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Perspectives on Russia's  
energy sector



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Heli Simola, Laura Solanko and Vesa Korhonen

## Introduction

No analysis of the Russian economy today can ignore the role of energy production. Russia is the world's largest producer of crude oil and natural gas, the world's third largest consumer of energy and a global giant in hydrocarbon exports. But just how big is the actual contribution of oil and gas production to national economic output? Who is discovering, pumping and shipping Russia's oil? What is the energy sector's role in government revenue and Russia's external balance? This issue of BOFIT Online comprises nine short articles with timely insights into the challenges facing Russia's energy sector.

**Key words:** Russia, energy, natural gas, oil, state economy, electricity production

## Heli Simola

### Assessing the contribution of Russia's oil and gas sector to GDP

Official figures suggest oil and gas production accounted for less than 10 % of Russia's GDP throughout the 2000s. Such numbers hide the true scope of Russia's dependence on oil and gas. Production merely forms the core of a constellation of branches tied to the sector. Oil refining is heavily dependent on domestic production. Most wholesale trade of oil and gas is handled by separate firms. Shipping and transmission of oil and gas plays a critical role in Russia's transport sector.

Statistics on oil refining are treated separately in the national accounts. Over the past decade, oil refining has represented 3–4 % of Russia's GDP. The gas and oil components of the trade and transport branches, however, are harder to specify as a share of GDP, due in part to the practice of "transfer pricing." Transfer pricing refers to internal pricing within a corporate group or consortium among its units. Companies producing oil and gas in Russia often sell their products through subsidiary commercial businesses they control. Using transfer prices, the production company sells oil and gas to its own transport company or a trading firm at an artificially low price. These companies, in turn, sell the product onwards at a considerable mark-up. As a result, the value added and profits from the transaction are attributed in the national accounts to traders and shippers rather than oil and gas producers. Transfer pricing is used ostensibly as part of a firm's tax planning, but in Russia it also offers a means of tax evasion.

Because the benefits of the activities of the oil and gas sector are spread across multiple branches of the economy, simple analysis of production numbers distorts e.g. the extent of the Russia economy's dependence on natural resource extraction, the structure of the economy, as well as productivity development in various sectors of the economy. Studies have applied various methods in estimating the actual contribution to GDP of Russian oil and gas sector. Most studies come up with a result approximately double the official estimate based on production alone. They find that the actual contribution of the oil and gas sector over the past decade has been in the range of 17–25 % of GDP depending on methodology and year (Table 1).

Table 1. Estimated share of oil and gas sector in Russia's gross domestic product (% of GDP).

	2000	2001	2006	2007	2008	2009	2010	2011
Kuboniwa (2012, 2005)		18.5	23.6					
IEA (2011)				17.0	24.0		21.0	
IES (2010)					22.5	23.6		
Gurvich (2010)	24.7	20.5	22.6	19.0	21.1	17.1		
Economy ministry (2008, 2013)				18.7				20.9
World Bank (2005)	19.2– 22.3							

In other words, there is fairly uniform agreement that oil and gas plays a substantially larger role in the total output of the Russian economy than official figures suggest. However, even the high-end estimates of researchers put the contribution of the oil and gas sector around a quarter of GDP which means that largest part of production comes from other sectors. Indirectly the oil and gas sector, of course, supports also many other branches such as the chemical and metal industries.

When adjusted to reflect the oil and gas sector's actual contribution to GDP, Russia is on par with Norway (Table 2). This is much less than traditional oil states such as Saudi Arabia, which generates about half of its GDP directly from the oil and gas sector. As is the pattern elsewhere, the mineral extraction sector, which includes oil and gas, is typically a minor contributor to employment. Less than 2 % of the Russian labour force is employed by the mineral extraction sector. The share is even smaller in many countries.

Table 2. Mineral extraction sector: shares of GDP and labour force employment in 2005, %.

	<b>GDP</b>	<b>Employment</b>
Saudi Arabia	49.2	1.4
Venezuela	32.4	0.7
Norway	26.1	1.6
Kazakhstan	16.4	2.5
Canada	8.6	1.1
Mexico	7.2	0.5

Sources: UN and ILO.

The contributions of Russia's whole energy sector to GDP and employment are still slightly larger than the estimates presented above. To the energy sector (*toplivno-energeticheskii kompleks*) as a whole is typically included also coal production, and electrical power generation in addition to oil and gas sector. Coal production in recent years has corresponded to around 0.4–0.7 % of GDP, while electrical power generation contributes some 2–3 % of GDP. All in all, the contribution of the energy sector as a whole is estimated to lie in the neighbourhood of 30 % of GDP (e.g. MinEnergO, IES).

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## Heli Simola

### How long can Russia sustain high levels of oil exports?

#### Oil output set to decline as domestic demand rises

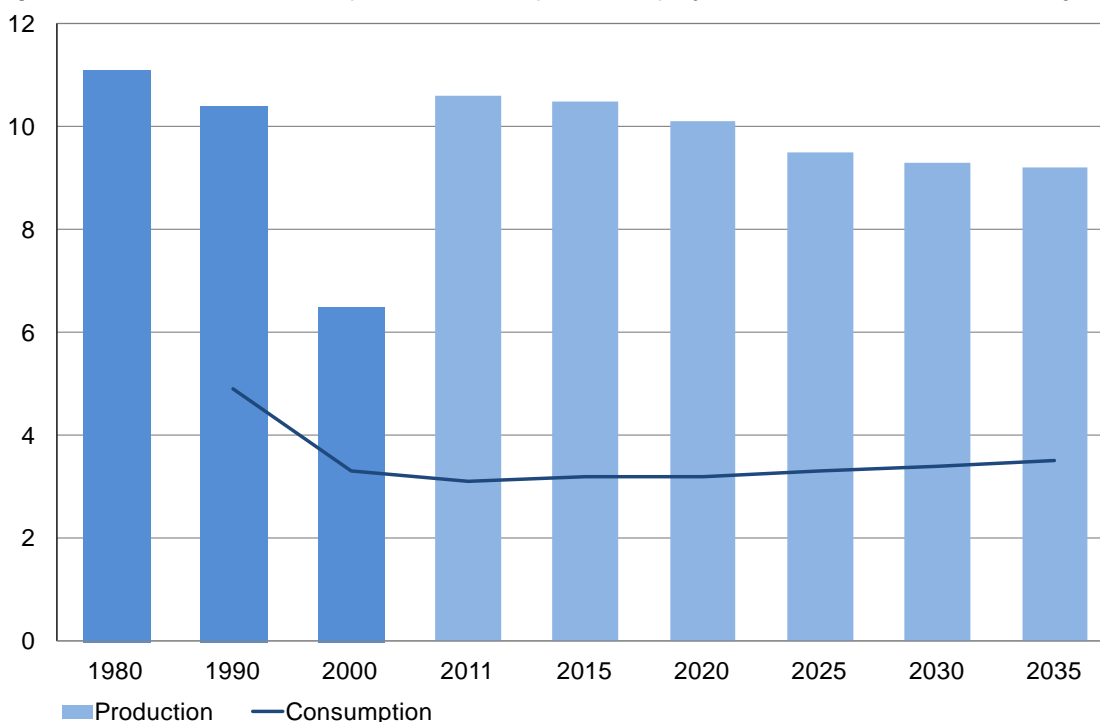
Russia has been tied with Saudi Arabia in recent years as the world's biggest oil producer. At the current pace of production, Russia's proven reserves should last about 20 years. The International Energy Agency (IEA, 2011) estimates that the size of Russia's remaining recoverable reserves is nearly four times its proven reserves.

