

Simola, Heli; Solanko, Laura

Research Report

Overview of Russia's oil and gas sector

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Heli Simola and Laura Solanko

Overview of Russia's oil and gas sector



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Heli Simola and Laura Solanko
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Bank of Finland
BOFIT – Institute for Economies in Transition

PO Box 160
FIN-00101 Helsinki

Phone: +358 9 183 2268

Email: bofit@bof.fi
Website: www.bofit.fi/en

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Heli Simola and Laura Solanko

Overview of Russia's oil and gas sector

Abstract

This overview is a compilation of ten concise articles that give a general picture of the current situation and prospects of Russia's oil and gas sector. The articles are independent and together they give a rich overview of the development of the oil and gas sector and the significance of the sector in the Russian economy. The oil sector generates more export and tax revenue for Russia, but the gas sector plays a key role, particularly from a domestic market perspective. In the next few years, Russia's oil production and exports are expected to grow slowly at best, because a stronger increase in production would require more investment. In oil production and particularly in exports, the focus of growth has shifted eastwards, and China has become one of Russia's most important export markets. Growth of natural gas production, on the other hand, is limited more by demand than supply factors and gas production will remain focused in the future on its present locations in Russia's Arctic regions. Despite plans, the export market for natural gas will still be mainly in the West, due to limited transport infrastructure. Examination of both the Russian and the international oil and gas sector is complicated by statistical peculiarities.

Key words: Russia, oil, gas, LNG, production, foreign trade, public finances, China, Arctic region

1. Introduction

Oil and natural gas have been a key part of the Russian economy for decades, even though Russia is, strictly speaking, not an oil state. It is difficult to assess accurately the importance of oil and natural gas for the Russian economy but, according to the latest estimates, oil and natural gas have accounted for approximately one fifth of Russia's GDP¹ in the 2000s. They have accounted for nearly 30% of consolidated budget revenue and over half of export revenue. The largest Russian companies operate in the oil and gas sector, and their weighting in the Russian stock market index amounts to more than half. Both the Russian stock market and the ruble exchange rate therefore closely follow the development of the oil price. From a labour market perspective, the significance of the oil and gas sector is, in contrast, small: production and transport of oil and gas as well as the oil refining industry employ approximately one million people in Russia, i.e. 1.5% of the employed.

As the oil and gas sector is so important for Russia's economic development, this collection of articles seeks to shed light on its current state and on several related special issues. The collection consists of ten concise non-technical articles. The articles are independent, but they complement each other in many respects, and together provide a rich overview of the Russian oil and gas sector. The first articles focus on the oil sector and the following articles deal with natural gas. Finally, a number of specific topics, such as taxation, are examined from the joint perspective of the oil and gas sector.

¹ For problems related to measurement and comparison of different estimates, see e.g. Simola, H., Solanko, L. and Korhonen, V. Perspectives on Russia's energy sector, BOFIT Online 2/2013; longer-term development has been assessed by e.g. Kuboniwa, M. Estimating GDP and foreign rents of the oil and gas sector in the USSR then and in Russia now, BOFIT Policy Brief 10/2016.

2. Oil production and exports are expected to grow slowly at best

2.1. Increasing oil production requires investment

Russia's oil production during the last decade has grown on average at an annual rate of one per cent. Growth has slowed markedly compared to the first years of the millennium, as the production of the traditional largest fields in Western Siberia has begun to decline. The introduction of new fields in the Russian Far East, Eastern Siberia and the Arctic region has replaced the production of the traditional fields, but this has not been sufficient to maintain the previous growth rate. Investment in new production has been constrained by, among other things, high taxation of oil production and exports as well as the higher political risks associated with the sector following the Yukos case in the early 2000s.

Russia's oil production is dominated by 11 vertically integrated companies, whose share of oil production is nearly 90%. The largest of them is majority state-owned Rosneft, whose share of oil production has grown significantly in recent years through the acquisition of other companies in the sector. Including its most recent acquisition, Bashneft, Rosneft accounted for nearly half of Russia's oil production last year. In addition, nearly 200 smaller companies operate in the oil production sector as well as three foreign companies within the framework of production-sharing agreements.²

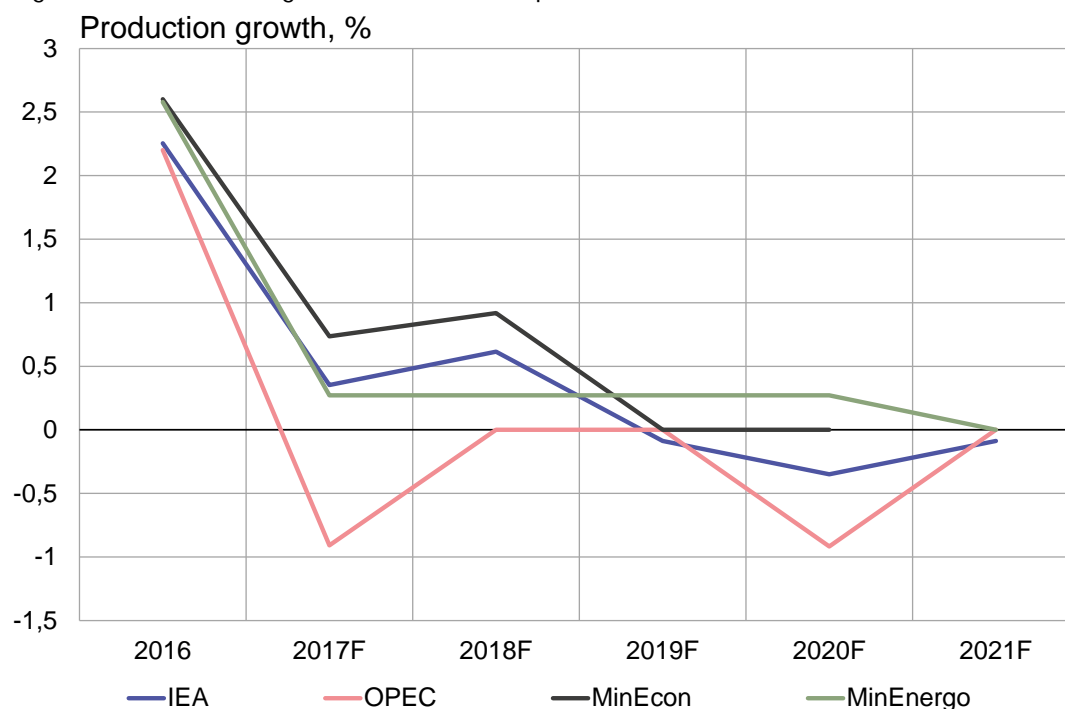
Most experts, both international and Russian, have for a long time now expected the country's oil production to begin to decline, so the continuation and even an acceleration of growth in last couple of years has come as a surprise to many of them. The decline in production of the traditional fields has been contained by better-than-expected improvements in production efficiency, and replacement production has been obtained from new fields more quickly than expected. Most forecasts, however, still expect production growth to at least level off in the next few years and for production even to decline (Figure 1)³.

It is expected that it will be possible to improve further the production efficiency of traditional fields, but this will become increasingly difficult and expensive, so investment would have to be increased. Production of many of the newer large fields is estimated to have already reached its peak level, so they, too, will no longer be able to maintain growth in the coming years. Completely new fields will be continually developed, but bringing them on-stream will take time and require investment. In recent years, the investment required to maintain growth has been limited by the decline oil prices, greater difficulty in obtaining financing, and the Western sanctions, which restrict the scope for purchasing the technology needed in oil production from abroad. The sharp weakening in the ruble, however, has significantly softened the impact of the decline in oil prices on Russian oil companies. In recent years, too, investment in oil and gas production has increased at a reasonably brisk annual rate of just over 10% (nominally), but due to high inflation the real growth of investment has been modest.

² Ministry of Energy of the Russian Federation 20.4.2017

³ IEA Oil Market Report 2017, Henderson & Grushevenko (2017).

Figure 1. Forecasts for growth in Russia's oil production, %.



Sources: IEA Oil Market Report 2017, OPEC World Oil Outlook 2016, April 2017 economic forecast of the Ministry of Economic Development of Russia, draft energy strategy up to 2035 of the Ministry of Energy of Russia.

2.2. Oil exports increasingly directed to Asia

Slightly more than half of Russia's crude oil is domestically refined and the rest is exported. In the 2000s, the proportion of domestically refined crude oil gradually increased as output of refined petroleum products grew – that is until recent years, when the trend has been reversed. Of refined petroleum products, gasoline production has been supported particularly by growth in domestic demand, because gasoline production goes mainly to domestic consumption. Unlike in many other oil producing countries, in Russia the consumer price of gasoline and other petroleum products is not subsidised nor regulated administratively⁴; on the contrary, they are taxed relatively heavily. For example, in a Bloomberg⁵ international comparison, the price of gasoline in Russia was among the lowest at the end of last year, but relative to average income it was significantly higher than in most European countries (including Finland).

An effort is also made to control the structure of oil sector production through taxation. In the early 2000s, the goal was to increase domestic refining as well as the share of refined products in exports instead of crude oil. The goal succeeded, in principle, because exports of crude oil declined and exports of petroleum products grew. Refined products produced for export were, however, mainly very low added value products, and the price obtained for them could be even lower than for crude oil exports.

