectation was that in 2018–2020 with the new LNG projects coming onstream, the oversupplied global LNG market will push more and more LNG to Europe, provoking the next round of severe price competition and a drop in spot prices, and once again Gazprom will lose market share in the European market.



**Figure 10:** European LNG imports, 2008–2017 (billion cubic meters)

Source: BP Statistical Reviews of World Energy 2009–2017, the LNG industry GIIGNL Annual Report 2018

So far this expectation has not yet materialized due to the delays in LNG projects and booming demand<sup>23</sup> in China and emerging markets; moreover, 2017 was a record year for Russian gas exports to Europe, both in terms of volumes and market share, which has reached 35 percent. US LNG cargoes in 2016–2017 primarily went to Asia and Latin America, but even taking into account some possible additional LNG project delays, in the next few years, it can be expected that Europe will see significantly higher LNG import volumes—and this will be the exact moment when Gazprom’s strategy will be tested.

### Unique European Two-Segment Gas Market Model: Locked-in LTCs

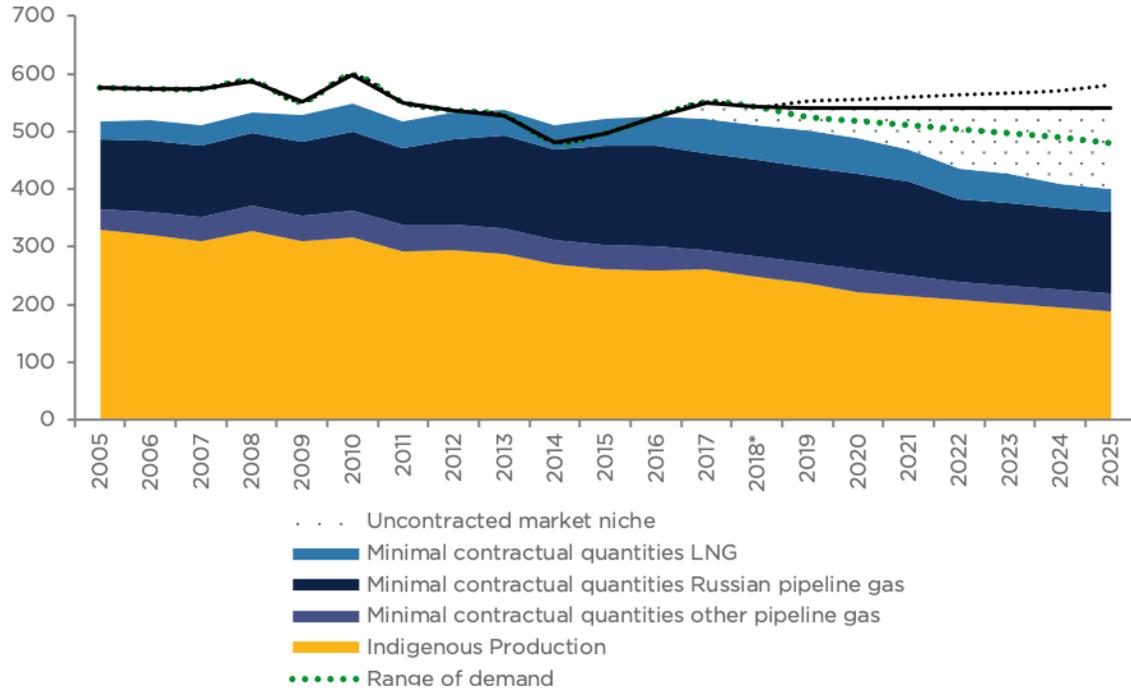
Competition indeed promises to be strong; during the last few years, European gas demand still has not recovered to the peak level reached in 2010—even a twofold drop of gas prices in 2016 compared to 2013 did not help. It is a mature market where demand is mainly driven by seasonal factors (warm or cold winter), and there is significant uncertainty concerning its future trajectory: both demand decline and growth are possible (figure 11).

European’s domestic gas supply dropped significantly in the last few years—first of all, as a result of declining production from the Dutch Groningen field—and will further decline in the future. With domestic decline and stagnant demand, European import requirements will nevertheless expand.

Theoretically, there is a huge abundance of gas import options for Europe; suppliers of several different types of gas (mainly LNG) could compete for the European market. But in this respect, the dynamics of Asian gas demand will be critical: if Asia is not able to absorb additional low-priced LNG and if gas demand price elasticity is low, many suppliers may switch to Europe. It is not the case so far, but if Asian demand slows down, indeed one can expect suppliers of uncontracted LNG to compete hard at spot in order to get part of this uncontracted European market niche, shown in figure 11 for the baseline gas demand scenario.



**Figure 11:** European gas balance, 2005–2025 (billion cubic meters)

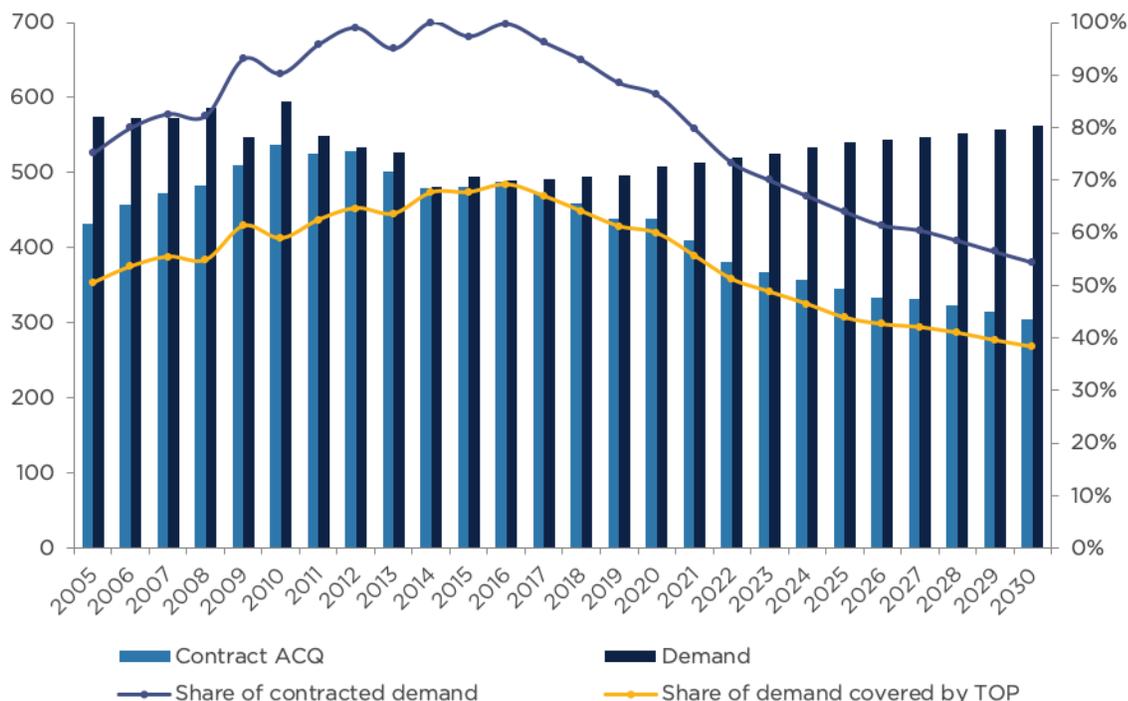


Source: Nexant WGM 2018, IEA World Energy Balances 2017, IEA Natural Gas Information 2017

But the main part of European demand is locked into existing LTCs—more than 50 percent of European demand until 2022 is covered by obligatory TOP minimal contractual quantities, which leaves a rather narrow uncontracted niche for real market competition (figure 12)<sup>24</sup>. Most of these contracts were signed before 2008, when there were overoptimistic expectations of European gas demand growth; in 2014–2016 annual contractual quantities (ACQs) of the signed LTCs covered 100 percent of European demand, making it very difficult for newcomers to enter this market.