Russian oil production levels began to climb rapidly after 2000. Around 2005, growth slowed down visibly as taxation on the oil sector was sharply increased and the level of political risk surrounding the sector rose. Interest in boosting production and new investment waned, even though nothing had changed with regards to the investment needs of a sector critical to Russia's future economic success. The lack of timely investment has meant that Russian oil production capacity has been stretched to the limit in recent years. Oil production has recovered to 1990 levels, although there is little likelihood that the peak levels of industry in the 1980s will again be matched.

Most Russian oil production comes from a few giant fields in Western Siberia and the Urals region that have been in production for decades. As output at these mature fields declines, maintaining Russia's production at current levels need investment elsewhere to bring new fields on stream. The new fields under development are mostly located in Eastern Siberia and on Sakhalin Island, and still only account for a small fraction of Russia's total output. Several promising deposits have also been found in e.g. Northern Russia and on the Arctic continental shelf. Exploiting these deposits, however, is costlier than the existing ones due to extreme conditions, remoteness and sensitive environments. A number of forecasts expect Russian oil production to decline gradually over the next few years. Figure 1 below gives the most recent IEA prognosis (IEA, 2012). Russia's official forecast is a bit more positive. Under the government's current energy strategy, oil production would rise an average of 0.4 % a year over the next two decades.



Figure 1. Russian crude oil output and consumption; IEA projections (millions of barrels a day)



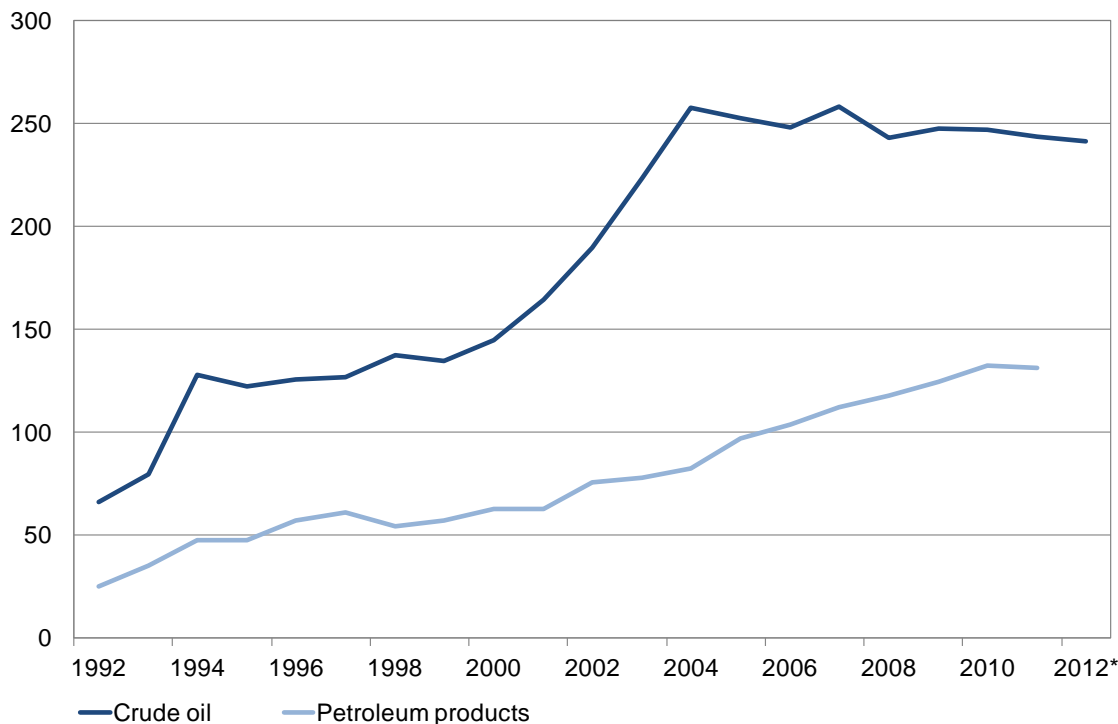
Source: IEA.

Domestic refineries, in particular, should see their oil demand outstrip production. Demand for fuels in Russia is soaring as the economy grows and road, rail, air and river traffic increase. Despite a boom in the number of passenger cars, Russia still has fewer cars per capita than most developed countries. In recent years, demand for gasoline has occasionally become so great that the government has intervened with temporary restrictions on gasoline exports in order to assure adequate domestic supplies. Even if the state does not explicitly regulate domestic fuel prices, oil companies have occasionally refrained from raising gasoline prices.

The volume of Russian crude oil exports nearly doubled during 2000–2004 to around 5 million barrels a day, making Russia the world's second largest oil exporter after Saudi Arabia. Since the mid-2000s, the volume of Russian crude exports has remained quite stable (Figure 2). The flat trend reflects the already-mentioned slow growth in crude oil production and a pivot to exporting refined petroleum products. The volume of exported petroleum products has risen briskly in recent years. Today more oil than before is slightly refined in Russia instead of exporting it as crude oil. Some of this shift has been motivated by changes in the export duty framework; refined oil products with a higher value added are taxed at lower rates than crude oil. Even so, the degree of refining in petroleum products is still quite modest.