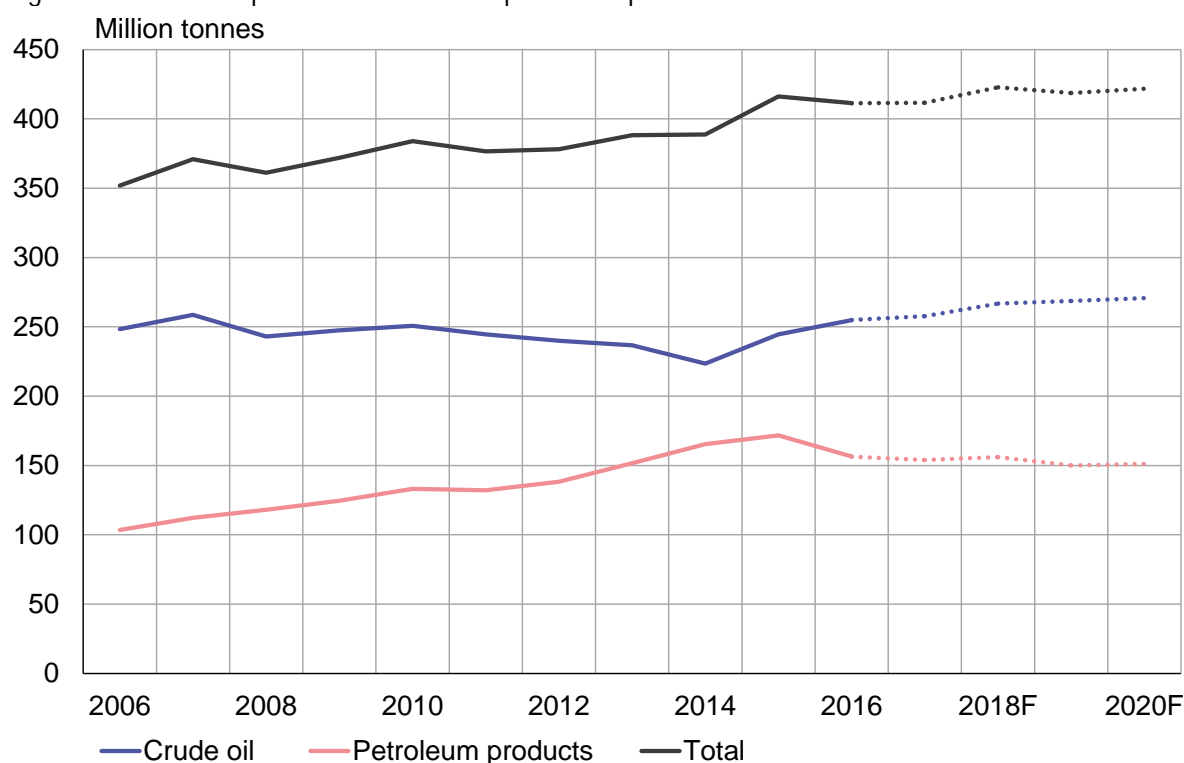
The aspiration was to direct production to more highly refined products, so taxation was again adjusted. During the last couple of years, production and exports of low added value petroleum

⁴ Temporary restrictions on increases in the gasoline price have been imposed from time to time, however, when the price has risen sharply.

⁵ Gasoline Prices around the World: The Real Cost of Filling Up, Bloomberg 16.1.2017.

products have begun to decline significantly, whereas exports of crude oil have increased. During the past decade, the combined volume of Russia's crude oil and petroleum products exports has grown by just under 2% per year, while the export trends for crude oil and petroleum products individually have been mainly in opposing directions (Figure 2). In the next few years, Russia's oil exports are expected to increase moderately at best, as output growth is limited, and domestic demand is gradually increasing as the economy recovers from the recession of recent years.

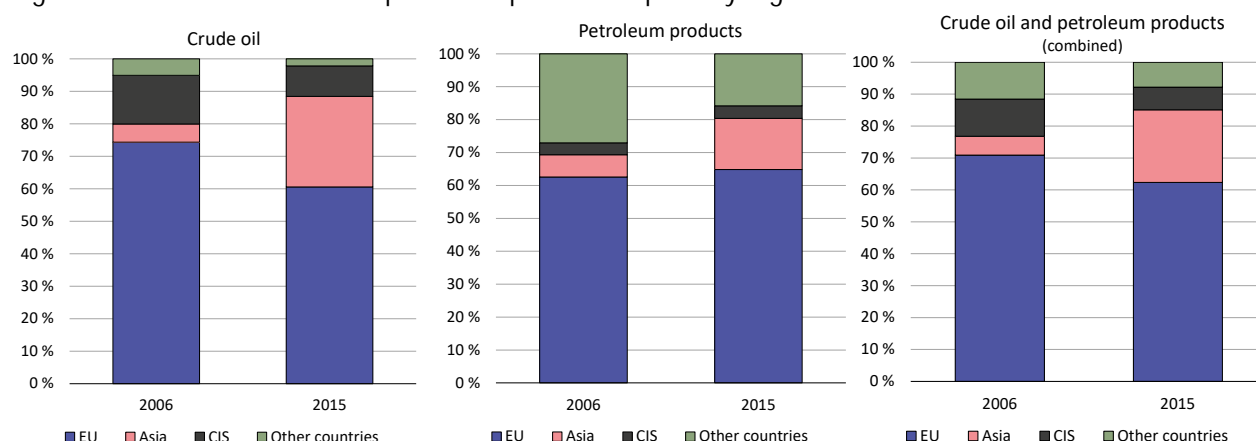
Figure 2. Russia's exports of crude oil and petroleum products



Sources: Central Bank of Russia, Ministry of Economic Development of Russia (forecast).

Geographically, there have been significant changes in Russian oil exports over the last decade. The proportion of crude oil exports accounted for by EU and CIS countries has markedly declined, while the proportion going to Asia has correspondingly increased (Figure 3). Changes in exports of petroleum products have been smaller. Here, too, Asia's share has grown, while the shares of EU and CIS countries have remained nearly unchanged. The EU, however, remains Russia's largest oil export market, accounting for just over 60% in exports of both crude oil and petroleum products. Russia's share of the EU-28's combined crude oil imports (from outside the EU) has, on the other hand, remained at around a third throughout the past decade, and in imports of oil products it has fluctuated between 40% and 50% annually.

Figure 3. Russia's crude oil and petroleum products exports by region in 2006 and 2015.



Source: UN Comtrade

There are many factors behind the change in the geographical structure of exports. Oil demand has grown significantly faster in Asia (particularly in China) than in Europe. Russia's new oil production regions are located mainly in Eastern Siberia and the Russian Far East, so it is significantly less expensive to transport their production to the closer Asian market. With the onset of production from the new oil fields, Russia has also built the transport infrastructure necessary for this, particularly the Eastern Siberia Pacific Ocean (ESPO) pipeline, which was commissioned in 2009. Through the pipeline, oil produced in Eastern Siberia can be transported to the Port of Kozmino for forward shipment as well as directly to China via a branch pipeline. After the opening of the China branch, Russian oil exports to China have multiplied, and China has become one of Russia's most important oil export markets. Due to the same factors, Asia's share of Russian oil exports is likely to continue growing gradually in the coming years.

3. Oil statistics are not clear-cut

Although oil is generally perceived to be a rather uniform product, practices vary in the definition and statistics of its production. Oil production can only include pure crude oil or, in addition, lease condensates, natural gas liquids (NGL) and sometimes even oil produced by unconventional methods (e.g. shale oil).⁶ Particularly in international comparisons, differences in production figures may also arise from the use of different units of measurement and conversion coefficients. Amounts of oil are measured both in tonnes and barrels, and different grades of oil must be converted from one unit of measurement to the other using coefficients that differ slightly from one another. Conversions based on average coefficients may give rise to inaccuracy also on a national level, if various grades of oil are produced in a country, as is the case in Russia⁷.

Due to differences in statistical practices, the oil production of different countries can be difficult to compare. As an example, consider the question of which country was the world's largest oil producer in 2014. The answer to this question depends on the statistics used (Table 1). If crude oil production alone, without gas condensates, is considered, the answer is Russia. If gas condensates are included and production is measured in barrels, then the answer is the United States. If, in turn, gas condensates are taken into account, but production is measured in tonnes, the largest producer becomes Saudi Arabia. Statistical differences do not, of course, always give rise to corresponding difficulties (e.g. in 2015 Russia was the world's third largest oil producer according to all of the above-mentioned statistics), but it is good to take them into consideration in comparisons⁸.

Table 1. Oil production of largest oil producing countries in 2014, based on various statistics

	OPEC (excl. cond.), 1,000 barrels/day (% share)	BP (incl. cond.), 1,000 barrels/day (% share)	BP (incl. cond.), million tonnes/year (% share)
Saudi Arabia	9,713 (13.2)	11,505 (13.0)	543.4 (12.9)
Russia	10,088 (13.8)	10,838 (12.2)	534.1 (12.6)
United States	8,708 (11.9)	11,723 (13.2)	522.8 (12.4)
World	73,331	88,834	4,228.7

Sources: OPEC Annual Statistical Bulletin 2016, BP Statistical Review of World Energy 2016.

Russia's official production figures also deviate slightly from international statistics (Table 2). International statistics apparently take gas condensate production slightly more broadly into account than Russia's own statistics, because they are regularly higher. It is unclear, however, why the production figures published by Russia's Federal State Statistics Service (Rosstat) and the Russian Ministry of Energy also differ slightly from one another, since it is reported that both include gas condensates, and both are expressed in tonnes. Rosstat and OPEC publish production figures for Russia both excluding and including gas condensates. Calculated on the basis of these figures, gas condensates have accounted for 5–7% of Russia's total oil production in recent years. During the past decade, gas condensate production has grown significantly more quickly than ordinary crude oil production, but annual fluctuations in production have also been significantly greater.

⁶ JODI Oil Manual

⁷ See, for example, the interview with Energy Minister Novak, Interfax 17 February 2017 (<http://www.interfax.ru/business/550199>)

⁸ For example, the production figures of various countries published in the IEA's annual Medium Term Oil Market Report and monthly Oil Market Report are not in all respects fully comparable. The production of individual OPEC countries is reported excluding gas condensates, and the combined gas condensate production of all OPEC countries is reported separately, but the production figures of other countries include the IEA's estimate of gas condensates production.