**Figure 12:** The share of LTCs in European gas consumption (left axis, billion cubic meters; right axis, percentage)



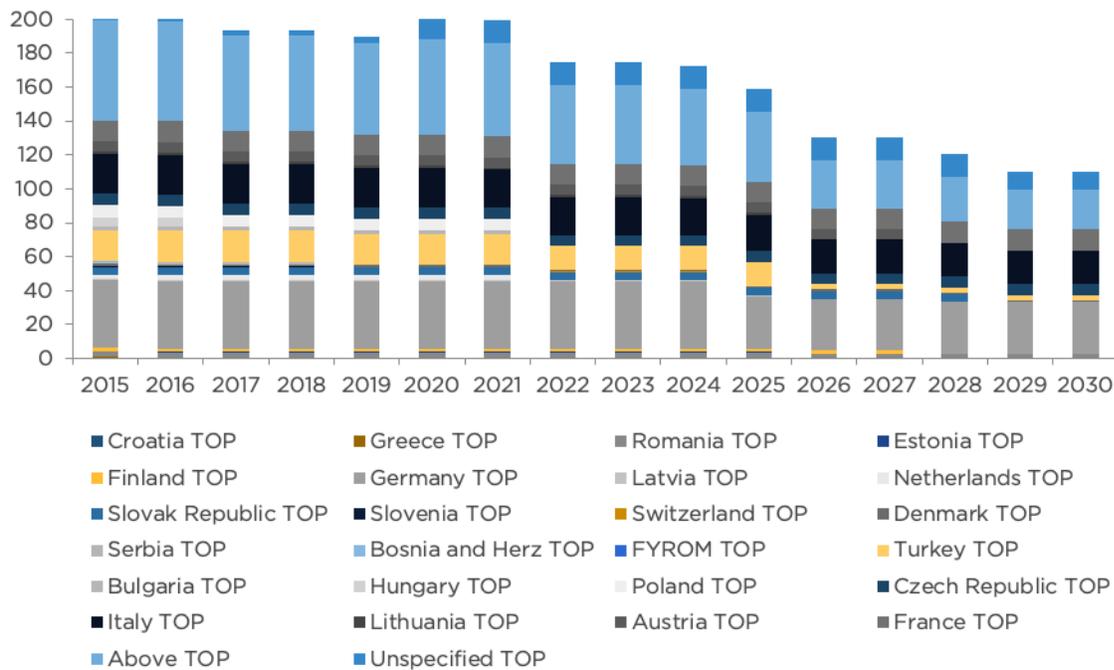
Source: Nexant WGM 2018, OIES

### Gazprom Secured the Biggest Portfolio of LTCs in Europe

Gazprom secured the biggest portfolio of LTCs in Europe compared to all the other suppliers (130 bcma guaranteed offtake up until 2021 and 115 bcma until 2024, during potentially the most challenging period of oversupply). These contracts will start to expire post-2021 but still provide guarantees of relatively stable export volumes to Europe (figure 13). It is worth noting that these minimum contract quantities (also called TOP volumes) under LTCs would not be affected (volume-wise) by any possible competition between US LNG and Russian gas. So the volume affected is the volume above MCQ in LTCs and sales outside LTCs.



**Figure 13:** Russian portfolio of LTCs, 2015–2030 (billion cubic meters)



Source: Nexant WGM 2018, Cedigaz LNG, and pipeline database 2015

Importantly, the European LTCs seem to be very termination-proof (under both English and continental law). If the buyers are strongly unsatisfied, the contractual terms might finally be adjusted through arbitration, but the contracts most likely will stay in place. In 2004 analysts concluded that “whereas long-term gas contracts will remain important in Europe, their nature is going to evolve significantly...and adapt to the new gas market environment,”<sup>25</sup> and this remains a reasonable expectation today. Analyses of the LTCs’ transformation demonstrate that in fact the markets do work, and even these quite rigid contractual structures are adapting to the increased competition, and the market participants are efficient in adjusting these instruments to the new market environment.

As for US LNG, several LTCs for its supplies have already been signed with European consumers, totaling approximately 20 bcma—just one-tenth of Russia’s portfolio—and even these volumes could easily be redirected to more attractive markets.

### Gazprom’s LTC Prolongation in Europe

Several Russian contracts with a total volume of at least 16 bcm will expire in the next few years, starting in 2019 (with Poland, Italy, Slovenia, and the Czech Republic), and their renegotiation process could be very interesting, as the process might define the future evolution of the entire Russian portfolio. Most likely, some of these contracts will be



prolonged—with some price revisions (especially as Energy Union is imposing its censorship and requires centralized approval for any contract), but the guaranteed volumes have a good chance at remaining unspoiled—primarily, prices and other clauses could be challenged.

So far only Polish PGNiG has indicated repeatedly that it does not intend to renew its contract with Gazprom and is looking at, among other options, US LNG instead. But this is much more the result of the geopolitical relationship between Poland and Russia rather than a market-driven decision.

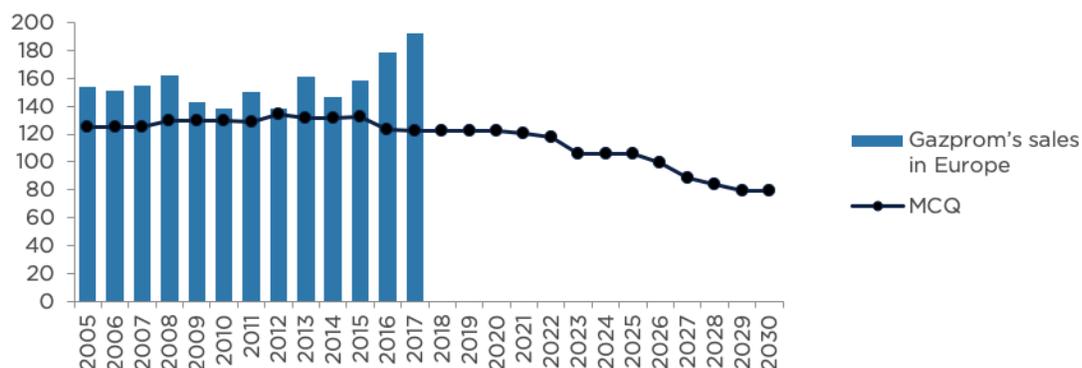
Things can change, of course, but evidently concerns about dependence on Russian Gazprom feature highly on the Polish national policy agenda. In other countries, like the Czech Republic, views may be different. But the majority of existing LTCs extend far into the next decade, and in some cases even beyond, limiting the options of European customers to maneuver even if they wanted to.

### Gazprom Selling at Spot

On top of LTCs, Gazprom is developing rather active hub sales through its subsidiary Gazprom Marketing and Trading (GMT). As figure 14 demonstrates, when Gazprom's pricing is adequate, its real sales significantly exceed its MCQs—both due to higher offtake from the LTCs and higher spot sales. Moreover, in December 2017 Novatek also joined the club of European gas suppliers with its Yamal-LNG, and at least part of these supplies will also be on the spot market.

In September 2015 Gazprom started selling some gas at auctions (at a price higher than its long-term oil-pegged contract prices). A second gas auction was carried out in March 2016, because after the opening of the regasification terminal in Lithuania, the gas landscape in the Baltic states began to change. In September 2018 Gazprom launched its own electronic trading system.<sup>26</sup> Russia now has different options to sell gas: via legacy LTCs, via auctions, via GMT, and via Wingas, a fully owned European utility.<sup>27</sup> Gazprom has demonstrated huge flexibility and creativity in developing its gas trading, but it is not the focus of this paper.

**Figure 14:** Gazprom's sales in Europe (including Turkey) and MCQs fixed in existing LTCs (without prolongation, billion cubic meters)



Source: Gazprom Export Annual Reports 2005–2016, Nexant WGM 2018



### Volume in Europe Will Be Defined by LTCs

Ironically, the volume of gas supplies in Europe is now defined by LTCs, while the prices, after a painful transitional period from 2009 to 2015, are formed at the spot market, affecting prices of gas supplied under LTCs. So this forthcoming competition for the uncontracted segment will most likely lower spot prices (if there is a real LNG oversupply, which the author has not observed so far) and, automatically, prices in LTCs—which will be, of course, bad news for Gazprom’s revenues and for the Russian state budget. But as Gazprom has already more or less adjusted its LTCs to bring them in-line with the hub prices, there will not be such strong pressure to reduce offtake from Gazprom in favor of alternative suppliers.