With the growth in domestic demand outstripping production, export volumes are unlikely to rise substantially in the future. A number of forecasts see Russian crude oil exports going into decline over the next few years. Even the optimistic scenario of the government's energy strategy sees crude oil exports remaining below 2005 levels for the next two decades. Exports of petroleum products, however, should continue to grow slightly.

Figure 2. Russian exports of crude oil and petroleum products, millions of tons



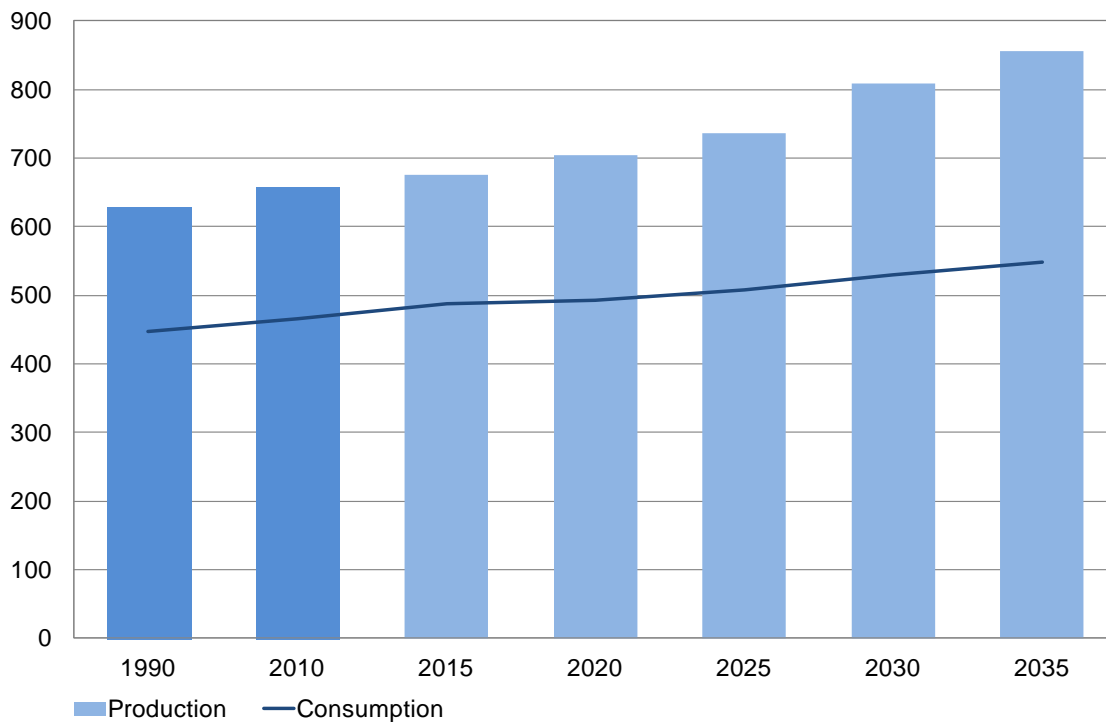
Sources: Ministry of Economic Development and Ministry of Energy (2012).

\*preliminary

## Natural gas production remains on a slow-growth path

Russia's international role as a natural gas supplier is even larger than its role as an oil supplier. Russia is tied with the United States as the world's largest natural gas producer and is unchallenged as the world's largest gas exporter. Russia holds the world's largest gas reserves, which represent about a quarter of the total global known reserves. Only Russia's proven reserves are sufficient to sustain production at current levels for the next 80 years.

Russian gas production began to rise in the first half of the 2000s, and in 2005 regained levels last seen in the early 1990s. On average, however, production in the 2000s only rose about 1 % a year. Moreover, the bulk of gas production continued to come from a few massive fields in Western Siberia. Production is generally declining now in these traditional production areas. Other gas deposits are gradually being explored and brought on stream, mostly in Eastern Siberia and Sakhalin Island, while survey and development of major deposits in the Yamal Peninsula and on the Arctic and sub-Arctic continental shelves have been postponed due to extreme conditions, remoteness and daunting production costs.

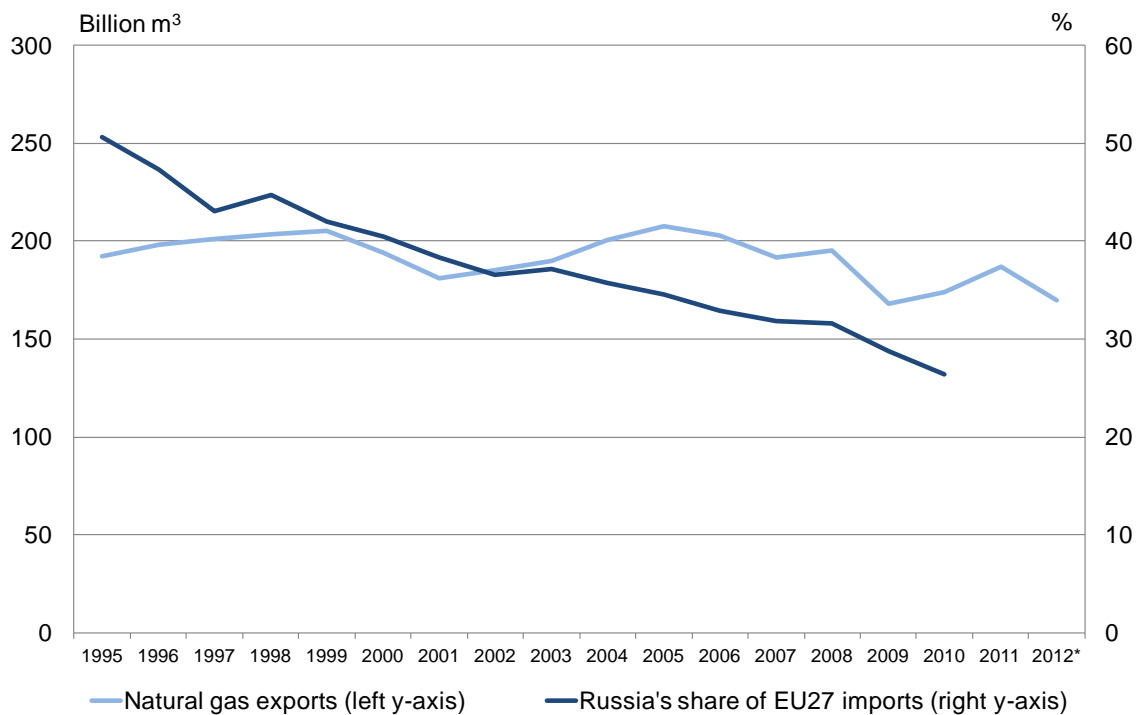
Figure 3. Russian natural gas production and consumption, including IEA forecast to 2035, billion m<sup>3</sup>

Source: IEA.