Table 2. Russian oil production (incl. gas condensates) based on various statistics, million tonnes (million barrels/day)

	2011	2012	2013	2014	2015	2016
Rosstat	512.4 (10.3)	518.7 (10.4)	521.7 (10.5)	526.1 (10.6)	533.7 (10.7)	549.0 (11.0)
Russia's Ministry of Energy	511.4 (10.3)	518.1 (10.4)	523.4 (10.5)	526.7 (10.6)	534.1 (10.7)	547.3 (11.0)
IEA	527.8 (10.6)	532.8 (10.7)	542.8 (10.9)	542.8 (10.9)	552.7 (11.1)	562.7 (11.3)
OPEC	517.8 (10.4)	522.4 (10.5)	529.6 (10.6)	531.6 (10.7)	540.1 (10.8)	552.2 (11.1)
BP	518.8 (10.5)	526.0 (10.6)	531.1 (10.8)	534.1 (10.8)	540.7 (11.0)	

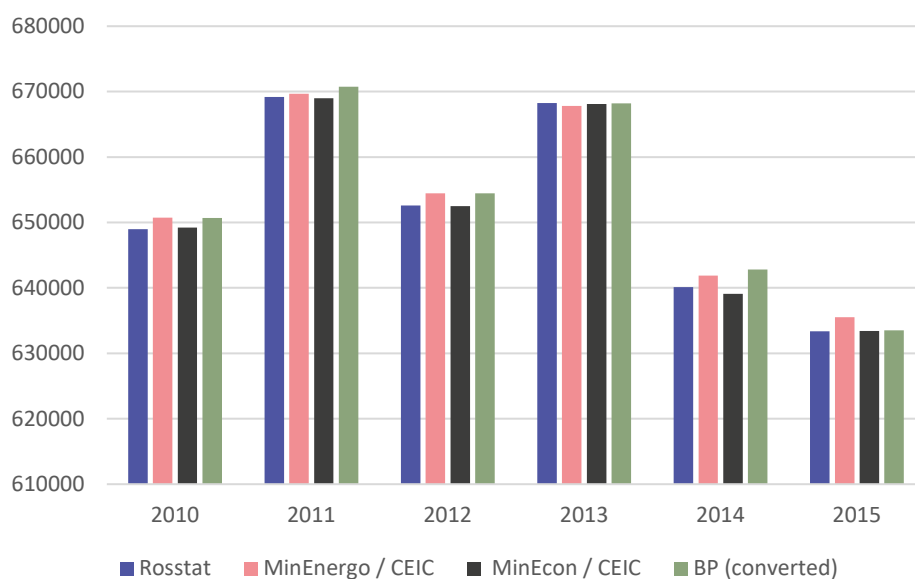
Note: Rosstat and the Russian Ministry of Energy report figures only in tonnes, OPEC only in barrels, BP in both tonnes and barrels. For the IEA, the source used here are the Oil Market Report publications, where figures are expressed in barrels. The IEA uses the Russian Ministry of Energy's figures as the basis for its statistics, adds to them its own estimate of condensates etc. and converts tonnes into barrels using a fixed coefficient. In this table, too, tonnes/year have, where necessary, been converted into barrels/day using the average coefficient used by the IEA, namely $X \times 7.33/365$ (and vice versa).

Sources: Rosstat, Russian Ministry of Energy, IEA Oil Market Report publications, OPEC Annual Statistical Bulletin 2016, BP Statistical Review of World Energy 2016.

4. Gas production follows fluctuations in demand

Publicly available statistics on Russia's gas production are generated by at least three bodies: the Federal State Statistics Service (Rosstat), the Ministry of Energy and the Ministry of Economic Development. The figures they produce are approximately the same on an annual basis, but the monthly variation between the different sources can be very large. All the same, Russia's gas production in 2015 was approximately 630 billion m³ and in 2016, according to provisional data, significantly higher, approximately 640 billion m³.

Figure 4. Russia's gas production 2010–2015, million m³ (Russian unit of measurement)

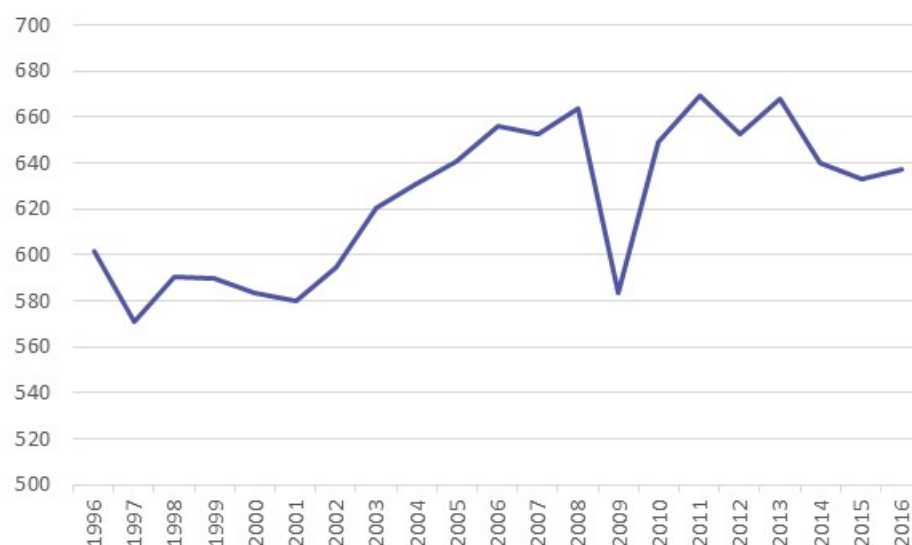


The figures include both natural gas as well as associated gas generated and captured in oil production, but not liquefied natural gas production.

Sources: Rosstat, Russian Ministry of Energy, Russian Economy Ministry, BP Statistical Review, own calculations⁹.

Because gas storage capacity is limited, fluctuations in gas production follow changes in demand. In the early 1990s, gas production declined to nearly half of its 1990 peak level. Output growth began as the economy recovered, and in 1999–2009 gas production grew by around 2% annually. Production growth was mainly based on more efficient utilisation of the giant fields of the Yamal region, which had been opened in Soviet times. Since the global financial crisis, growth of demand both domestically and abroad has been very volatile. As production at the old giant fields declines, new production areas have been brought on-stream, the largest being the Bovanenkovo field, where production began in 2012.

⁹ Production figures reported by BP have been converted to the Russian unit of measurement using the coefficient 1.105. For further information on differences in measurement methods, see chapter “Export volume of natural gas depends on the calculation method”.

Figure 5. Russia's gas production 1996–2016, billion m³ (Russian unit of measurement)

The figures include natural gas and associated gas production. The associated gas share of total production has grown in the period under examination from 4% to 13%.

Source: Rosstat

In 2014–2015, demand again fell sharply both domestically, due to an economic downturn, and in one key export market (Ukraine), due to political problems and price competition. Last year's production growth, on the other hand, is explained by increased demand, particularly in the EU countries. Estimates of Russia's current production capacity vary, but generally it is considered that production growth is constrained by lack of demand rather than production capacity.

4.1. Gazprom still dominates gas production

Gas production is by no means the monopoly of one producer; according to a Ministry of Energy listing, around 230 companies are engaged in gas production. The gas giant Gazprom's dominant position is undeniable, however. In 2015, Gazprom accounted for around two-thirds of the country's gas production. The Russian oil companies (e.g. Rosneft and Lukoil) accounted for around 18%, the private gas producer Novatek for around 8% and other gas producers for a total of around 10% of Russia's gas production.

Gazprom's share of production has, however, declined significantly in recent years. Until 2009, Gazprom's share was around 85%, but thereafter this has declined steadily from around 80% in 2009 to around 64% in 2016. Gazprom has become a swing producer, adjusting its output according to fluctuations in demand. Since 2009, Gazprom's production has been limited by a decline in export demand and greater domestic competition for business customers.

4.2. Liquefied natural gas production

Russia has one operating gas liquefaction plant, located on Sakhalin Island in the Far East. Liquefied natural gas (LNG) production began on Sakhalin in 2009 at a plant operated by the Sakhalin 2 consortium (Gazprom, Shell, Mitsui and Mitsubishi). The plant's two units produce approximately 10 million tonnes of LNG annually (design capacity 9.6 million tonnes)¹⁰. This is equivalent to approximately 14 billion m³ of natural gas. The second LNG plant, built by a consortium led by Novatek, is nearing completion on the shore of the Arctic Ocean in the Yamalo-Nenets Autonomous Okrug. The Yamal LNG project's final investment decision was made in December 2013 and the plant's first unit is scheduled for start-up at the end of this year. On the completion of a third unit, the total output capacity at Yamal LNG will be approximately 15 million tonnes, scheduled to mid-2019.¹¹

If the Yamal LNG plant is completed on schedule, at the beginning of 2020 Russia's LNG production capacity will be approximately 25 million tonnes, which is approximately 10% of world-wide LNG exports and approximately 8% of global LNG production capacity in 2015.

Other Russian LNG projects are still in the planning stage. Closest to implementation may be Gazprom's Baltic LNG terminal, planned for the port of Ust-Luga. Its planned capacity is 5–10 million tonnes, but the project may be implemented at the earliest in 2020–2025. The Baltic Sea LNG project differs from the others, in that it would be based on the liquefaction of gas produced by Gazprom elsewhere, and would not be dependent on the output of a single gas field. At the same time, the tariff authorities will have to decide on the price at which Gazprom could sell pipeline gas to an LNG plant aimed at the export market.

All the LNG projects are joint projects of a Russian gas company and international energy companies. At Sakhalin, the foreign partners are Shell, Mitsui and Mitsubishi, at Yamal, Total, CNPC and China's Silk Road Fund, and at the Baltic Sea terminal project, Shell. Global oversupply of gas, a low price level and Western sanctions have muted preparation of new projects since 2014.