Moreover, the expanding volumes of US LNG (due to its unique business model and the ability to redirect unwanted feed gas back to the domestic market) will have sufficient scale to shift the spot price curve lower and to narrow the Atlantic spread via the gradual convergence of spot prices, particularly from 2018 onward, when US liquefaction capacity will likely become too big to ignore.<sup>28</sup> It should be noted, though, that these competitive positions vary significantly between western Europe (TTF, NBP) and Central and Eastern Europe—bringing US LNG there requires additional costs. Russian gas seems to remain more competitive in this part of Europe, but US LNG will impose a sort of ceiling on the European spot prices.

### Long-Run Marginal Cost Competitiveness

When it comes to competition for the uncontracted niche in Europe, Russia has a significant advantage both on the long-run marginal cost basis (LRMC) and on the short-run marginal cost (SRMC) basis.

LRMC includes all the full-cycle investments required to bring additional supplies to the market (e.g., building new LNG plants or new project construction). Russia is still one of the cheapest options for Europe. Upstream costs are very low—below 1 USD/MBtu (including taxes – figure 15)—though lengthy transportation and, for pipeline gas, the 30 percent export duty put some limits on this competitiveness, ruble devaluation supports the attractiveness of Russian gas (as a majority of the costs is fixed in rubles).

**Figure 15:** Gazprom’s reported average cost of production (USD/MBtu)

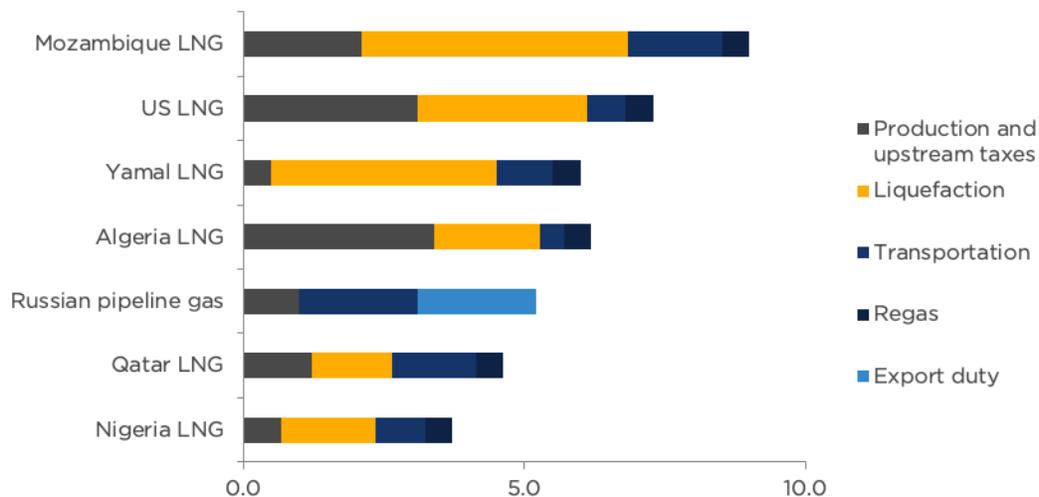


Source: Gazprom



What should be stressed concerning price competitiveness of both Russian and US gas is the simple fact that the cheapest option for Europe, beating both Russian and US prices, would be gas from Qatar and Nigeria. As history shows, Qatar will most likely expand supplies to Europe in the case of a brutal price competition (figure 16).

**Figure 16:** Estimation of the long-run marginal supply costs to Europe, 2025 (USD/MBtu)



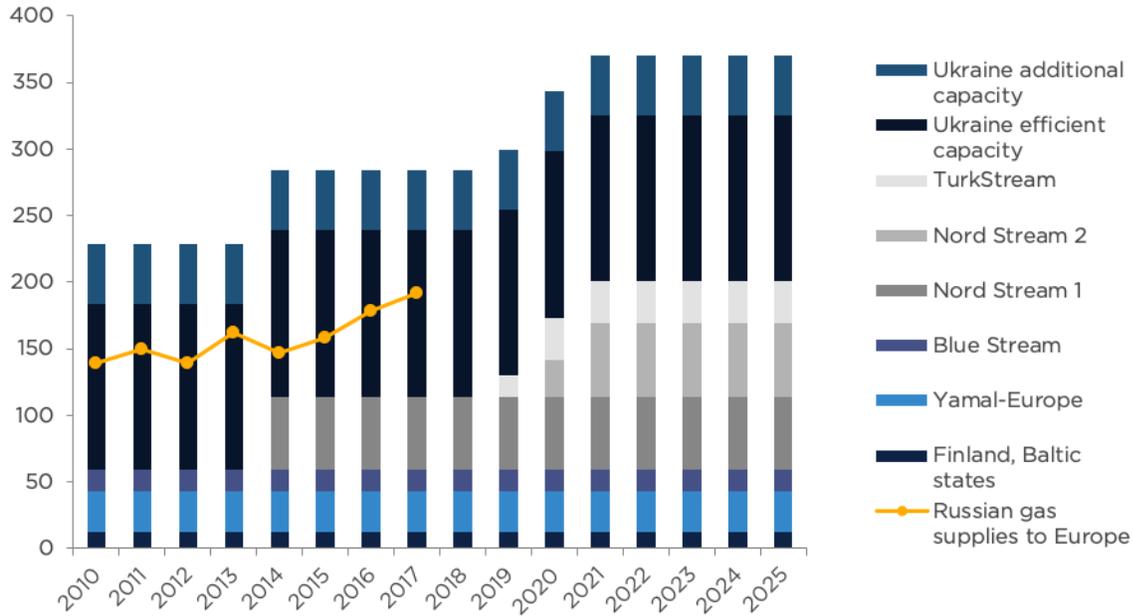
Source: Nexant WGM 2018, Gazprom, Federal Antimonopoly Service

Detailed Russian supply curve analyses show that about 45 bcma could be added without any significant additional investments, as there are still spare upstream capacities<sup>29</sup> and approximately 45 bcma of underutilized efficient transit capacities (figure 17—total transit capacities are even bigger, but they require additional utilization of the Ukrainian system, which is not acceptable for Russia).

Another 86 bcma could be added in case of successful Nord Stream 2 and TurkStream construction—these additional volumes will require higher upstream and domestic transportation costs, but in case of full utilization, they could provide for lower per-unit transit costs.<sup>30</sup> In the longer term, another 30–40 bcma could be theoretically brought on stream through the new LNG projects construction in the Yamal and Gydan peninsulas—of course, at higher cost due to liquefaction and challenges of transportation, but still at a lower LRMC than US LNG.



**Figure 17:** Existing and planned Russian pipeline export capacities to Europe (billion cubic meters per annum)



Source: Gazprom data

### SRMC Competitiveness

SRMC is defined as the change in short-run total cost for an extremely small change in output, and therefore SRMCs do not include CAPEX. In many cases when assessing the competitiveness of US LNG, different experts refer to the concept of “sunk costs,”<sup>31</sup> arguing that the liquefaction fee is paid by the offtaker under LTCs and can therefore be left out of the SRMC calculation. In this case SRMC of the US LNG is 1.15 HH + 1.1 USD/MBtu for transportation and regasification, which at the Henry Hub price of 2.7 USD/MBtu results in a short-run cost of US LNG delivered to Europe of 4.2 USD/MBtu (figure 18). This is currently the minimal acceptable price level for the US LNG suppliers (though, of course, they prefer to send their LNG to the markets that cover not only SRMC but also LRMC, with considerable margin). With the price below SRMC, aggregators would prefer to pay a penalty to the LNG plant owner rather than to generate losses by sending gas to Europe. And, of course, no new FIDs would be supported by banks or shareholders if prices were around this level.