Forecasts by international institutions and Russian officials largely agree that gas production will grow at an average rate of 1–2 % a year over the next 20 years, while domestic demand should rise 1–1.5 % a year. Thus, most forecasts expect Russian gas exports to grow a bit in coming years. Russia's energy strategy assumes average growth of 2 % a year. In recent decades, however, the annual volume of Russian gas exports has remained around 200 billion cubic meters (Figure 4), although there was a sharp drop in 2009 during the depths of the international financial crisis. Gas exports fell 14 % that year, mostly on lack of demand.

A crucial issue recently for Russian gas exports has been the abundance of supply on the world market due to the increased availability of shale gas and LNG. Further, the global financial crisis has led to decline in demand in Russia's key markets, particularly in Europe. A growing chorus of criticism from Europe on Gazprom's long-term fixed-price supply contracts has driven customers to seek alternative suppliers.

Figure 4. Russia's natural gas exports (billion m<sup>3</sup>) and Russia's share of EU27 natural gas imports (%)



Sources: Ministry of Economic Development, Ministry of Energy and Eurostat.

\*preliminary

## Laura Solanko

### Successes in Arctic oil and gas development remain elusive

Estimates of Russia's oil reserves in Arctic regions vary widely.<sup>1</sup> The IEA (2011, p. 289) reports Arctic regions (including Sakhalin Island) contain about 55 billion barrels of unexploited oil reserves, or about 16 % of Russia's total oil reserves (conventional ultimately recoverable resources). Gas reserves are likely more substantial. The IEA (2011, p. 303) puts Russia's Arctic gas resources at around 50 trillion cubic meters, or about 40 % of the country's natural gas reserves (conventional ultimately recoverable resources). Even these numbers could understate hydrocarbon potential; geological surveys of the Arctic are just underway and some estimates are several times higher than the IEA figures.

Interest in exploring for Arctic hydrocarbon deposits has increased as production in Russia's traditional fields in Western Siberia has peaked. Extreme climates, long travel distances and fragile environmental conditions, however, mean that development of the Arctic region will require massive investment and implementation of new technology. State-owned Rosneft and Gazprom own the sole rights to develop oil and gas deposits on the Arctic continental shelf, but neither has the capacity or technical capability to exploit Arctic resources on their own. Realising this, the government is allowing other companies, foreign and domestic, to participate in joint ventures with Rosneft or Gazprom as minority partners. The government has recently engaged in an active debate as to whether it should licence offshore blocks on the continental shelf to privately held Russian firms, but the matter has yet to be decided.

### Promises of tax breaks to lure exploration

In his final days as prime minister in spring 2012, Vladimir Putin oversaw the creation of three new joint ventures for offshore exploration involving Rosneft and several foreign oil companies. In a speech in mid-April, Putin announced that export duties on new offshore production on the Arctic continental shelf would be dropped entirely and other taxes and resource fees reduced significantly. Soon thereafter, Rosneft announced the creation of joint ventures with US-based ExxonMobil, the Italian Eni and the Norwegian Statoil to focus on hydrocarbon exploration in the Arctic.

In January 2011, Rosneft had entered in an agreement with UK-based BP on wide-ranging exploration in the Kara Sea. The deal quickly fell apart, however, but already in August 2011, Rosneft announced it had reached an agreement with ExxonMobil on, among other things, setting up a joint research centre and technology transfer. In April 2012, ExxonMobil and Rosneft announced they were increasing cooperation through the establishment of a joint venture to explore and develop three blocks of the Kara Sea and one block of the Black Sea. Although exploration is just getting underway, the potential oil reserves of the Kara Sea blocks alone are put at around 40 billion barrels. ExxonMobil and Rosneft also hold substantial stakes in the Sakhalin 1 consortium, which is developing three fields off the northeast coast of Sakhalin Island.

Eni and Rosneft penned a separate cooperation deal in April 2012 to explore and develop two blocks in the Barents Sea and one block in the Black Sea. The total potential oil reserves of the three blocks are estimated to be around 36 billion barrels. Exploratory drilling in the Black Sea is slated to commence in 2015 or 2016, while drilling in the Barents Sea would not start until 2020.

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<sup>1</sup> Russia signed an agreement with Norway on demarcation of territorial waters in 2011. Russia's unresolved territorial claims today largely involve areas near the North Pole and the Kuril Islands.

Eni is also involved in gas production in Russia. It holds a minority stake in the SeverEnergiya gas venture, which oversees production in fields in the Yamal-Nenets autonomous region in Northern Russia. SeverEnergiya's partners include Enel, another Italian energy giant, which also owns electrical power plants in Russia.<sup>2</sup> Eni, for its part, is also involved with Gazprom in the South Stream gas pipeline that will run under the Black Sea.<sup>3</sup>

In May 2012, Statoil and Rosneft signed a deal on exploration of four offshore licences, one for the Perseevsky block in the western part of the Barents Sea and three blocks in the Sea of Okhotsk (Kashevarovsky, Lisyansky and Magadan 1). The blocks have total estimated potential oil reserves of about 2 billion tons. The first exploratory drilling will take place in 2016–2019 in the Sea of Okhotsk and in 2020 in the Barents Sea. Statoil and its French partner Total are also involved in a joint venture with Gazprom (majority stakeholder) to study the massive Shtokman gas field in the Barents Sea. The decision to go ahead with investment in development of the Shtokman field was delayed several times, and eventually Statoil pulled out of the venture in July 2012. Statoil has extensive experience with oil production in Northern Russia. Together with Total, it holds a 70 % stake in the Khariyagan oil consortium, which operates in Yamal-Nenets. Total is also extensively involved in Russian gas production, owning a 14 % stake in Novatek, Russia's largest privately held gas producer, as well as a 20 % stake in Novatek's Yamal LNG project.

## The long road ahead

Rosneft's new offshore ventures could bring considerable international investment and talent to hydrocarbon exploration in the Russian Arctic. The deals will also solidify Rosneft's position as Russia's largest oil producer for years to come. The basic idea behind the deals is that Rosneft provides each joint venture with offshore exploration licenses, while the foreign partners contribute know-how and investment capital for exploration. Rosneft retains a majority stake in all of these joint ventures. All contracts grant Rosneft access to a few joint ventures with its international partners outside Russia. The investment decision to move ahead with commercial production still requires years of research, exploratory drilling and amendments to Russian law to grant promised tax relief. Moreover, shifts in global markets for natural gas and oil, as well as uncertainty over Russian export duties, have diminished enthusiasm for study of Arctic gas deposits. The IEA (2011) does not expect commercial oil production in the Arctic to start before 2030.