4.3. Natural gas imports

Until the global financial crisis, Gazprom imported nearly 60 billion m³ of gas annually from the Central Asian republics. Since then, import volumes have declined, and in 2009–2013 approximately 30 billion m³ of gas was imported annually (IEA 2014). Gas imports from Turkmenistan have fallen steadily, and have ceased almost entirely from early 2016 onwards. In 2015, Gazprom still purchased 22 billion m³ of gas from Kazakhstan, Uzbekistan and Turkmenistan, of which 3 billion m³ went to customers in Kazakhstan and 19 billion m³ in exports to “far abroad countries”, namely outside the former Soviet Union.¹²

There are many factors behind the decline in imports. Traditionally, natural gas purchased from Central Asia has largely been re-exported, particularly to Ukraine and the EU market. A decline in consumption after the global financial crisis (particularly in the CIS countries), growth of Russia's own gas production and an increase in the price of Central Asian gas have all contributed to reducing interest in purchasing gas from elsewhere.

¹⁰ <http://www.gazprom.com/about/production/projects/lng/sakhalin2>

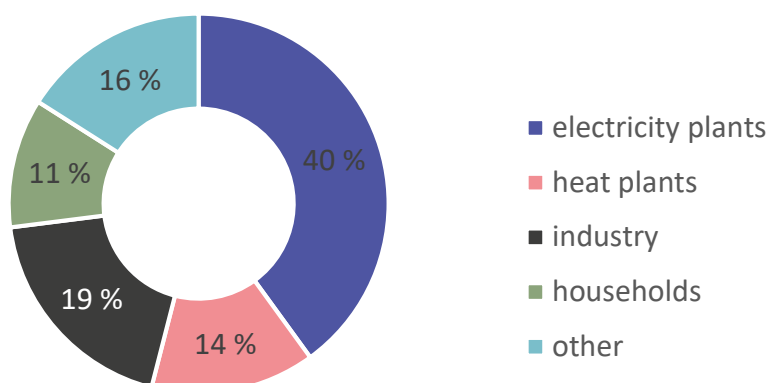
¹¹ <http://yamallng.ru/en/project/about/>

¹² <http://www.gazprom.com/f/posts/56/116176/gazprom-annual-report-2015-en.pdf>, page 104.

5. Gazprom's domestic market share has fallen to less than half

Approximately two-thirds of Russia's natural gas production is consumed domestically. Natural gas is the main fuel for power generation in Russia's thermal power plants, and around half of Russia's electricity production is generated from natural gas¹³. Heat and power generation accounts for over half of total domestic consumption. The industrial sector, mainly the chemical industry, and raw materials use represent almost 20% of domestic consumption. Households' share in gas consumption is small, only around 10% of the total (Figure 6).

Figure 6. Natural gas consumption by sector, percentage



Source: IEA, 2014.

Russia's gas transmission system is owned and operated by Gazprom. During the last fifteen years, the domestic natural gas pipeline network has been expanded so that it now covers 70% of all cities and nearly 60% of the rural population centres. Expansion of the distribution network has certainly brought new users, but has not increased overall consumption. Connecting more and more small population centres to the distribution network makes little economic sense, but the Gasification Programme is likely to be continued, mainly for political reasons.

5.1. Gas pricing

Gazprom sells gas to domestic retail and wholesale customers at regulated tariffs, while other producers may sell gas to wholesale (industrial) customers at nonregulated prices. Retail tariffs determining gas prices for household customers are tightly regulated and the price level is significantly lower than that for industrial customers. Gradual reform of wholesale price regulation has been discussed for over a decade.

Under a decree issued in November 2006, wholesale tariffs were to be increased by 2011 to a level corresponding to export prices less taxes and transport costs (i.e. netback parity). The rapid increase in export prices for natural gas in 2006–2012 made the target impossible to achieve and in December 2010 the deadline was shifted to 2014. In April 2014, the target date was postponed until the end of

¹³ Nuclear power, hydropower and coal, with approximately equal shares (15%), account for the other half of Russia's electricity generation.

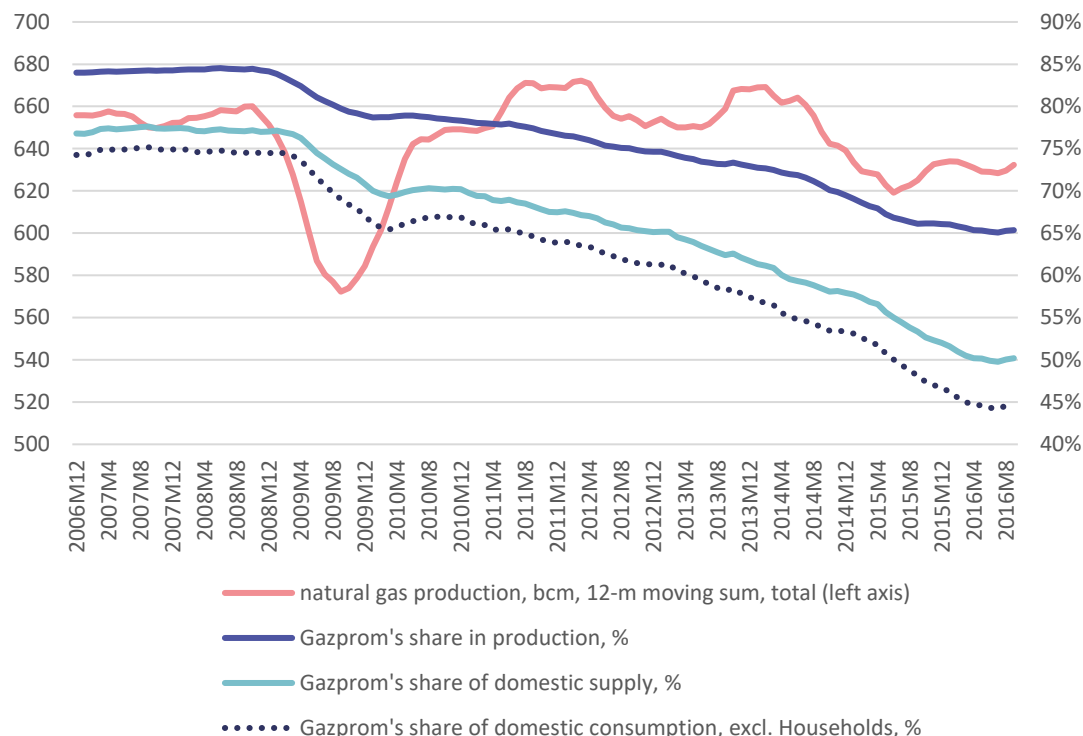
2017. The domestic economic downturn, however, has made also this target politically impossible to achieve.¹⁴

Linking domestic prices to export prices was never going to be straightforward. Comparing price levels between countries is very difficult, as cross-country variation in taxes, fees and market conditions is significant. According to the IEA, gas prices in Russia are significantly lower than in the EU countries, but at around the same level as in another large producer country, the United States. Comparison is hampered by the fact that in some the EU countries (such as Poland) prices are regulated.

Unlike in many other countries, in Russia the wholesale tariff has since 2009 been significantly higher than unregulated prices offered by private gas producers. It is therefore unsurprising that in recent years private gas producers have concluded an increasing number of supply contracts with industrial customers. As the sales and production of private producers have grown, Gazprom's share in Russia's gas production has declined from around 85% in 2008 to 64% last year. As Gazprom still has exclusive monopoly in pipeline natural gas exports, its share of the domestic market is 10–15 percentage points smaller than its share of production. In addition, it can be assumed that the gas sold to households comes to a large extent from Gazprom. Non-Gazprom producers prefer to sell gas to industrial users, with markedly higher prices. Thus Gazprom's share of the domestic gas market for industrial users is significantly smaller than its whole market share.

Roughly estimated, Gazprom's share of the industrial users' gas market has been less than half since mid-2015 (Figure 7). It is therefore still the absolute market leader but no longer an outright monopoly provider. As Russia is not a unified market area, regional variations in market positions may be considerable.

Figure 7. Gas production (billion m³ left-hand scale) and Gazprom's share (right-hand scale) 2006–2016.



Source: Rosstat and own calculations. Domestic supply = production – exports, figures do not include LNG.

¹⁴ See e.g. Yafimava (2015): The Evolution of gas pipeline regulation in Russia. OIES Paper 95/2015. Available: <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2015/03/NG-95.pdf>

The decline in market share has increased Gazprom's demands for price liberalisation. Ministry of Energy has proposed releasing large industrial users from tariff regulation, a proposition other producers strongly oppose. As Gazprom owns and controls access to the gas pipeline network, the argument goes, non-Gazprom actors need a tariff system that discriminates against Gazprom.

The future of Gazprom's export monopoly regularly arises in discussions on the development of the Russian gas sector. Other producers understandably consider the monopoly to be distorting, while Gazprom considers it necessary given the additional obligations imposed on it (e.g. higher gas production tax and the mandatory expansion of the gas network). Gazprom is also burdened with a small but increasing number of bad customers. As Gazprom is a guarantee supplier, important customers cannot be disconnected from gas distribution, even if bills are unpaid. Relative to the company's total sales, overdue payments are negligible, but they have been increasing in recent years.

Even if private producers are free to determine the price of gas they sell to industrial customers, one cannot speak of a genuine market price. The establishment of a gas exchange has been attempted a couple of times, but the results to date have been meagre. As an example, not a single trade was made in the St. Petersburg raw material and commodity exchange in January 2017. As private producers largely sell their production directly to their corporate customers, the only significant seller in a gas exchange would be Gazprom.¹⁵

¹⁵ The same problem could also arise if there were one big gas exchange in Europe and Gazprom were obliged to sell all gas via the exchange instead the present direct contracts.