**Figure 18:** Estimation of the short-run marginal supply costs to Europe of Russian pipeline gas and US LNG (USD/MBtu)



Source: Nexant WGM 2018, Gazprom, Federal Antimonopoly Service

\*Export duty is applied to the sales price; in this calculation, it is assumed to be 6 USD/MBtu

But for the sake of fair comparison, the same approach should be then applied for the SRMC of Russian gas. In the current situation of a domestic gas bubble and significant underutilized upstream and transportation capacities, these short-run marginal costs would include the following:

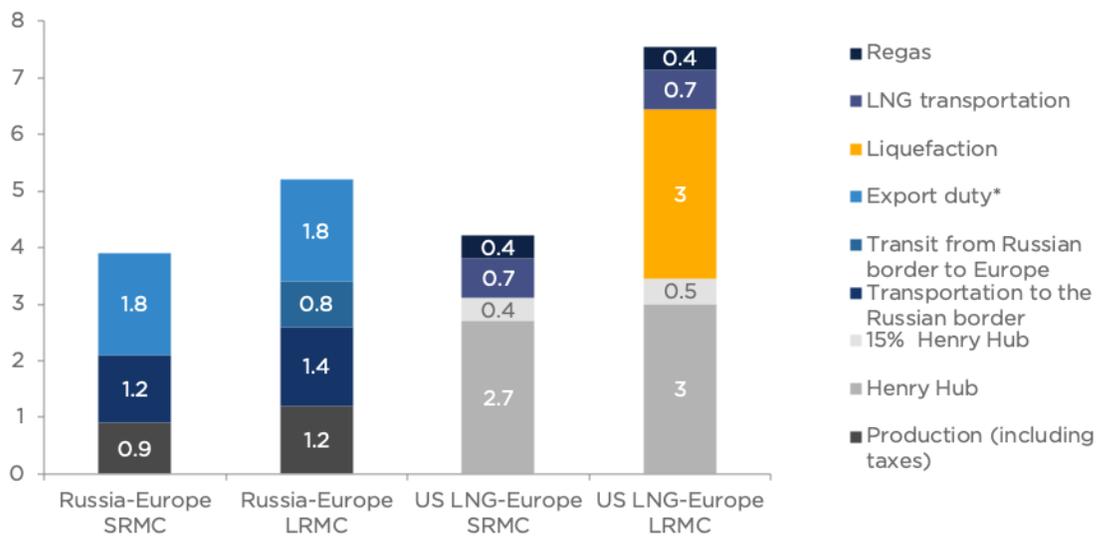
- The cost of gas production in western Siberia (including upstream taxes). As shown in figure 19, Gazprom has very low upstream costs—even now, after it made major investments in the entire infrastructure and development of the Yamal peninsula, thus securing the next generation of gas fields with low upstream costs. Russian ruble devaluation in 2014 helped to keep these costs low.
- Transportation from western Siberia to the Russian border at the current regulated tariff<sup>32</sup> costs on average 1.2 USD/MBtu (and again it benefited from ruble devaluation).
- Transit from the Russian border to Europe through Nord Stream 1 or through Yamal-Europe is organized on a “ship-or-pay” basis, which means the same sunk costs capacity fee as US liquefaction—so these costs could similarly be left out of the calculation.
- Export duty, which constitutes 30 percent of the gas export sales price. So if one assumes the price of gas in Europe to be 6 USD/MBtu, the export duty would be 1.8 USD/MBtu.

The results of this comparison are shown in figure 17—the SRMC levels of US LNG and Russian pipeline gas are indeed very close, but Russian costs are still lower (and could be further decreased through the next round of ruble devaluation).



It is interesting to compare SRMCs and LRMCS for Russian gas and for US LNG in Europe (figure 19). Both suppliers are able to significantly increase gas production at nearly the current cost levels (approximately 0.9–1.2 USD/MBtu for Russia and 2.7–2.9 USD/MBtu for the United States), but export infrastructure is becoming a sort of constraint, requiring additional investments. The USD-to-ruble exchange rate will play an important role in this cost competition.

**Figure 19:** SRMC and LRMCS of Russian pipeline gas and US LNG supplies to Europe (USD/MBtu)



Source: Nexant WGM 2018, Gazprom, Federal Antimonopoly Service

\*Export duty is applied to the sales price; in this calculation, it is assumed to be 6 USD/MBtu

## The Asian Market

### Asian Buyers Are Looking for Risk Diversification

Asian gas consumers, who are much more import dependent than Europeans, are more and more showing their desire to change old-fashioned business practices in gas trade in the region. Obviously, they are interested in diversifying their supply sources, but consumers are even more interested in mitigating their price risks. The availability of US LNG provides Asian consumers with a unique opportunity to receive gas from a new, reliable source at a price indexed to a different benchmark. Of course, US LNG has its own price risks—but these risks are different from the traditional oil-linked Asian LNG contracts. Together with the completely different business model (tolling schemes instead of integrated projects, high divertability, and volume flexibility—exactly what the Japanese Fair Trade Commission is trying to promote), US LNG is a very interesting option for Asian consumers.

This new approach is especially interesting for China (though its interest was significantly undermined by the trade dispute); unlike established LNG importers that import the bulk



of their cargoes under long-term contracts with fixed monthly volumes and a link to the oil market, many Chinese utilities buy LNG on the spot market when they need it on short notice, such as peak demand in winter. In this respect the business model of US LNG is a good match for the quite volatile and unpredictable nature of Chinese gas demand.

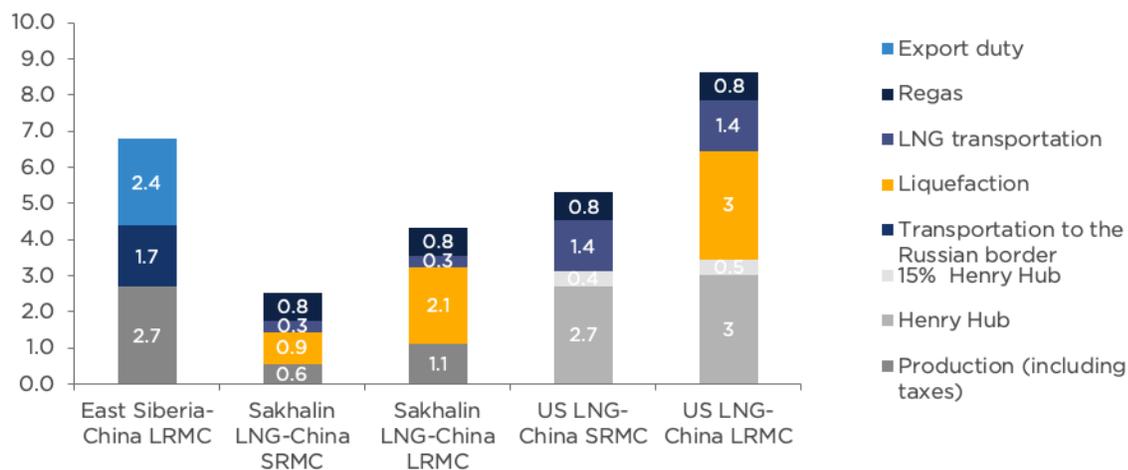
But Russian gas—both pipeline and LNG—is also an attractive option for Asian buyers: it is closely located, does not require lengthy maritime transportation, and allows for additional diversification of sources and price benchmarks.

### LRMC and SRMC Competitiveness

The Asian gas market, especially China, likely has the biggest demand growth potential in the world. China is soon set to top Japan as world’s biggest natural gas importer—in 2017 its LNG imports alone surged more than 50 percent.<sup>33</sup> Chinese ambitions to expand its gas use by switching from coal to gas in the cities—especially for residential use—has recently drawn gas demand up, making China the biggest prize for the different gas exporters. Thus, competition between gas from Russia, which is willing to diversify its export markets, and the United States, which looks at the Asian premium markets as its potential main source of margin, is nearly inevitable.

This competition should also be assessed in terms of LRMC and SRMC (with one significant difference compared to the European market: Russia does not have any established pipeline infrastructure in the region, so there is no SRMC for pipeline gas at all—figure 20).

**Figure 20:** SRMC and LRMC of Russian gas and US LNG supplies to Europe (USD/MBtu)



Source: Nexant WGM 2018, Gazprom

Basically, Russian gas (both pipeline and LNG) seems to be cheaper, so in the longer term it might have better prospects. But currently, because US LNG can be supplied at a lower SRMC, it is conquering the Asian market.



## Geopolitical Competition

Apart from the purely commercial considerations, there are also significant geopolitical consequences of the United States becoming one of the major players in the global LNG market. It would not only enhance traditional US dominance as the leading power of “Atlantism” (with its sea routes versus Russia’s “Heartland” position provided by onshore infrastructure), but it would also shift the balance of power in the global gas market, thus making the market (at least for a period of time) even more politicized than ever. It is tempting to view competition between Russian and US gas through this geopolitical lens.