An example of difficulties related to Arctic production is Gazprom-owned Prirazlomnoye oil field in the Pechora Sea, which after over 20 years of development is still not producing any oil. Prirazlomnoye was discovered in 1989 and it is located just 60 kilometres from the coast in shallow waters (20 metres). In contrast, the Statoil/Rosneft blocks in the Sea of Okhotsk are located under 70–350 meters of water, while the Perseevsky block in the Barents Sea is located about 350 kilometres from Barents Island and over 1,000 kilometres from the mainland.

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<sup>2</sup> SeverEnergiya is a consortium operating mainly ex-Yukos assets. The Italian firms Eni and Enel hold a 49 % stake, while Novatek and GazpromNeft hold the 51% stake.

<sup>3</sup> Participants in South Stream include the French EDF, which is also involved in electrical power distribution in the Tomsk region.

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Laura Solanko

## Shake-up in the natural gas market – new sources, LNG and market pricing

The popular topics in gas discussion today such as shale gas, LNG, gas market reforms, and their impacts on Gazprom's dominant market position, would have seemed strange just five years ago. This is more than new terminology or debate-framing; it is the language of an industry coming to grips with major shifts in its markets.

Just a decade ago, most of the natural gas consumed in the EU was piped in from elsewhere in the EU (mainly from the North Sea), Russia, Norway or Algeria. Natural gas does not have a global market price like crude oil, as transmission and storage requires producers and consumers to maintain their own dedicated infrastructures. As a result, gas pricing in Europe was traditionally tied to world prices of crude oil and certain petroleum products. Supply contracts tended to be very long term. As oil prices rose during the 2000s, natural gas became a pricy energy source, particularly for electrical power producers. EU emissions-trading schemes were supposed to favour the use of relatively clean natural gas in electricity generation, but ultimately the price of carbon credits was so low that they provided industry with little incentive to stay committed to gas.

The pressure to lower gas prices spread beyond electricity producers in 2008–2010 as a range of other factors came into play, particularly reduced gas demand in Europe and a dramatic increase in gas supplies globally. IEA forecasts currently do not expect European gas consumption to return to its 2010 level before 2020. In the meantime, liquefied natural gas (LNG) supplies have increased rapidly with Qatar's massive LNG facilities in the Persian Gulf becoming operational. The hydraulic fracturing (fracking) boom in the US has boosted domestic gas production so much that the country suddenly finds itself self-sufficient in gas. With the world's sea lanes full of tankers laden with LNG, LNG has become cheaper than traditional pipeline gas. LNG's share of natural gas imports to the EU was about 15 % pre-crisis, but post-crisis have risen to nearly 20 %.

One reason for the rising popularity of LNG is that it can be bought and sold on the spot market in the form of supply contracts that are shorter than four years and can be as small as a single shipload. The spot market accounted for less than 10 % of global LNG trade up to 2005, but by 2012 it represented about a quarter of all LNG deals. Spot-gas trading volumes have increased sharply on European exchanges, so price formation is now largely market-based.

These changes in gas markets have pushed some European energy companies and large industrial consumers to demand discounts from gas suppliers and increased flexibility in the long-term pipeline gas supply contracts.<sup>4</sup> While some gas producers have been willing to lower their prices, Gazprom continues to resist changes to its pricing scheme, which ties the gas price to oil prices and relies on a traditional supply contract framework. Gazprom's stance is by no means unique,<sup>5</sup> but as the EU's largest gas supplier, Gazprom has become the main object of criticism. In September 2012, the European Commission launched an enquiry into Gazprom's operations. If the Commission finds that Gazprom has abused its dominant market position and limited competition in the market, the EU could force Gazprom to alter significantly its practices within the EU. Gazprom has been put under further pressure by Norway's state-owned Statoil, the EU's number-

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<sup>4</sup> Most Gazprom long-term supply contracts contain a "take-or-pay" clause that obliges the buyer to pay for at least 85 % of the contract amount, even when there is insufficient demand in the buyer's market to justify taking the minimum supply amount.

<sup>5</sup> Algeria's Sonatrach, too, has refused to modify its pricing scheme.



two gas supplier. Statoil claims to tie about 40 % of its gas exports to gas market prices on the British NBP.<sup>6,7</sup> Gas buyers are clearly attempting to minimise their dependence on Gazprom as long as gas spot prices remain below prices linked to world oil prices. Thus, even if gas production within the EU dwindles further and imports rise in the next few years, Gazprom's exports to the EU are not expected to increase. Instead, the gap in imports will be made up by LNG shipments from e.g. Qatar, Nigeria, and Trinidad and Tobago.

Only time will tell if Gazprom's intransigence on pricing schemes and insistence on long-term supply contracts makes commercial sense. Global gas demand is expected to rise rapidly, but much of that growth is taking place in Asia's emerging economies, as well as advanced economies like Japan and Korea that are rethinking their commitments to nuclear power. Lacking the necessary pipeline infrastructure to serve these markets, most gas imports will be shipped to Asia in the form of LNG.<sup>8</sup> LNG currently represents about half of global international gas trade. If growth in Asia remains strong and the shale gas boom peters out, the price of LNG could rise significantly in Europe. On the other hand, if shale gas production continues to expand rapidly in the US, China and Australia (and to a lesser extent in Poland and Ukraine), spot market prices could long remain below gas prices linked to oil prices further eroding Gazprom's competitiveness.

The shift to price formation in virtual markets such as NBP inevitably brings greater volatility in gas prices, and hedging against price swings raises the need for smooth-functioning financial markets. Currently trading in related financial assets is only taking shape and gas prices that track the oil price are far more predictable. Gazprom's insistence on the oil-price link is most likely also affected by domestic factors. Linking gas export prices to market prices in Europe could spur Russia's debate on gas pricing for domestic customers. Lifting domestic price regulation should inevitably challenge also Gazprom's export monopoly. For the time being, it might be easiest and most realistic for Gazprom to concede a share of the EU gas market, which is on the other hand in line with the ambitious demands of Russia's 2030 energy strategy.