6. Gas export routes run from east to west

Natural gas is a special kind of a commodity, as its transport requires a separate infrastructure (pipeline or liquefaction and gasification plants), its storage is extremely difficult, and trading is typically done on very long supply contracts. For these reasons, there is no true global market price for gas. The price of gas in different countries and continents varies widely and the price is based on different kinds of calculation formulas. This is not, therefore, a characteristic particular to Russian gas trading.

In Russia, pipeline gas exports are a state monopoly, which is managed by Gazprom. Only liquefied natural gas (LNG) exports from Sakhalin bypass Gazprom's export pipeline network. The private gas company Novatek and the oil giant Rosneft, in particular, have loudly demanded the dismantling of the export monopoly, but to date no progress has been made on the issue. Although the development of domestic competition is welcomed, decision-makers wish to avoid a situation where Russian gas suppliers compete against each other in the international market. As Russia is the world's largest gas exporter, complete liberalisation of exports could lead to major changes in pricing in both the European and Asian markets.

All of Russia's gas export pipelines run from east to west; mainly from Western Siberia to Central Europe and Turkey. Overwhelmingly the largest pipeline routes in terms of capacity (the Soyuz and Urengoy-Uzhgorod pipelines) run through Ukraine and Slovakia towards Western Europe. The EU market is also served with Nord Stream, which began operating in 2012, and the Yamal-Europe pipeline, which opened in 2006. The combined annual capacity of these three routes is over 200 billion m³, i.e. significantly more than gas exports to EU countries. Additionally, Turkey is served by Blue Stream pipeline, whose capacity is smaller than Gazprom's annual exports to Turkey. Some of the exports to Turkey therefore go through Ukraine.

Table 3. Gazprom's export pipelines to the EU countries and Turkey, design capacity, m³ annually.

	Capacity, billion m ³
Blue Stream (to Turkey)	16
Nord Stream (to Germany)	55
Ukraine-Slovakia*	100
Ukraine/Romania*	19
Yamal-Europe (via Belarus)	33
Total	223

* In some sources, the combined capacity of the Urengoy-Uzhgorod (Brotherhood) and Soyuz pipelines is reported to be 140–160 billion m³. In terms of the available capacity of the pipelines, there are also estimates that are significantly lower this.

Sources: Gazpromexport, Gazprom, Pirani and Yafimaya (2016)¹⁶.

6.1. Plans and pipe dreams

Not a single export pipeline goes towards the growing Asian market. Russia hopes to change this, and in 2014 Russia and China agreed on the massive Power of Siberia project, aiming to begin gas exports to China after 2019. The implementation of the project will require huge investment in both

¹⁶ Pirani, Simon and Yafimaya, Katya (2016): Russian gas transit across Ukraine post-2019. OIES Paper 105/2016.

production and transportation, and the progress to date has not been impressive. By the end of 2015, 115 km of the required 3,170 km transmission pipeline network had been built on the Russian side. At the end of 2016, 445 km had been built. During 2017, the goal is to build a total of 600 km of the Power of Siberia pipeline¹⁷. Implementing the project will also require the development of the Chayadinskoye gas field.

Table 4. Planned export pipelines, design capacity, m³ annually.

Planned export pipelines	Capacity, billion m ³
Power of Siberia	38
Nord Stream 2	55
Turkish Stream	30
Altai (to China)	30

Source: Gazprom.

In addition, there exists at least 10 other gas export projects, including: Turkish Stream in the Black Sea, Nord Stream 2 in the Baltic Sea, Yamal LNG, Altai pipeline to China, Sakhalin 2 LNG plant expansion, Sakhalin 1 LNG, Korean pipeline, Vladivostok LNG, Far East pipeline to China, and the Baltic LNG plant. Of these, the first stage of the Yamal LNG export terminal is projected to be completed by 2018, and the preparations for the Turkish Stream and the Nord Stream2 are under way. However, not all of these projects can be or are even meant to be implemented. On the other hand, all of the proposed projects are well in line with the guidelines of Russia's energy strategy¹⁸. The objective of the strategy is a) to increase the share of Asian markets in total gas exports, and b) to achieve direct contact with customers without transit countries and transit related problems.

Figure 8. Russia's existing and planned natural gas export pipelines.



Sources: Gazprom, map modified 17 March 2017 from base:
https://commons.wikimedia.org/wiki/File:The_World_map.png

¹⁷ <http://www.interfax.ru/business/551612>

¹⁸ ES-2030, approved 2009 and ES-2020, approved 2003.

6.2. Ukraine's role declines

Various export projects highlight that Gazprom considers Europe to be a key market also in the future and Gazprom is ready to invest in an operationally reliable transmission system. The now abandoned South Stream, Turkish Stream's predecessor, and Nord Stream 2 may originally have been competing options; both were scarcely considered to be necessary, and certainly both could hardly be afforded in the current situation. In both projects, the goal was to deliver a larger share of Russian natural gas exports directly to European customers without Ukrainian transit pipelines, which are perceived to be in poor condition and unreliable. The goal was not to open new markets.

Ukraine's share of transit deliveries of Russian gas exports has declined. Currently, less than half of gas exports to Europe go via Ukraine. In 2015, a total of 60 billion m³ of gas passed through Ukraine, i.e. around 40% of Gazpromexport's sales to Europe. Completion of a new export pipeline in the Baltic Sea or Black Sea would not completely remove transit through Ukraine, but it would make its transit pipelines a very marginal export route. Unless European gas imports grow significantly, Ukrainian pipelines could become mainly a backup system, used to balance possible spikes in demand.

Forecasts of European gas consumption in the coming decades vary depending on how e.g. the EU emissions trading and the share of renewables are considered to evolve. Growth of energy consumption in EU countries will, in any case, be small, even if economic growth were to return to "normal" levels. As indigenous North Sea production declines, the EU countries' gas imports are, however, expected to increase in the future.

7. Export volume of natural gas depends on the calculation method

The comparability of foreign trade statistics is often poor, but with respect to Russia's natural gas exports there are many additional challenges in reporting. Publicly available statistics on gas exports are produced at least by the Federal State Statistics Service Rosstat, the Federal Customs Service, the Central Bank, the Ministry of Energy and the Ministry of Economic Development, Gazprom, and Gazpromexport, the Gazprom subsidiary responsible for exports. Each statistics provider uses slightly different methodology, which means that the export figures also differ significantly.

In Russia's gas export statistics, statistics are compiled separately for three different markets. These are export of liquefied natural gas (LNG), export of pipeline gas to the area of the former Soviet Union, and export of pipeline gas to "Europe". Some sources compile statistics for pipeline gas exports to Europe excluding re-exports of gas coming from Kazakhstan and elsewhere in Central Asia, and some include re-exports. An overall picture of the volume of Russia's gas exports is compiled by counting all three different export figures (and one import figure) together. If pipeline exports to China materialize one day there is probably separate statistics for those flows too.

Confusion is sometimes caused by the fact that Europe in this context is not the same as the European Union; it covers exports to everywhere outside the area of the former Soviet Union, i.e. outside the "near abroad". Exports to Europe also include Turkey, which is one of Gazprom most important customers. Correspondingly, in gas exports, the Baltic countries are included in the category "near abroad". The categorisation is inherited from the time when all pipeline in the area of the Soviet Union were an inseparable part of the Soviet Gas Ministry's unified gas transmission system.

7.1. Exports of pipeline gas and LNG

Table 5 below assembles figures gathered from different sources on the export volumes of natural gas in 2015. Corresponding data from 2016 are not yet available. The pipeline gas export figures reported by the Central Bank are directly from Rosstat, whose data (presumably) are based on Customs Service figures. Rosstat's pipeline gas export figures apparently include only exports of Russian gas, and therefore no re-exports. Ministry of Energy and Gazpromexport figures include re-exports. It should be noted that the sales of the whole Gazprom Group in Europe were around 20 billion m³ higher than those of Gazpromexport¹⁹. The difference is made up of gas marketed by Gazprom's other subsidiaries such as Gazprom Marketing and Trading, which trades LNG brought on international markets.

¹⁹ <http://www.gazprom.com/about/marketing/europe/>

Table 5. Gas exports in 2015, billion m³

	Europe	Former Soviet Union area	Pipeline gas, total	LNG	Total (incl. LNG)
Rosstat / Central Bank	144.7	40.7	185.5	21.4	206.7
Gazpromexport	158.6				
Gazprom sales ²⁰	184	40.3	224.3	4.75	229.1
Ministry of Energy	162.9	34.1	197	14.5	211.5 ²¹
BP (bcm, international unit of measurement)	159.8	33.2	193	14.5	207.5

Natural gas production, consumption and trade are generally recorded in billion cubic metres, whereas statistics on LNG production, consumption and trade are in million tonnes. The generally used conversion factor is 1 million tonnes = 1.36 billion cubic metres. The Central Bank of Russia and Rosstat report LNG export figures in millions of cubic metres, but with the generally used conversion factor these figures do not correspond to Russia's LNG production capacity. The Ministry of Energy figures, on the other hand, closely match both Russia's LNG production capacity and, for example, BP's data. As Russia has no LNG import terminals, and there is only one export terminal, significantly different official figures is an achievement in own right.

Given the large differences in export figures, it is no wonder that various authorities and analysts also prepare their own estimates. For example, the Ministry of Economic Development (MER) uses in its own scenarios Rosstat's pipeline gas export figures as well as its own LNG figure (which fortunately is rather close to the Ministry of Energy figure). The figures used in the Russian Federation's Energy Strategy (ES-2035) also include exports of liquefied natural gas, but they do not match any other source.

7.2. Exports to EU countries and international comparisons

We therefore know that, according to its own statistics, Russia exported around 185–195 billion m³ of pipeline gas in 2015. Of the exports, 145–163 billion m³ went to Europe and rest to the CIS countries. Of European exports, around 125–143 billion m³ were Russia gas and around 20 billion m³ re-exports. As stated at the beginning, in this context “Europe” is not at all the same as the European Union. According to data published by Gazpromexport, exports to the EU countries were around 130 billion m³ in 2015 (around 110 billion m³ of this was Russian gas). In 2016 exports to EU countries grew to around 150 billion m³.