To a large extent, development of this gas rivalry will depend on the United States’ own vision of its role in global gas trade: whether it is regarded as a purely commercial development driven by private companies, or whether it is viewed as a part of the country’s foreign policy. Will the United States give in to the temptation to become an energy superpower, or will it stick to its free market approach? In other words, will the United States remain firmly rooted in its support for open markets, or will it be driven by the White House’s geopolitical agenda?

Moscow could interpret recent statements from the United States to mean that Washington is following Russia in its rhetoric about being an energy superpower, utilizing gas as a tool for its geopolitical goals. A recent Atlantic Council paper suggests the following:

As an emerging energy superpower, the United States should take on a leadership role in the global natural gas markets to support its allies in Europe, contain its adversaries, and reshape relations with rising Asian powers. Potential uses of this resource policy could vary from coordinated efforts with allies to enact sanctions against energy exports of hostile powers to creating energy blockades vis-à-vis targeted states or relieving allies, who are cut-off from energy supplies by rival states. Overall, the recent shale revolution has provided the United States with the power to take a leadership position in the global gas sector and the geopolitics of gas.<sup>34</sup>

Outsiders could get the impression that the Trump administration is following a similar playbook. There are clear signs, including official statements that stress the role of LNG exports in promoting the United States’ geopolitical agenda. This may seem like a rather curious strategy, not in the least because Russia’s example has already demonstrated the limitations of this approach—not only for the country’s gas industry but also for the gas market as a whole.<sup>35</sup> To be sure, the authors do not anticipate that the US government will in fact intervene to disrupt market functioning. Rather, the authors think that rhetoric will continue, and meanwhile suppliers will find their customers in the global market place, albeit in Asia, Latin America, or Europe. However, such rhetoric is not always without impact, and can be interpreted falsely by others, in turn incentivizing bad policy decisions. It is important for policy makers everywhere, including the United States, to carefully craft statements, in order to avoid tit-for-tat decision-making, and zero-sum thinking.<sup>36</sup>

Of course, a relevant question to ask is: Who exactly decides to supply gas from the United States? Right now these decisions are chiefly made by private companies, global aggregators, and traders who add US LNG to their portfolio and then optimize this portfolio depending on the market situation. Moreover, in contrast to the Russian state-controlled energy companies,



US LNG suppliers would hardly be able to afford financing purely “political” projects and selling gas with losses. The very business model is designed in such a way that in an unfavorable market environment, LNG would either be diverted to markets that are more attractive or not produced at all. The most interesting question however, is whether Russian and US suppliers will engage in intense, exhausting competition.

### **Europe: Supporting European Energy Security or Marketing US LNG?**

There is a growing sentiment against Russian gas in Europe: since the transit crisis of 2009, politicians have been trying to reduce their countries’ dependency on Russian gas. Further events in Crimea and in eastern Ukraine have reinforced the already strong political motivation to reduce dependency on Russian gas. As Bousse and Locatelli point out, EU policy explicitly seeks to guard against dependence on Russian imports, which are seen as accounting for too great a share of the overall total.<sup>37</sup> More broadly, the EU seeks to mitigate the supposedly specific “Russian risk,” particularly after the gas crisis between Russia and Ukraine and the subsequent armed conflict between the two countries. With increased interest, European consumers are assessing every additional gas import option from other sources, and US LNG is very seriously being considered both by European politicians and by commercial companies.

The concept of the United States as a new energy superpower, promoted by President Trump, includes both traditional opposition to the Russian pipeline projects (such as TurkStream and Nord Stream 2<sup>38</sup>) and active political support of LNG exports to Europe. These arguments raise understandable questions: is the US administration really driven by the worries concerning European energy security, or is it inspired by the desire to market US LNG? It does seem like the current administration is pushing European countries to wean themselves off Russian gas and switch to American gas in a move that would benefit American companies. As the Trump administration is more bullish and vocal on this than the Obama administration, gas market development in Europe appears to be an issue in this administration in a way it wasn’t in the last. The authors are well aware of the fact that the views on European natural gas markets within various branches of the US government are nuanced, and that many well informed policy makers have spent endless hours distinguishing between the need to further develop and open up European gas markets on the one hand, and promoting US companies on the other. Yet all those efforts and nuances are easily lost on the wider public, when Secretaries and Presidents undo them when captioning personal views in a short press statement, or single Tweet.

According to some analysts, another way the United States could support energy-vulnerable states in Europe, Asia, and beyond is by sharing its know-how or financing feasibility studies for pipeline infrastructure, gas storage caverns, and LNG terminals. For example, Washington funded the initial feasibility study for Lithuania’s new LNG terminal in Klaipeda. Grigas asserts, “It is up to Washington to forge a long-term strategic vision, capitalize on the opportunities afforded by its new position in the natural gas markets, and reduce the risks for itself and its allies in this new era of geopolitics of gas”.<sup>39</sup> It is an interesting thought, though the authors are yet to be convinced that US taxpayers would be excited about footing the bill for actions that arguably European companies and, in case of market failure, policy makers are responsible for.

In this context it is not surprising that sanctions against Russian LNG (the Uzshno-Kirinskoe



field development at Sakhalin and Novatek) and the whole opposition against Nord Stream 2 (including the recent Countering Russian Aggression Act of 2017, which explicitly targets this pipeline) are regarded by Russian leadership as unfair competition against Russian gas. As Russian foreign minister Sergei Lavrov mentioned in his interview with Russian news channel TVC, commenting on Nord Stream 2, “There is a big battle going on: the United States wants to use the current situation in order to separate Europe from Russia economy-wise and bargain for the most favorable conditions for themselves in the context of the ongoing negotiations on the creation of a transatlantic trade and investment partnership”.<sup>40</sup> The Russian foreign minister said that such talks have been going for several years: “Europe has been persistent enough in defending its interests. According to the Europeans, the United States wanted to gain unfair profit. Now, however, these [US] efforts have intensified, including through the attempt to force Europe to purchase the American liquefied natural gas at prices that cannot be competitive with the price of the Russian gas. This was definitely motivated by economic interest. Still, geopolitical calculations play a huge role, a key one,” the minister said.

In the end the authors do not believe that increased political tensions and harsh rhetoric from either side help the credibility of natural gas as a fuel source. Considering the already daunting challenges that the global energy transition brings with it, this is an additional complication that the EU (and other parts of the world) could do without.

### Asia: Who Will Tame the Dragon?

Both for Russia and for the United States, a positive relationship with China—the world’s biggest economy, the largest energy consumer, and a rising geopolitical superpower—should be extremely important.

For the United States, increasing its energy exports to China would not only help to change the trade balance, but this increase could also become an important argument in the other complicated discussions (like those surrounding North Korea, the South China Sea, and some other issues). So it is not surprising that among the headline announcements from President Donald Trump’s first state visit to China was a nonbinding memorandum of understanding (MOU) for Sinopec, the Bank of China, and China Investment Corporation to join the Alaskan LNG megaproject.<sup>41</sup> The problem is that the commercial characteristics of this project are very weak—so this memorandum seems to be a sort of political courtesy, indicating that the United States has begun to play the same game as Russia does with China, signing numerous MOUs in order to demonstrate friendly relations. And all the recent trade disputes demonstrate how controversial these relations could be.