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<sup>6</sup> The UK National Balancing Point (NBP) is a virtual gas trading hub operated by TSO National Grid that provides near real-time gas pricing.

<sup>7</sup> <http://www.reuters.com/article/2012/11/20/statoil-wintershall-idUSL5E8MK0W320121120>

<sup>8</sup> The exception is China, which also imports small amounts of gas via pipeline from Turkmenistan and Uzbekistan.

## Laura Solanko

### Diversifying routes for oil and gas export

Crude oil and natural gas are exceptional commodities. Moving these volatile hydrocarbons from one point to another requires a vast dedicated infrastructure, including long pipelines for transmission, massive refrigeration and compression capabilities, as well as special tankers for international shipping. Without pipelines and specialised ports for handling oil and gas, world trade in these commodities would be impossible. Crude oil and higher value petroleum products can also be shipped by rail or road, but oil moving from the oil fields to the refinery or to an export port typically involves pipeline transmission. Russia's traditional oil and gas production areas are remote – not just from their export markets but domestic consumers as well. For this reason, Russia has spent decades constructing an elaborate pipeline grid, the maintenance and operation of which are widely seen as critical to having a functional energy sector. Transport sector as a whole accounts for about ten percent of Russia's GDP. Rosstat's figures show that about half of all Russian transport activity is pipeline transmission of oil and gas when measured on a tons-per-kilometre basis.

Russia's pipeline grid for transmission and distribution of gas are owned by state-controlled Gazprom and its subsidiaries. Crude oil and bulk petroleum products are shipped via state-owned pipeline operator Transneft and Transnefteprodukt (mainly light oil products such as diesel fuel, gasoline and kerosene). Which is to say that Gazprom and Transneft essentially dictate oil and gas export routes. The quantities of oil and gas exports not shipped via the state-owned pipeline grid are marginal.<sup>9</sup>

Table 1. Russia's major crude oil pipelines and their end points (EU, China and Pacific Rim markets)

Pipeline	Capacity, barrels a day	Port / terminal	Completed
BPS-1	1.5	Primorsk	2001/2006
BPS-2	0.6	Ust-Luga	3/2012
ESPO-1	0.6	Skovorodino/Kozmino	12/2009
ESPO-2		Kozmino	12/2012
Druzhba	2	Belarus/Ukraine/Slovakia Poland/Germany	+ 1964
<i>Caspian Pipeline Consortium*</i>	0.7	<i>Novorossiysk</i>	<i>2001/2004</i>
Skovorodino-China	0.3	Daqing, China	1/2011

Sources: transneft.ru, kpc.ru, <http://en.rian.ru/business/20121219/178266236.html>, EIA Country Data Russia update 18.9.2012.

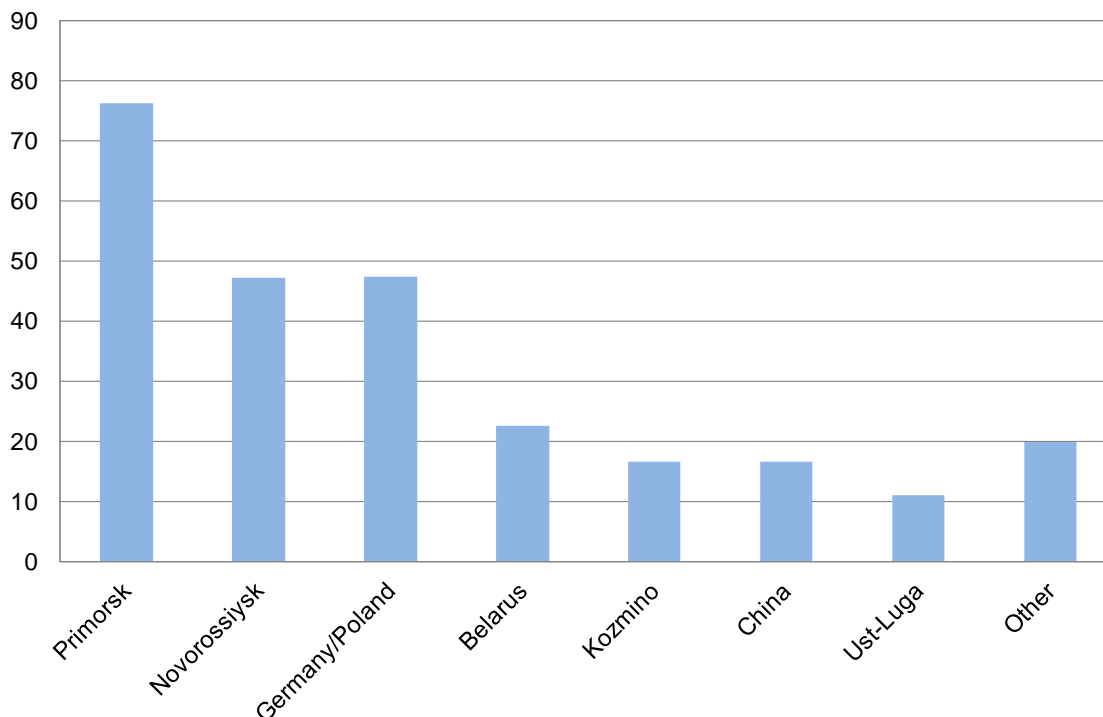
\*) The Caspian Pipeline Consortium (CPC) is a pipeline is mostly owned by private oil companies. It carries crude oil from fields in Kazakhstan to the Black Sea port of Novorossiysk.

<sup>9</sup> Lukoil exported about 5 million tons of oil via its own oil terminals, especially the Port of Varandeyn ([http://www.lukoil.com/static\\_6\\_5id\\_2171\\_.html](http://www.lukoil.com/static_6_5id_2171_.html)). Oil and gas produced in the Sakhalin fields are typically exported directly to markets in Asia. Small quantities of petroleum products are shipped by rail.

Over the past ten years, Russia has deliberately sought to shift oil and gas export operations to its own ports and terminals to reduce dependence on sometimes unreliable transit countries. At the end of 2012, over 40 % of non-CIS oil exports were shipped via the Primorsk and Ust-Luga ports on the Gulf of Finland (see Figure 1). The shift to Baltic shipping has been dramatic. Ten years ago, Russia did not have a single port for transshipping crude oil in the Gulf of Finland. Today, Russia's transshipping of oil from export terminals in Baltic states has been phased out entirely and shipment from Black Sea ports reduced slightly due to the new port capacity.