All Russian sources report gas export volumes according to Russian measurement standards. The content of a Russian cubic metre differs from the IEA standard. According to the IEA (2011), a cubic metre of gas is 1.017 Russian cubic metres²². Exports of Russian gas to EU countries in 2015 was therefore around 108 billion m³ applying the measurement method used in Europe.

In addition to the measurement method, the energy content of the gas may vary. For this reason, some operators (such as BP in its statistical review of world energy) use “standard cubic metres”,

²⁰ Gazprom Annual Report 2015: (<http://www.gazprom.com/f/posts/60/660385/gazprom-annual-report-2015-en.pdf>)

²¹ <http://minenergo.gov.ru/node/1217>; figure includes 19.1 billion m³ of re-exports.

²² According to the IEA's definition, gas is measured at a temperature of 15°C and a pressure of 101.3 kPa. The Russian method is to measure gas at 20°C. (IEA World Energy Outlook 2011, page 304.)

whose energy content is standardized, e.g. 42 megajoules/m³.²³ To facilitate comparison Eurostat tends to report gas consumption and imports in energy units instead of cubic metres (BTU, British thermal unit or GTV, terajoules), which have their own conversion factors.

The use of mirror statistics in gas trade is not straightforward either. From January 2013 forward, Eurostat reports monthly gas import volumes according to the final transit country, not the country of origin. In the annual statistics, imports are reported by the country of origin, but the most recent annual statistics are for 2014. Working from monthly statistics, in 2015 EU countries' gas imports²⁴ from Ukraine were 47 billion m³, from Russia 52 billion m³ and from Belarus 40 billion m³, totalling nearly 140 billion m³. One would assume imports from these countries to be solely Russian gas, but 140 billion m³ is clearly more than Gazpromexport's 130 billion m³ to EU countries. Using the IEA's conversion factors, the difference in export volumes is around 12 billion m³. Eurostat includes pipeline gas and liquefied natural gas in its gas import statistics, which could explain some of the difference. However, currently no significant quantities of Russian LNG reach Europe, but after the completion of the Yamal LNG plant, the situation may, of course, change.

7.3. Conclusion

A comparison of statistics mainly shows that comparing figures from different sources is difficult, if not downright pointless.

When describing Russia's gas production, local sources may be the best. If one wants to describe Russia's share in global production or trade, it may be worth using an international source, like the BP's statistics. And if one wishes to obtain an accurate picture of Russia's share in the EU countries' gas imports or consumption, one may be advised to wait for the next release of Eurostat's statistics.

All in all, one may have to accept that all figures should be rounded to the nearest ten billion and, even so, due to differences in statistical methods, the remaining margin of error may be around 10 billion m³ annually.

²³ BP uses the factor 1.105 in the production of Russian gas, a factor of 1.017 in exports to Europe and 1.118 in CIS exports.

²⁴ http://ec.europa.eu/eurostat/statistics-explained/index.php/Natural_gas_consumption_statistics

8. Role of LNG in global gas market growing slowly

Nearly one third of global gas trade is in liquefied natural gas (LNG) and two-thirds in pipeline gas. As far as the end-users are concerned, the product is the same; only the transportation method differs. With respect to gas trading, LNG is a significantly more flexible product; LNG trading does not necessarily require long-term agreements between the buyer and seller.

Traditionally, LNG has been marketed in Asia and pipeline gas in Europe. This largely continues to be the case, and in 2015 over 70% of the global LNG trade went to Japan, South Korea, China and other Asian countries.²⁵ Only around 15% of trade was directed to European customers. Growth in LNG supply in 2008–2011 has changed the situation slightly, however. In 2006, the three largest importing countries (Japan, South Korea and Spain) accounted for two-thirds of all global LNG trade. In 2015, these three countries accounted for only around 52%, and China has become a larger importer than Spain.²⁶

Table 6. Global natural gas trade, billion m³.

	Pipeline gas, billion m ³	LNG, billion m ³	Total, billion m ³	LNG share, %
2007	537	211	748	28%
2008	587	227	814	28%
2009	634	243	877	28%
2010	678	298	975	31%
2011	695	331	1025	32%
2012	697	324	1021	32%
2013	711	325	1036	31%
2014	677	332	1009	33%
2015	704	338	1042	32%

Source: BP Statistical Review of World Energy 2016

In 2015, 15 countries exported liquefied natural gas. With the exception of Nigeria and Trinidad & Tobago, all major producers are located in the Middle East or the Pacific region. Growth of production has been particularly significant in Qatar (in 2009–2010) and Australia (in 2014–2016). Currently, one third of the world's LNG supply comes from Qatar, around 12% from Australia, 10% from Malaysia and 7% from Indonesia. Russian exports of LNG began in 2009, but Russia's share of global supply is only around 4%.²⁷ In the next few years, the United States is expected to become a significant exporter of natural gas, but the present gas glut may sink export prices and temper export plans.

Most European gas imports continue to be pipeline gas. Of gas imports by European Union countries, just over one third, on average, comes from Russia, around one third from Norway and the rest from North Africa, Qatar and other countries. On average, 10–15% of gas imports are LNG, but there are great variations between countries.

The gas boom of recent years has led to the construction of receiving terminals (regasification plants) around the world. According to the International Group of Liquefied Natural Gas Importers (GIIGNL), in 2015 the capacity (777 million tonnes per year) of the world's receiving terminals was

²⁵ <http://www.giignl.org/lng-markets-trade-0> ; 72% in 2015, 75% in 2014.

²⁶ BP Statistical Review 2016.

²⁷ If Russia's (Sakhalin) LNG is included in the Pacific region, the Middle East and the Pacific region accounted for 81% of global supply in 2015.

more than double the capacity (308 million tonnes per year) of LNG export terminals. Thus, it is no wonder that a large proportion of the world's LNG import terminals are running at under capacity²⁸. European countries are no exception; in Spain, for example, the capacity utilisation rate in 2015 was under 20% and in the United Kingdom only around 25%²⁹.

²⁸ <http://www.giignl.org/lng-markets-trade-0>

²⁹ IGU World Report 2016, p.47

9. Russia and China key partners in oil trade – natural gas trade yet to start

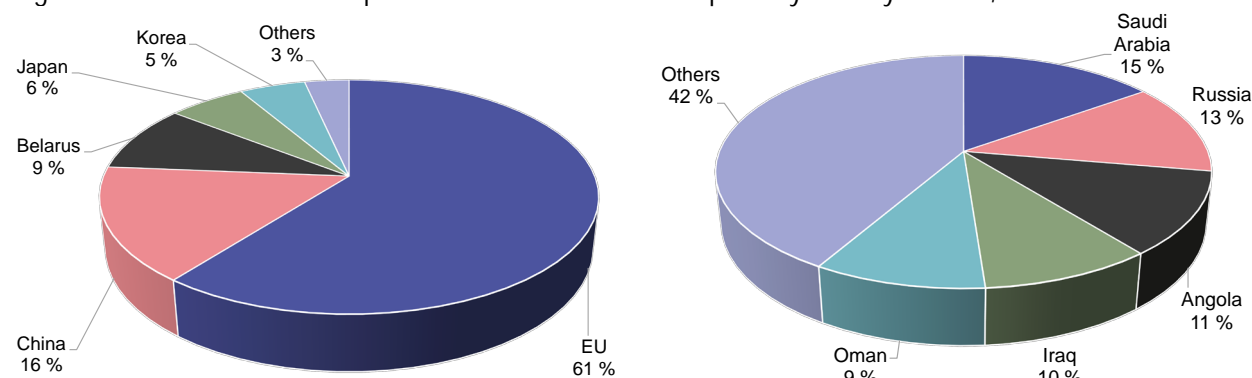
Cooperation between Russia and China in the energy sector has advanced rather slowly, considering the clear opportunities: one of the world's largest energy producers is next door to one of largest energy consumers.³⁰ The target of increasing Asia's share of oil and natural gas exports was set already in the Russian energy sector development strategies prepared in the past decade. The focus of growth in demand has shifted to Asia, while in Russia's traditional market, Europe, growth in demand has been slow at best. In addition, a large proportion of the Russian oil and gas fields introduced since the turn of the millennium are located in Eastern Siberia and the Far East, so it is less expensive to transport their production to the more closely situated Asian market.

In Russia, the significance of Asia and especially China as an economic partner began to be underlined particularly strongly in 2014, when relations between Western countries and Russia became strained after Russia occupied Crimea. As a consequence of the "Pivot to Asia" campaign, many cooperation projects between Russia and China, such as a gas pipeline between the countries, appeared to moving forward. Many experts, however, have considered that Russia had to make major concessions to China to promote the projects. After the initial hype subsided, the "Pivot to Asia" has fallen into the background, while the sharp fall in the oil price has curbed enthusiasm for new oil and gas sector projects.

9.1. Oil trade has grown rapidly in recent years

In oil trade, Russia and China are already among each other's most important trading partners (Figure 9). Trade has grown significantly in the past decade as Russian fields located in Sakhalin and Eastern Siberia have been brought on-stream and pipeline to transport the production to China has been constructed; the ESPO oil pipeline runs from Eastern Siberia to the Port of Kozmino on the Pacific Ocean, with a branch running directly to China. Both countries have had an interest in increasing oil trade between them in order to secure and diversify supply and demand.

Figure 9. Russia's crude oil exports and China's crude oil imports by country in 2015, % share



Source: UN Comtrade.

³⁰ For more detail on the recent development of economic relations between Russia and China (incl. energy) see Simola, H. Economic Relations between Russia and China: Increasing Inter-Dependency? BOFIT Policy Brief 6/2016. A comprehensive overview of energy relations between Russia and China is provided by, for example, Henderson, J. & T. Mitrova. Energy Relations between Russia and China: Playing Chess with the Dragon, Oxford Institute for Energy Studies WPM 67, August 2016.