For Russia, supplying gas to China (primarily thanks to the 2014 megadeal, the “Power of Siberia,” with its 38 bcm pipeline construction, but also the other project, the 30 bcm “Altai” pipeline, which is again under discussion) would help to improve its complex relationship with China as well as to diversify export markets away from Europe, as Russia is looking for political diversity in a region that has a less antagonistic relationship with the Kremlin. This is not to say that the Asia-Pacific region offers a wealth of new political allies for Russia, but at least the countries there appear more open to doing business than those in Europe.<sup>42</sup>

Another key element of the pivot to Asia for Russia is the development of its own Eastern



regions. These have been largely neglected in the post-Soviet era, with the result that their population has declined and their economy has stagnated. Russian authorities are keen to reverse this trend, not least because it leaves Russia weakened in its relations with China, and Russia has therefore embarked upon a redevelopment program based on the construction of key infrastructure, such as oil and gas pipelines, in the region. If this foundation can be used to support the emergence of new industries and services in the region, there is some hope that the potentially pervading influence of China in eastern Siberia and Russia's far east can be contained.<sup>43</sup>

On a broader scale, expansion of trade with the world's fastest-growing economies is important for Russia's standing as a geopolitical player. Russia's oil and gas resources and exports play a key role in establishing the country's standing in the world, and in order for Russia to be a global energy superpower, it is obviously vital to be present in all the key energy-consuming regions. The absence of Asia as a major market for Russian commodities had become an anomaly that is now slowly being addressed, but further development of Eastern trade will continue to be an important theme for the foreseeable future. This can then offer Russia political and economic diversity and can remove some of the threat of isolation that is apparent in its current relations with the West.<sup>44</sup>

Generally, it seems that as Russia becomes more isolated geopolitically, it will find itself more dependent on China.

The Russian influence (driven by energy exports) will decrease in Europe and in CIS (with the further diversification of their supply options), while in Asia, due to US and Australian LNG, Russia will not be able to build such a uniquely dominant position as it has in Europe. The question is whether it is in the long-term interest of the United States to keep Russia isolated geopolitically.

## Fundamental Competition between the Two Institutional Systems

Now the competitiveness and overall attractiveness of Russian gas exports, for the first time ever, are compared with US gas exports: customers in Europe and in Asia now have a choice. In this situation, everything will play a role: not only costs and geopolitical image but also contractual flexibility; speed of decision making and getting approvals and permissions; the availability of investments, employers, and service companies; and the overall investment climate.

The evolving US LNG industry is now developing a brand-new institutional model (see the fundamental institutional differences between the two systems in table 1). It appears that the US system has much more flexibility and is driven by private capital, in contrast to Russia, where the decision-making process (even for private companies like Novatek) largely depends on the state.



**Table 1:** Comparison of the Russian and US gas export institutional frameworks

	United States	Russia
<b>Investment climate and cost of capital</b>	One of the most favorable in the world, low cost of capital.	One of the highest risks, high cost of capital.
<b>Upstream gas production</b>	Highly competitive market, very flexible production volumes due to the price elasticity of shale-gas production.	Predominantly megafields in western Siberia, which are technologically not very flexible; oligopoly of Gazprom, Rosneft, and Novatek in the upstream; Gazprom's monopoly in pipeline gas transportation.
<b>LNG/pipeline construction</b>	Due to a relatively short permitting process, low state involvement.	Long permitting process, state has decisive role.
<b>Project financing</b>	Private sector.	Government's decision and financial support.
<b>Contracts</b>	Completely new contractual system (tolling scheme instead of vertically integrated chain) and HH indexation (with all price risk transferred to the customer); new business model based on optionality and destination flexibility: LNG is able to flow to the region that has the highest prices.	Traditional LTCs with (partial) oil indexation, destination clauses (if possible), and MCQs.
<b>Gas export projects structures</b>	<p><i>Tolling model:</i> LNG plant does not take title to natural gas feedstock or LNG produced at the plant but provides liquefaction and processing services (Jordan Cove, Cameron, Freeport, Cove Point, Lake Charles, and Elba Island).</p> <p><i>Merchant model:</i> Project company that owns the liquefaction facility purchases natural gas from a third party and sells LNG to offtakers like Sabine Pass or Golden Pass (Miles 2013).</p> <p><i>Flexible LNG production volumes:</i> It appears that US LNG capacities will not be strongly utilized in a "normal market" situation, but they might be called upon during the "tight market" and higher prices. The United States might become a swing supplier, reacting on short notice, while the other producers will operate on higher-capacity utilization rates.</p>	<p><i>Integrated upstream model:</i> Participants own gas supply and pipeline (Gazprom)/LNG plant (Novatek) and market their own pipeline gas/ LNG.</p> <p>Production and export plans should be approved by the government in the "Energy Strategy" and "General Scheme of Gas Industry Development."</p>



<b>Decision-making process</b>	Fast and flexible, driven by the commercial rationale of private companies and banks.	Very much depends on the decisions of top leadership, thus requiring a long time.
<b>Who is responsible for marketing</b>	US companies have little share in the marketing of the LNG produced; mainly, it will be sold by the offtakers—global aggregators like Shell, BP, etc.; the main customers are aggregators, who will most likely mix this gas with more expensive LNG from the other sources.	A single export agency—Gazprom Export—is responsible for pipeline gas marketing for LNG; also, Novatek markets its Yamal-LNG volumes; all contracts have to be approved by the energy ministry.
<b>State involvement into export negotiations</b>	Became high under the Trump administration.	Traditionally high: gas export is regarded as a pillar of national security.

Source: Author

It will be very interesting to see how exactly these competing institutional frameworks will transform in the future. So far we can observe that the more liberalized US model starts to affect old-style Russia’s model, which is slowly changing and getting new features, such as hybrid pricing and spot pricing, development of trading activities, establishment of Gazprom’s own electronic trading platform, Novatek’s interest regarding LNG hub creation potentially with a FOB index in the Arctic and in the North Pacific, and other innovative ideas. The US gas industry is developing new approaches at the same time as well, with Tellurian eyeing the integrated model while Cheniere is preparing to develop the LNG FOB Gulf of Mexico index and futures contract with CME Group.<sup>45</sup>



# THE EMPIRE STRIKES BACK: RUSSIA'S POTENTIAL RESPONSE AND GAS EXPORT POLICY SCENARIOS

## Potential Financial Consequences for Gazprom and the Russian Budget

How painful could the consequences of stronger competition with US LNG be for Gazprom and for the Russian budget? Russian LNG exports to Japan are oil linked under LTCs, so there should be no direct implications for Gazprom's revenues, while Asian pipeline gas exports through the "Power of Siberia" project will only begin in 2020, thus adding to the current revenues of the company. This means that all potential losses would be related to the European market. As figure 8 demonstrates, an oversupply in the European market might drive Gazprom's revenues back to the lower levels of 2009 and 2016.

Lower revenues in Europe would be, of course, bad news for the company, which is already struggling with growing expenditures due to the need to simultaneously finance several extremely expensive pipeline projects. But Gazprom still has a low debt-to-equity ratio of 0.27, and such a decline in revenues will not be life threatening to the financial sustainability of the company.

Nor would it be catastrophic for the Russian federal budget, which is indeed very much dependent on the hydrocarbon revenues and taxes—but mainly from oil, not from gas (gas usually represents only 10–20 percent of oil revenues). And it has already demonstrated its resilience to the dramatic drop of oil and gas revenues, from 51 percent of the federal budget in 2014 down to 34 percent in 2016.

As mentioned above, the stakes are high for Gazprom as the company threatened by domestic competitors that are trying to undermine its exclusive position, so any visible loss of the market share and revenues in Europe will be immediately used in order to promote Gazprom's unbundling. But for the state and for the Russian gas industry, even the most pessimistic scenario is not that dramatic.

## Gazprom's Strategy in Europe Will Depend on the Market Conjuncture: Asian Gas Demand and Oil Prices

How would Russia react to this competition in Europe—would Russia ignore it and follow its old pattern, or would it try to adapt and change its own system? The Russian side does not add clarity to this discussion. So far the answer has been a "strategy of minor acceptable adaptation steps," but what are the other alternatives? What strategy might Gazprom adopt in its efforts to preserve its existing market share?

As Boussena and Locatelli stressed, the reality of Gazprom's market power in Europe is subject to many questions. Gazprom is certainly a major supplier of gas to the EU market. Yet despite its size, Gazprom has never been a price setter, as it only enjoyed limited market power in the competitive Northwest European market.



It has consequently had to adapt to the growth of free markets (spot markets and gas hubs) and a decline in demand since 2008 by making more or less substantial changes to its long-term contracts...Within the framework of TOP-type contracts, Gazprom has only a limited amount of leeway to manipulate prices, constrained by its obligations regarding supply and the price terms in its contracts. Once a TOP contract has been signed, Gazprom has little room for maneuvering, even if the contract allows for price review. The TOP clauses in long-term contracts also hamper any strategic behavior regarding volume. Suppliers are required to guarantee the minimum deliveries stipulated in the contract, limiting their ability to influence prices by restricting the volume they export.<sup>46</sup>

Despite Gazprom's very real determination to diversify into Asia, its strategic goal is still—perhaps surpassing any consideration of revenue—to preserve (or indeed increase) its share of the European market. Over and above any concern for profit, this objective reflects the strategic goals of the Russian state, Gazprom's main shareholder.