At the end of 2012, about 10 % of Russia's oil exports went to Asia (China and Sakhalin Island). Ten years ago the share of Russian oil going to Asian markets was practically nonexistent.

Figure 1. Main crude oil export routes 10/2011–10/2012, million tons



Source: CEIC (Transneft).

Diversification of gas export routes remains an area of intense focus. The last ten years have seen the inaugurations of the Blue Stream pipeline, which runs under the Black Sea from Russia to Turkey, and the Nord Stream pipeline, which runs under the Baltic Sea from Russia to Germany. In late 2012, final sign-offs from Serbia, Slovenia and Hungary allowed the go-ahead for construction of the South Stream pipeline, which will run under the Black Sea from Russia to Bulgaria and then on to Greece, Italy and Austria. In contrast, talks on construction of a gas pipeline to China remain bogged down after years of negotiations.<sup>10</sup> Russia's sole means of bringing gas to Asian markets is an LNG terminal located on Sakhalin Island. A second LNG terminal is planned for Vladivostok, but ground has yet to be broken on the project. Privately held Novatek is moving ahead with its LNG terminal at the Sabetta Port on the Yamal Peninsula. The terminal should be operational in 2016.

Because gas exports to EU countries are not expected to grow over the next few years, the main motivation for construction of new pipelines to serve the European market (i.e. South Stream and Nord Stream 3+4) is to bypass Ukraine. Russia and Ukraine have been embroiled in bitter gas

<sup>10</sup> Russia-China gas negotiations, see e.g. Henderson (2011)

transit and pricing disputes for years that have led to supply disruptions to Europe and political turmoil (Pirani et al., 2010). The Nord Stream pipelines 1 and 2 have already allowed Russia to diminish somewhat the amount of gas flowing to the European market via Ukraine. When the South Stream pipeline is complete, it should substantially reduce the amount of gas transiting Ukraine. On the other hand, Russia cannot abandon its Ukraine pipeline routes entirely. Ukraine has large natural gas storage facilities that will remain an integral part of Gazprom's gas transmission network in the foreseeable future.

Table 2. Gazprom's existing pipelines for export; pipelines and LNG terminals under planning

Completed		Planned	
	capacity, billion m <sup>3</sup>		capacity, billion m <sup>3</sup>
Blue Stream	16	Nord Stream 3+4	55
Nord Stream	55	South Stream	65
Ukraine-Slovakia	61	Altai (for Chinese market)	30
Ukraine-Romania	17.8	Vladivostok LNG	13.6
Yamal-Europe (Belarus)	32.9	Yamal LNG (Novatek)	20
Total to Europe	182.7		
Sakhalin II, LNG	13.6		

Sources: GazpromExport ([www.gazpromexport.fu/content/file/brochure/ge\\_ru\\_2011.pdf](http://www.gazpromexport.fu/content/file/brochure/ge_ru_2011.pdf)), [www.novatek.ru](http://www.novatek.ru).

### Further reading:

James Henderson (2011). The Pricing Debate over Russian Gas Exports to China. Oxford Institute for Energy Studies Working Papers, October 2011.

James Pirani, Jonathan Stern, Katia Yafimava (2010). The April 2010 Russo-Ukrainian gas agreement and its implications for Europe. Oxford Institute for Energy Studies Working Papers, June 2010.

## Heli Simola and Laura Solanko

### An oil and gas sector ruled by giants

A few behemoth companies dominate Russia's oil and gas sector. Nearly all are state-majority owned. While the state's involvement in the oil and gas sector has actually increased in recent years, the situation is hardly exceptional internationally. Many countries have nationalised their oil and gas industries entirely or have extensive state involvement in the sector. Russia's oil and gas companies play a huge role in the national economy. Six of the country's ten largest companies operate in the oil and gas sector, and listed companies in the oil and gas category account for over half of the market capitalisation of the Moscow Stock Exchange. All of Russia's big oil and gas companies are vertically integrated (i.e. production, refining, distribution and transport). Gazprom, Lukoil, Surgut and pipeline grid operator Transneft are even involved in electrical power generation in various Russian regions.

#### Rosneft, Russia's biggest oil company

Russian oil production is dominated by five companies that together produce about 80 % of Russia's crude oil (Table 1). The Big Five include state-owned Rosneft and Gazprom Neft, as well as privately held Lukoil, TNK-BP and Surgutneftegaz.<sup>11</sup> Rosneft is currently in the process of acquiring TNK-BP. When the deal is completed, Rosneft will account for about 40 % of all Russia's oil production, and the two big state-owned companies together will account for about 50 %. The five mid-sized oil companies (Tatneft, Slavneft, Bashneft, Rusneft and Zarubezneft) are considerably smaller. The bulk of transport of oil and petroleum products is handled through state-owned Transneft and Transnefteprodukt.<sup>12</sup> Both firms are designated as "strategically important" by the government, which means there are no plans to privatize them.

Table 1. Russia's biggest oil producers

	<b>Average daily production in 2011 (millions of barrels)</b>
Rosneft	2.45
Lukoil	1.72
TNK-BP	1.55
Surgutneftegaz	1.22
Gazprom Neft	0.89
Tatneft	0.52
Other companies	1.60
Total Russian output	10.18

Sources: Company financial reports and Rosstat.

Russian oil companies have traditionally concentrated on domestic market operations, but have gradually expanded into other markets in recent years. Rosneft is a participant in joint ventures to explore for oil in Kazakhstan, Algeria, Venezuela and the United Arab Emirates. Last year, Rosneft

<sup>11</sup> [http://www.minenergo.gov.ru/activity/oilgas/structure\\_gas\\_industry.php](http://www.minenergo.gov.ru/activity/oilgas/structure_gas_industry.php)

<sup>12</sup> <http://transnefteprodukt.ru/company/information/>

also signed Arctic and sub-Arctic offshore exploration and development joint venture agreements with several foreign oil companies. Rosneft expanded its refining operations abroad in 2011 through the acquisition of a 50 % stake in Ruhr Oel, which owns stakes in four German refineries. The deal means that nearly 20 % of the company's 62-million-ton refining capacity is located outside Russia.<sup>13</sup> Rosneft has also agreed with the Chinese CNPC on construction of a refinery in Tianjin.<sup>14</sup>

Lukoil, Russia's biggest privately owned oil producer, operates in 37 countries. In addition to oil production in Russia, it has production in Kazakhstan, Uzbekistan, Azerbaijan and Egypt. While production outside Russia accounts for less than 7 % of the company's total production, some 40 % of Lukoil's refinery capacity is located outside Russia (most notably Italy, Bulgaria and the Netherlands). Unlike its domestic refining capacity, Lukoil's foreign refining capacity has not been fully utilized in past years. Lukoil's fuel distribution chain extends to 27 countries, mostly in Europe (including Finland), but also serves markets in the US and Central Asia.