For Russia, the risks associated with introducing new fields and building the ESPO pipeline were reduced significantly by safeguarding demand and obtaining finance from China. In 2008 Rosneft and CNPC entered into long-term supply contract, and the pipeline company Transneft obtained from China a substantial loan against future oil deliveries. In addition, Russia has long tried to diversify its oil export market in order to reduce its dependency on European demand alone.

In China, on the other hand, oil demand has grown strongly, driven by the country's rapid economic growth, and securing the availability of oil (and other raw materials, too) has been a key objective. China has also endeavoured to diversify supply, in order to be less dependent on Middle East oil producing countries. The attractiveness of Russian oil in diversifying supply has also been increased by the pipeline transport possibility, because otherwise oil is brought to China mainly by sea.

Oil exports from Russia to China have doubled in the last decade and they are likely to grow in the future. Pipeline transport capacity has already been expanded, and the next expansion is due to be completed by the end of 2017. Then, it will be possible to export double the original quantity of oil, i.e. 30 million tonnes per year, to China directly by pipeline. The quantity to be delivered was agreed in a contract signed by the Russian and Chinese governments in 2013. In addition, oil is exported to China via the Port of Kozmino, and last year 70% of the port's oil transports went to China³¹.

Deeper cooperation in trade between Russian and Chinese oil companies has, at least to date, remained rather modest. CNPC has had a small holding in Rosneft since 2006, after which the parties have discussed increasing this holding and purchasing new holdings in Rosneft subsidiaries, but no agreements have been concluded. Last year, there were also negotiations with the Chinese about the possible sale of a 19.5% share in Rosneft as well as, for example, a share in Vankorneft, but no deals were closed and the stakes were sold to other foreign investors instead.

9.2. Only big plans in natural gas trade

With regard to natural gas, cooperation between Russia and China has progressed even more slowly than in the oil sector. For both countries, natural gas does not play as key a role as oil, and its trading is still significantly more dependent than oil on suitable transport infrastructure. There is no gas pipeline between the countries, and the gas produced by Russia's only LNG production plant is mainly shipped to elsewhere in Asia. Natural gas trading between Russia and China has therefore been practically non-existent to date.

Negotiations on natural gas cooperation began at the beginning of the 2000s, but it took until recent years to conclude an agreement. China's interest has been moderated by demand and supply factors. Natural gas still accounts for a small proportion (around 6%) of China's energy consumption and it has not grown according to the most optimistic expectations. In addition to its domestic production, China has already secured from other markets a relatively substantial and diverse import supply of natural gas. Of China's natural gas imports, around half comes through pipelines from Central Asia and Myanmar and the remainder as LNG deliveries to the east coast from a number of different sources. China's present natural gas import capacity has been under-used to date, so there is no essential need for additional gas. Russia, moreover, has not wanted to start building an expensive gas pipeline merely for Chinese exports before there would be some guarantees of demand.

In spring 2014, however, Gazprom and CNPC finally signed the first agreement on natural gas along the so-called eastern route. According to the agreement, deliveries are due to begin gradually

³¹ <http://kozmino.transneft.ru/press/news/?id=44177>

during 2019–2021 and to grow in five years to 38 billion m³ per year. The natural gas will be supplied from the new Chayanda field (later also from another new field, Kovykta), where production is due to begin when the Power of Siberia pipeline has been completed. According to Gazprom, around 500 km of the pipeline has been built, whereas around 2,000 km is needed for deliveries to begin. The prices specified in the agreement have not been published, but many experts consider that the agreement is loss-making for Gazprom at the current oil price level.

In 2015, the companies also signed a letter of intent for 30 billion m³ of natural gas deliveries along the so-called western, or Altai, route. For Gazprom, this route would be less expensive, because gas could be supplied from fields already in production, and the gas pipeline required for transport (Power of Siberia 2) would be considerably shorter. For China, on the other hand, this agreement is less attractive, because the gas pipeline would come to the west of the country. Most of the demand, however, is on the other side of the country and natural gas is already delivered to Western China along the pipeline from Central Asia. In the letter of intent, moreover, no agreement was reached on the price of gas deliveries, so negotiations are far from complete.

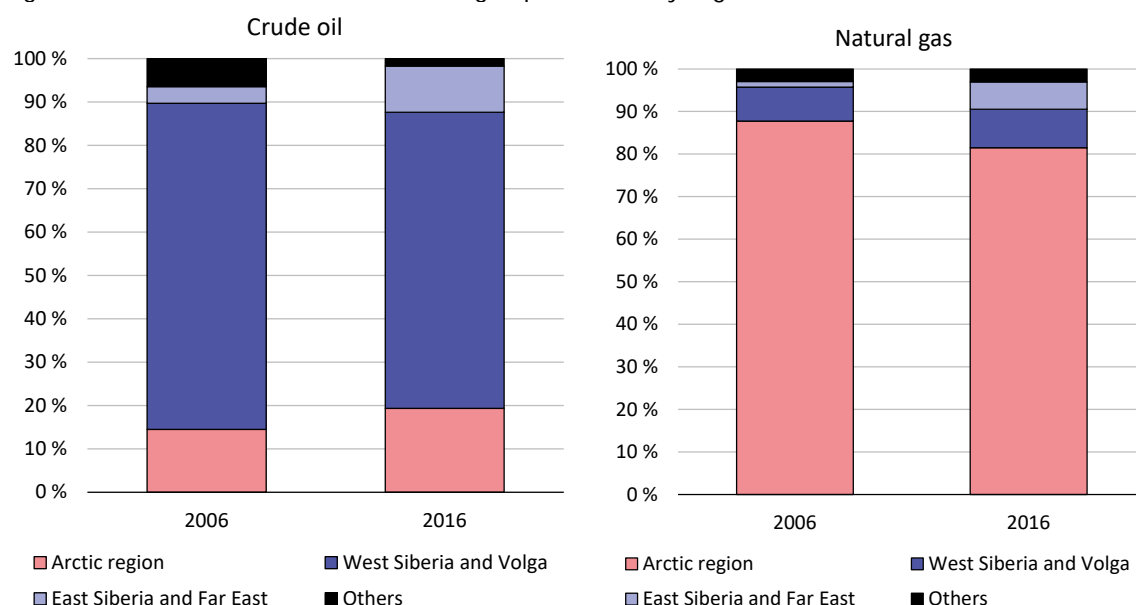
Faster progress, however, has been made with the LNG production plant being built by Novatek on the Yamal Peninsula, in which the Chinese are minority shareholders. In 2013, CNPC acquired a 20% holding in the project and is committed to buy 3 million tonnes of its production per year. After the project encountered financing problems as a result, among other things, of sanctions imposed by Western countries, China's Silk Road Fund came to the rescue and purchased a just under 10% holding in the project at the end of 2015. The first stage of the production plant is due to be taken into use this year.

Currently, therefore, it is not completely clear to what extent and schedule the natural gas projects planned between Russia and China will proceed in the future. Even if all of the above projects were to proceed as planned, their full implementation would, in any case, take several years.

10. Arctic region important in oil and natural gas production

Russia's Arctic region, with its abundant natural resources, has in recent years received greater attention as resources of traditional production areas have declined and general international interest in the region has increased. In Russia, the Arctic region's natural resources, particularly natural gas, have already been exploited for a long time now. For decades, the country's foremost natural gas production area has been the Yamalo-Nenets Autonomous Okrug, which is located in the Arctic and from which most of Russia's natural gas production is derived (Figure 10). According to Rosstat, slightly more than 80% of Russia's natural gas in 2015 was produced in the Arctic region³². The Arctic region will also remain Russia's most significant natural gas production area in the future, because a large proportion of the fields to be brought on-stream in the next few years are located on the Yamal Peninsula.

Figure 10. Russian crude oil and natural gas production by region* in 2006 and 2016.



**The figures are not completely accurate, because the statistics are based on administrative areas. Here, the Arctic region consists of the Komi Republic, the Nenets Autonomous Okrug, the Yamalo-Nenets Autonomous Okrug and the Krasnoyarsk Krai. The Komi Republic and Krasnoyarsk Krai are not included in their entirety in the Arctic region, but their oil and gas production is concentrated in the northern parts of the areas (Timan-Pechora area and Vankor field).*

Source: CEIC

Oil has also been produced in the Russian Arctic region for decades, but the region's significance in oil production is considerably smaller than in gas production. According to Rosstat, 15% of oil production was derived from the Arctic region in 2015. Most of the oil is produced further south in the large traditional fields of Western Siberia, and new fields have been brought on-stream mainly in parts of Eastern Siberia and Russia's Far East, further south than the Arctic region (Figure 10). Arctic region oil production is concentrated in the Yamalo-Nenets Autonomous Okrug and in

³² Definitions of the Arctic region vary in different contexts. This chapter uses the definition used in the Russian government documents and official statistics. In this definition, the Arctic region is considered to be the Murmansk Oblast, part of the Archangel Oblast, the Nenets Autonomous Okrug, part of the Komi Republic, the Yamalo-Nenets Autonomous Okrug, part of the Krasnoyarsk Krai, part of the Sakha Republic, the Chukchi Autonomous Okrug, and the islands and areas of the Northern Arctic Ocean.

Timan-Pechora, which extends into areas of the Komi Republic and the Nenets Autonomous Okrug. Some new oil fields are also continually being introduced in the Arctic region, such as in recent years Trebs and Titov as well as Kharyaga in Timan-Pechora and Novy Port and Messoyakha in the Yamalo-Nenets Autonomous Okrug. As production volumes are limited, however, the Arctic region's share of total Russian oil production is not expected to grow much at least during the next decade.