Indeed, as Gazprom Export CEO Elena Burmistrova said at the FLAME Gas Conference in May 2017 (reiterated in May 2018), Gazprom's target is to preserve 33 percent of the European market: “Our strategic task is to keep a one-third share of European consumption and we will carry out the strategy in a peaceful way without a price war.” There are two important takeaways in this phrase: (1) Gazprom is not looking to expand its European market share, and (2) it has learned its lesson—the company will no longer fight for high gas prices as it did in 2009–2011, losing the market share (down from 30 percent before 2008 to just 23 percent in 2009) as a result.<sup>47</sup>

To preserve its market share in Europe, Gazprom must strike a balance between prices and volume. Initially (in 2008–2012), the firm opted to give priority to prices, but as Gazprom lacked real market power in the key market of northwestern Europe, this behavior resulted in a substantial drop in overall market share. Responding to this setback, Gazprom sought to restore its competitive edge through contractual adaptation by increasing its share of spot indexation.<sup>48</sup> Since that time Gazprom is revising its pricing strategy in order to keep its contractual prices competitive with the spot prices that allowed it to increase its market share up to 35 percent in 2017.<sup>49</sup> So how will this balance between price and volume evolve in the future?

The authors' analysis suggests that Gazprom is not trying to develop one single strategy but rather is very closely following market development in order to adjust properly to this changing environment, with its primary goal to sustain its current market share. In addition, Gazprom hopes to maximize revenue generated by its 33 percent of the market. So its future strategy will mainly depend on the market scenario. Any gas glut (whether it will happen and how long it will last before the market rebalances) as well as oil price level will be the key market factors that define Gazprom's negotiating position in Europe in the next 5–10 years (table 2).



**Table 2:** Gazprom's strategy scenario matrix

	Low oil price	High oil price
High Asian demand (no LNG glut)	NO CHANGE/MANIPULATION (voluntarily limiting supply in order to increase prices)	AVOIDING COMPETITION (voluntarily decreasing contractual prices)
Weak Asian demand (LNG glut)	ADAPTATION (voluntarily decreasing contractual prices and creating demand)	ADAPTATION (voluntarily decreasing contractual prices and creating demand)/ PRICE WAR (voluntarily increasing supply in order to drop prices and crowd out competitors)

Source: Author

## No Change/Manipulation

Of course, there is always the option to keep things as they are, which so far seems to be preferred by Gazprom and the government. And it could well be that if Asian gas demand stays high, this scenario would be the most reasonable choice for Gazprom.

In the case of high Asian demand and low oil prices, gas demand in Asia would keep rising, spot prices in Asia would increase, and new LNG would be absorbed by this premium market without significantly interfering with the European supply-demand balance. As long as opportunities to sell LNG to Asia exist, US LNG will primarily go there, thus not challenging Gazprom's position in the European market. There will of course be some US LNG sent to Europe sporadically, but the price differential in Asia will be more attractive for the aggregators.

In this scenario Gazprom actually would not need to adjust its export policy and prices (if oil-linked prices remain below spot prices, as was the case for a period of time in 2017). In certain situations Gazprom might even slightly manipulate the market by limiting supplies in order to drive prices up and to increase its rent—but very cautiously, as this might lead to demand destruction and prompt new FIDs on US liquefaction capacities.

## Avoiding Competition

Global oil price dynamics will determine the gap between LTCs and hub prices, as well as the attractiveness of LNG export to Europe from the US: the higher the margin, the more stimulus for the US LNG offtakers to increase export volumes to this destination. In the scenario of high Asian demand and high oil prices, Asia would generate a slightly higher margin for US LNG, but due to high oil prices, the European market could also be very attractive for the aggregators: US LNG would be fairly competitive in this price environment. In the longer term, high prices will incentivize new FIDs on US liquefaction capacities.

In this scenario Gazprom's position would initially be well protected by gas deficits in the short to medium term, while high oil prices and booming demand in Asia would keep



revenues at reasonable levels. But as in the longer-term case, high prices will attract more competitors to the markets, so it is important for Gazprom to keep its own prices in a corridor that would avoid competition and keep the margin of the aggregators supplying European markets below their margin in Asia. As Bros wrote, “To remain in a tunnel between an EU floor and the incentive for new gas by swinging supply to adjust to demand—this option so far is the best one for long term rent-maximization.”<sup>50</sup>

And as Boussea and Locatelli correctly point out, until the complete liberalization of the EU gas market, Gazprom is in a position to create uncertainty about the price of natural gas instead of simply starting a price war. Thanks to several comparative advantages—primarily the size of its reserves, the proximity of its current markets, and its spare capacity—it remains a key player in the EU gas market.<sup>51</sup> However, to successfully play on future price uncertainty, Gazprom will need to make significant changes to its policy on exports, its contracts in particular. For Gazprom, one of the priorities will be to reduce, as far as possible, the predictability created by the current form of these contracts.

There are already almost no “pure” oil-linked contracts left—Gazprom in Europe mainly has hybrid pricing—but this scenario will require a more fundamental shift in pricing, with the share of spot becoming dominant. Put simply, Gazprom might remain in its current position if it is not too greedy.

### **Adaptation and More Proactive Market Strategy**

During the last decade, Gazprom played the role of a residual supplier to EU hubs, a passive swing producer on the spot markets<sup>52</sup>, or, in the terms of Stern and Rogers, as the “buffer or shock-absorber in the new global order.”<sup>53</sup> As a result Gazprom had a passive role, obliged to align its prices with those set elsewhere in free markets.

In a scenario of low Asian demand and low oil prices, the market conjuncture might become so unfavorable for the company that it would have to go for stronger adaptation and much more proactive market-oriented behavior.

In this scenario, Asian markets would not be able to absorb additional LNG supplies, and a significant portion of the volume might end up in Europe, creating the situation of a large oversupply and strong competition at the level of SRMC (about 4 USD/MBtu)—at least in the medium term. US LNG supplies will likely put a ceiling on the European gas prices: when European hub prices exceed HH + 1.5 USD/MBtu level, it will be a clear signal for the US LNG offtakers to increase supplies to Europe. On the other side, as the economics of US LNG exports are based on a wide differential between domestic gas prices and global oil prices, these low prices, stagnant global demand, and an oversupplied market will make it difficult for additional US LNG export projects to reach FIDs.

This scenario will force Gazprom to pursue further significant adaptation of its LTCs in order to keep its contract prices competitive with the SRMCs of US LNG. And simultaneously it will incentivize the company to use more proactive marketing approaches, developing new markets (both in Asia and in Europe), employing more flexible and creative marketing, and improving the efficiency of all its operations. Ideally, this scenario requires a dramatic change in the gas



industry structure domestically, and in order to keep the market share in this environment, Russia must completely refrain from using its “gas weapon” as a blackmailing tool.

In this scenario if Gazprom still tries to keep its former approach, losing the market, it might finally force the authorities to pursue further export liberalization. Novatek and Rosneft could become powerful new players, ready for spot indexation and more flexible behavior. Novatek will most likely promote an aggressive LNG export strategy—it claims that its LNG production potential in the Yamal and Gydan peninsulas is over 70 mtpa. If the company is able to build strategic cooperation with China, it will not only get a strong position in this growing market, but it will also be able, together with Chinese equipment suppliers, to develop downstream markets in the countries of non-OECD Asia. So its adaptation strategy is also related to increasing competition between domestic market players, opening access for international companies, and optimizing its project portfolio from its less-efficient gas projects, decreasing state tax offtake, and creating more flexible market behavior and pricing.

Given the scale of its sales to Europe, Gazprom could become one of the most influential spot market players. But it has so far avoided any large-scale intervention in such markets, preferring to secure its sales through long-term contracts.<sup>54</sup> In this adaptation strategy, Russia might voluntarily move to complete spot indexation, simultaneously trying not only to find new market niches for its gas but also to create new demand.

### **Adaptation/Price War**

In the scenario of low Asian demand and high oil prices, not only adaptation (voluntarily decreasing contractual prices and creating demand) but also the more aggressive strategy of starting a price war could be potentially applied. At high oil prices, US LNG exports to Europe would become very profitable, and in the case that Asia is not interested in higher gas imports, the main volume of US LNG will target Europe, creating an extremely tough environment for Gazprom.

The question that many analysts asked during the last couple years was whether Russia would follow KSA’s strategy in 2014 and flood the market in order to crowd out US liquefaction capacities and destroy any incentive for the new FIDs on US LNG plant construction. There are some objective preconditions for such an approach: Russia is indeed one of the lowest-cost gas suppliers, and Gazprom has sufficient reserves for margin reduction in order to engage in price competition.

In this scenario Russia would feel pressure from the increased competition not only from the United States but also from all existing low-cost LNG suppliers (first of all, Qatar), which may have to switch their supplies to Europe and keep gas prices at a low level. In order to protect its market share, Gazprom will have to engage in this price competition as well, flooding the market using spare capacities and driving the prices down to the level of its SRMC, which will disincentive US LNG aggregators to offtake this LNG.

It should be noted, though, that MCQs under LTCs would be not affected (volume-wise) by this possible “war” between US LNG and Russian gas—so for Russia the war would result mainly in lower prices but not significantly lower volumes.



In 2015, after the opening of the Lithuania regasification terminal, Gazprom already responded in this way by discounting the price of its gas by 23 percent. So by further cutting prices, it could manage to shut in to-be-opened US liquefaction. A price war would also impact the Energy Union's strategy, as it would reveal the real cost of diversification of supply. To implement this hypothesis, Gazprom would need to decide to use its spare production capacity to push more volume on the spot/hub markets in Europe on top of its contracted gas.<sup>55</sup>

Gazprom has enough volume flexibility (~100–120 bcm), as there are considerable underutilized upstream capacities and projected spare transportation capacities (after TurkStream and Nord Stream 2 become operational), allowing for price dampening in order to keep European prices below the level acceptable for US LNG suppliers. And as shown in figure 20, it has both a lower LRMC and SRMC, so its costs allow it to engage in price competition.

But there are also some important tradeoffs in this strategy that will most likely make it unacceptable for the Russian leadership.

First of all, in order to drop the prices and to pump all this additional gas to Europe, Russia will have no other choice than to use the Ukrainian route, which it is trying to avoid for the obvious geopolitical reasons. In terms of commerce, Ukrainian transit might be more expensive—it means higher transportation costs, thus further increasing Russian losses from this strategy (while—surprise—Nord Stream 2 construction will increase opportunities to dampen prices).

Secondly, European gas demand price elasticity is very low—as the market response to the recent twofold gas price decline shows—so price dampening will result in further revenue loss for Russia. At the same time, US LNG projects are large scale, driven mainly by big companies under long-term capacity agreements—they will not disappear from the market in one to two years. So in order to get rid of US LNG, Russia would have to keep low prices for much longer, which would be too painful.

Finally, this decision requires resoluteness, prudence, and the ability to take the risk of sacrificing short-term revenue in favor of long-term strategic benefits. Russia must also have enough strength to protect the chosen strategy. Gazprom's top management is very cautious when it comes to its politically sensitive gas export policy: they must wait for orders from the Kremlin to make serious strategy adjustments. Only the president himself can make such a decision, but he is busy enough with other problems, so he will pay attention to this issue only when it becomes pressing.

For Gazprom and Russia, this is the least preferable scenario associated with low revenues—Russia does not seem to be interested in initiating this price war; it could only be a response. This strategy could also be applied sporadically in order to compensate for high oil prices and corresponding gas demand destruction.

At the same time, this does not mean that this strategy would never be applied. There could be geopolitical circumstances in which Russian leadership (not Gazprom) could decide to play this card; for example, if new sanctions are applied and the US-Russian relationship further deteriorates. Then, at a certain point, for purely political reasons, the gas market might become a battlefield—if Russian leadership decides to show the Americans who the real master of the European gas market is.



## CONCLUSION

Russia is in a good position to defend its market share in Europe, but this defense will require a very cautious policy, depending on how the global gas market develops. US LNG (as well as the expected LNG glut—if it really happens) does not seem to represent a real financial threat to Gazprom or to the Russian Federation. Of course, in certain scenarios US LNG might drive Russia’s gas export revenues down to the revenue levels of 2009 or 2016, but this would not be a catastrophe.

Loss of a significant argument in its relationship with gas-consuming countries in Europe is the most unpleasant consequence of advancing US LNG for Russia. The country is used to applying this gas argument in different negotiations on the state level, and now, for the first time, there will be an equal counterargument: the existence of US LNG as an alternative, which is increasing liquidity and competitiveness in the globalizing LNG trade.

If this competition between Russian and US gas develops in the commercial dimension, it will speed up the process of the global gas market’s formation, changing the conventional practices of the international gas trade via new contract configurations and “UBERization” of LNG trade, with buyers dispatching LNG cargoes from a liquid global market whenever they need one. Overall, the market will become much more efficient and liquid.<sup>56</sup> Theoretically, one can even imagine a “cooperative scenario,” with the development of swap and arbitration operations involving both Russian and US companies.

In this case, at the end of the day the role of politics will diminish, and gas markets will have the upper hand in the gas trade. Greater flexibility and liquidity would allow for a more efficient way of mitigating various crises and supply disruptions across the globe, removing this “security risk” component from the public perception of gas. Another much more negative scenario would be if the United States follows the Russian example of trying to manipulate gas transactions in order to achieve its geopolitical goals, as unlikely as that seems at the moment. Most likely this would provoke the next downward turn in the security spiral, further damaging the public’s perception of gas and undermining business for both countries.



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## NOTES

1. For example, Jason Bordoff and Trevor Houser, from the Center on Global Energy Policy, addressed this issue in their 2014 paper “American Gas to the Rescue? The Impact of US LNG Exports on European Security and Russian Foreign Policy.” Since then global gas markets have experienced an unprecedented price collapse driven by the declining price of oil—and later, its recovery, accompanied by booming Asian gas demand. Many other researchers contributed important work on this topic, including James Henderson (2012), Thierry Bros (2016), Agata Łoskot-Strachota (2016), Bud Coote (2016), Anne-Sophie Corbeau and Vitaly Yermakov (2016), and Sadek Boussena and Catherine Locatelli (2017), along with some others.
2. The United States was supplying LNG from Alaska to Asia, and by 1980 it had already terminated LNG supply contracts from Algeria and Libya.
3. The German economy minister Karl Schiller and his Soviet counterpart signed an accord linking the Ruhrgas and Gazprom monopolies and Deutsche Bank for the following project: in exchange for the FRG receiving supplies of 0.5 bcm of gas per year in 1973 and 3 bcm per year beginning in 1978, the USSR would get 1.2 million tons of high-pressure pipes manufactured by Mannesmann, plus a very advantageous loan of 1.2 billion Deutsche Marks.
4. The Coordinating Committee for Multilateral Export Controls was an international organization that aimed to control the export of strategic products and technologies to banned locations. It was made up primarily of NATO member states, as well as other countries such as Japan and Australia.
5. For more on the evolution of Transatlantic perspectives on EU energy security, see Elkind, J., and Boersma, T., 2018. Talking Past Each Other: Transatlantic Perspectives on European Gas Security. Center on Global Energy Policy commentary - [https://energypolicy.columbia.edu/sites/default/files/pictures/TalkingPastEach%20Other\\_CGEP\\_FINAL.pdf](https://energypolicy.columbia.edu/sites/default/files/pictures/TalkingPastEach%20Other_CGEP_FINAL.pdf).
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States was mentioned as a target market in the energy strategy of the Russian Federation through 2030. In 2006, the Gazprom Marketing and Trading USA company was established to help the Gazprom Group penetrate the US market, carry out trade, lease transportation and regasification capacities, and purchase LNG. In October 2009 GM&T USA began commercial operations in North America.

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Tatiana Mitrova (2016) Shifting Political Economy of Russian Oil and Gas. CSIS. <https://csis->



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