Oil and gas have been produced for a long time on the mainland of Russia's Arctic region, but exploitation of offshore resources has advanced significantly more slowly. Only the majority state-owned Gazprom and Rosneft have the right to exploit them. The giant Shtokman natural gas field and the substantial Prirazlomnoye oil field were discovered in the late 1980s. Oil production at Prirazlomnoye only began, however, at the end of 2013, while investment plans for Shtokman were shelved a few years ago after many years of preparation due to excessively high production costs. Prirazlomnoye is still the only field in production in Russia's Arctic offshore area. The sharp fall in the oil price that occurred after production got under way has not hindered production, however; production at Prirazlomnoye has increased significantly, and growth is due to continue in the next few years.

In general, Russia's Arctic region is considered to possess extensive, but mainly unproven, offshore oil and gas resources. Technological advances and an improvement in the navigability of the Northeast Passage have increased the attractiveness of these assets, but there is still considerable uncertainty surrounding their exploitation: the true size of the resources, high costs, difficult conditions, technological demands, environmental risks etc. Investment in Arctic oil fields is constrained by the present low price of oil (the production costs of a number of Arctic fields are estimated to be at least USD 60–80, even above USD 100 per barrel³³) as well as the economic sanctions imposed on Russia by the EU and the United States, which restrict the availability of technology and services. On the other hand, Russia will still be able to produce for a long time to come natural gas at sufficient volumes and at a lower price in areas where exploitation is easier. In any case, bringing new offshore fields located in Russia's Arctic on stream will take a long time. Based on corresponding international experiences, start-up of production from the time a field is considered to be commercially viable takes, in the best case, around ten years.

³³ Henderson, J. & E. Grushevenko. Russian Oil Production Outlook to 2020, The Oxford Institute for Energy Studies Energy Insight 3, February 2017, Rystad Energy

11. Oil and gas taxes make up lion's share of Russia's budget revenue

In Russia's oil sector, the main taxes are the production-based mineral extraction tax (MET) and the export duties. MET has a fixed component per tonne produced and a variable component dependent on the oil price and the ruble-dollar exchange rate. Special features related to the production location and process may justify tax relief³⁴. To support new production, taxation of fields recently brought on-stream and fields subject to difficult production conditions is generally lighter, and some are even completely exempt from MET, at least in the early years of production. Export duties on crude oil and petroleum products are determined on the basis of the world market price of oil.

For natural gas and gas condensate production, a fixed MET is paid per unit produced (currently RUB 35 and RUB 42 per 1000 m³), which is adjusted with coefficients dependent on the details of production. Export duty on natural gas is 30% of the export value, but LNG exports are exempt from the duty. Oil and gas companies are also subject to the same general taxes as other companies, such as corporate income tax (profits tax). Separate excise duties are also levied on petroleum products.

11.1. Oil and gas sector taxation changing

In connection with state budgetary reforms at the beginning of the 2000s, oil and natural gas production began to be taxed so that the state would also receive revenue from the exploitation of natural resources. In addition, export duties on oil have tried to be utilised for directing the structure of the production and export of oil and refined petroleum products. Initially, the objective was to increase domestic refining of oil and reduce exports of crude oil. In this way, the aim was to ensure sufficient supply of refined petroleum products, particularly gasoline, to meet rapidly growing domestic demand and to develop domestic production towards higher added value products. Exports of crude oil began to decline and exports of petroleum products began to grow. The petroleum products going for export were refined to only a modest degree, however, and their price could even be lower than that of crude oil. Even so, the lower export duty on petroleum products still made the export of modestly refined petroleum products more profitable than the export of crude oil.

Oil sector taxation has been reformed since 2011, culminating in the "big tax manoeuvre" (*bolshoy nalogovy manevr*), adopted at the end of 2014. The previous tax system was seen as unfairly subsidizing oil refiners and maintaining inefficient and too old-fashioned refining production. Due to the high export duty on crude oil, it was more profitable for oil producers to sell oil even at a significantly lower price to domestic refineries than to export it. The change of customs duties due to the Eurasian Economic Union at the beginning of 2015 also contributed to accelerating tax reform, because in trading within the Economic Union no export duty is levied on oil. Of the member states, Belarus, in particular, is a rather large export market for Russian oil, so taxation focused on production generates more tax revenue.

The big tax manoeuvre has gradually shifted the focus of taxation from exports to production. The ultimate goal has been to abandon export duties completely and replace them with higher production taxes and excise duties. During the transition period, export duties have also been changed so that exporting low added value petroleum products has been taxed more heavily in relation to other exports. In the new system, fluctuation of state oil revenue is reduced, because changes in the price of oil have significantly less impact on the mineral extraction tax than on export duties.

³⁴ As an exception, the MET on oil produced from continental shelf fields is determined separately based on the world market price of oil

As state finances have deteriorated in recent years, the original plans have been adjusted slightly by postponing reductions in export duties and raising production taxation temporarily more than previously planned. In principle, the big tax manoeuvre was due to be completed at the beginning of this year, but development of taxation is still under discussion. The possibility of shifting from taxation of production and exports to taxation of company profits has also been mentioned, but at least to date this has been discussed mainly in connection with individual pilot projects.

Table 7. Development of Russian oil taxation

	2014	2015	2016	2017
Mineral extraction tax, basic component, RUB / tonne *	530	766	857	919
Mineral extraction tax, fixed supplementary component, RUB / tonne	-	-	-	306
Crude oil export duty, oil price coefficient, % (A) **	59	42	42	30
Export duty on certain petroleum products, % (B) ***				
Gasoline	90	78	61	30
Diesel	65	48	40	30
Heavy fuel oil (Mazut)	90	76	82	100

* Mineral extraction tax = Basic component x component determined based on oil price and rouble exchange rate – possible reduction based on coefficients related to production details

** Crude oil export duty per barrel (oil price > USD 25/barrel) = USD 4 + A% (oil price -USD 20)

*** Petroleum products export duty = B% of crude oil export duty

Sources: Russian Ministry of Finance; Ernst & Young. Tax Manoeuvre Parameters and Impact Assessment, Oil and Gas Tax Alert, December 2014.

11.2. Oil and gas revenue important for budget, but oil price does not tell the whole story

The revenue obtained from oil and gas taxation has accounted for half of federal budget revenue and just under 30% of consolidated budget revenue. Due to the sharp fall in oil prices in recent years, the proportion of revenue obtained from oil and gas taxation has declined, so that last year it accounted for just 40% of federal budget revenue and 20% of consolidated budget revenue. Significantly more tax revenue comes to the state from oil than from natural gas (Table 8), because oil is taxed more heavily than gas and it is anyway the economically more significant sector for Russia.

Table 8. Russia's oil and natural gas revenue in 2011–2016.

	2011	2012	2013	2014	2015	2016
<i>Export revenue, USD billion</i>	<i>345.6</i>	<i>351.4</i>	<i>354.6</i>	<i>329.6</i>	<i>203.5</i>	<i>150.9</i>
<i>(% GDP)</i>	<i>(17.0)</i>	<i>(16.3)</i>	<i>(15.9)</i>	<i>(16.1)</i>	<i>(15.0)</i>	<i>(11.8)</i>
crude oil	181.8	180.9	173.7	153.9	89.6	73.7
petroleum products	95.7	103.6	109.4	115.8	67.5	46.3
natural gas	68.1	66.9	71.5	59.9	46.4	30.9
<i>Budget revenue*, USD billion</i>	<i>191.9</i>	<i>207.7</i>	<i>205.1</i>	<i>192.5</i>	<i>95.6</i>	<i>72.3</i>
<i>(% GDP)</i>	<i>(9.5)</i>	<i>(9.6)</i>	<i>(9.2)</i>	<i>(9.4)</i>	<i>(7.0)</i>	<i>(5.6)</i>
crude oil	142.1	148.8	142.0	131.7	67.4	52.1
petroleum products	31.9	36.4	37.9	38.6	12.2	13.5
natural gas	17.9	22.6	25.2	22.3	16.0	6.7

* MET and export duties. 2016 data are provisional, converted into dollars at the average exchange rate for the year.

Sources: Central Bank of Russia, Roskazna, Rosstat.

In connection with the state finances of oil producing countries, a budget break-even oil price is often spoken of. This refers to the oil price that balances the budget, namely the oil price at which budget revenue exactly covers budget expenditure. This indicator is, in principle, simple and easy to understand, but no far-reaching conclusions should be made on the basis of it.

The state finances of a country dependent on oil revenue will not necessarily crash, even if the price of oil were to remain below the budget balancing price. Many oil producing countries have saved their substantial oil revenues from earlier years in funds, whose assets can be used to cover budget expenditure when the oil price falls. In many oil producing countries, the public sector is also relatively moderately indebted, so state finances can often be temporarily patched by borrowing. In addition, exchange rate development is a significant factor in countries with floating exchange rates, such as Russia. When the exchange rate weakens, the oil price in the seller's currency falls less than in dollars. In such cases, the purchasing power of tax revenue received from oil in one's own currency holds up better, because state expenditure is generally mainly in the domestic currency.

These softening factors are temporary, of course, so if the oil price stays for an extended period lower than the budget balancing price, steps must be taken before long to adjust the budget. Russia, too, has prepared for this in the 2017–2019 budget plan, by curbing growth of expenditure. Whereas Russia's budget balancing oil price in 2014 was nearly USD 100 per barrel, the 2017 budget should be balanced with an oil price of USD 55 per barrel.

A weaker ruble significantly softens the need for adjustment, however, because in rubles the budget balancing oil price was RUB 3,800 per barrel in 2014 and, according to the assumed exchange rate used as the basis of the budget, it would be RUB 2,700 per barrel in 2017. The assumed exchange rate is significantly weaker, however, than the actual ruble exchange rate has been this year to date. If the ruble remains stronger than expected, the dollar-denominated oil price that balances this year's budget will be correspondingly higher. In practice, Russia's budgets for 2017–2019 have been planned to be in deficit, and the deficit is intended to be covered mainly from Russia's oil funds.

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