In principle, the Russian state does not regulate prices of crude oil or petroleum products. Refined fuels like gasoline, however, are more expensive in Russia than in most major oil-producing countries. Because gasoline prices are a politically sensitive issue, oil companies are from time to time encouraged to "voluntarily" refrain from raising fuel prices. Such encouragement was quite evident ahead of the Duma election in late 2011 and the presidential election in spring 2012. Domestic prices for petroleum products (and thereby crude oil) are sometimes indirectly regulated through adjustments in exports duties. When domestic supplies of gasoline dipped in spring 2011, export duties were hiked 90 % to increase gasoline availability inside Russia. The move effectively halted gasoline exports, while providing a sudden increase in domestic supplies and lower gasoline prices.

## Gazprom continues to dominate the gas sector

Production and transmission of gas in Russia are dominated by state-controlled Gazprom. It accounts for about 75 % of Russian gas production (Table 2). Gazprom's output has risen quite slowly in recent years, allowing other producers to eat into Gazprom's share of gas production. The newcomers include privately held firms like Novatek, which has seen its production grow rapidly in recent years. Gazprom maintains an absolute monopoly on exports at the moment, but the LNG production planned by Novatek on the Yamal Peninsula is about to change the situation. Novatek is currently already in the construction phase of an LNG export terminal in Sabetta in Northern Russia jointly with Gazprom. State-owned Gazprom retains exclusive rights to export gas via pipeline.

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<sup>13</sup> <http://www.rosneft.com/news/pressrelease/05052011.html>

<sup>14</sup> <http://www.rosneft.com/Downstream/refining/Construction/>

Table 2. Russia's biggest gas producers

	<b>Production in 2011 (billion m<sup>3</sup>)</b>
Gazprom (parent + holdings in other companies)	513.2 + 11.3
Novatek	53.5
Lukoil	13.8
Itera	13.1
Surgutneftegaz	13.0
Rosneft	12.9
Other gas producers	39.0
<b>Total Russian output</b>	<b>669.8</b>

Sources: Company annual reports and MinEnerg.

Gazprom has distinguished itself among Russian gas companies in recent years with its active participation in international projects. It has oil and gas production operations in Uzbekistan, the North Sea, Serbia and Libya. While the amount of gas produced outside Russia is still relatively small compared to Gazprom's domestic production, Gazprom is moving ahead in oil and gas exploration projects in Algeria, Iraq, Venezuela and Vietnam, as well as joint ventures involving gas transmission and distribution in the EU and CIS.

Russia's domestic gas market is regulated. There was an effort to partly liberalize gas pricing in 2006–2008, but deregulation came to a halt with the onset of the financial crisis. The government has, however, sought to raise the administratively set rates for natural gas every year. (For further discussion of domestic gas rates in Russia, see e.g. Anker et al., 2009).<sup>15</sup>

<sup>15</sup> Morten Anker, Daniel Buikema Fjærtøft, Jouko Rautava, Heli Simola and Laura Solanko: "Russia, Finland and Norway: Economic Essays." BOFIT Online 10/2009.

## Vesa Korhonen

### The days of booming growth in federal oil revenues are over

Over the past ten years, Russia's state finances have become quite dependent on revenues from energy taxes. The bulk of that comes from the oil sector in the form of special taxes. At the start of Russia's oil boom in 2000, production taxes on crude oil, along with export duties on oil and petroleum products, represented less than one tenth of consolidated budget<sup>16</sup> revenues – despite the fact that the oil sector accounted for a substantially larger share of economic output (estimates range between 20–25 % of GDP at the time and still about 20 % of GDP today).

Three factors contributed to the sharp rise in state revenues from oil taxes. First, despite intense opposition from Russia's oil oligarchs, taxes on oil production and export duties on oil and petroleum products were raised substantially in the early 2000s during president Putin's first term. The export duties, which account for nearly two-thirds of oil tax revenues, as well as the production tax were structured to rise progressively with the world market price. Thus, the taxes were designed to rise more sharply than the rise in the oil price. Second, world market prices of oil and petroleum products increased nearly seven-fold in dollar terms between 2000 and 2008. Third, crude oil production in Russia increased about 60 % in the period, production of petroleum products rose 40 % and export volumes of oil and petroleum products doubled.

As a result, revenues to the state from oil production taxes and export duties increased some 50–60 times in nominal terms between 2000 and 2008. By 2006, revenues from oil taxes funded nearly a quarter of the state budget. With revenues from natural gas export duties and production taxes included, that share climbed to nearly 30 % of budget revenues.<sup>17</sup> As other budget revenue streams also swelled, total state revenues increased ten-fold in nominal terms in the period. Still, revenues from oil taxes remained the main drivers behind the increase in budget revenues relative to GDP (Figure 1).

The Russian state began to generate substantial annual budget surpluses (7–8 % of GDP during 2005–2007), so money was set aside in the state reserve funds. This was feasible even if government spending increased eight times in nominal terms during 2000–2008 due to e.g. president Putin's ambitious efforts to raise pensions and public sector wages. In real terms, spending roughly doubled. The government applied stimulus policies during the 2009 recession that further raised budget spending, and spending has since increased in line with economic growth. Russia's economy revived and oil prices again experienced a strong rise that lasted from spring 2009 to spring 2011. With budget revenues again growing, state finances went back into the black. Revenues from oil taxes as a share of total budget revenues returned to pre-crisis record-high levels.

Over time, the government has gradually become accustomed to budgeting on the assumption of higher oil prices. The oil price sufficient to balance public finances increased from below \$60 a barrel in 2008 to about \$105 in 2012. The emerging dynamic, however, is different from pre-crisis years both with regard to Russia's oil production and export volumes and the price of oil. While oil prices may rise at a reasonable pace over the longer term, this cannot be used, and currently it has not been used, as an assumption for the growth outlook for the Russian economy or budget spending policies. Russia's crude oil output has risen very slowly, and is not expected to rise in coming years. The volume of oil exports has decreased, and the expectations are meagre.

<sup>16</sup> The consolidated budget comprises the federal budget, regional and municipal budgets, as well as state social funds.

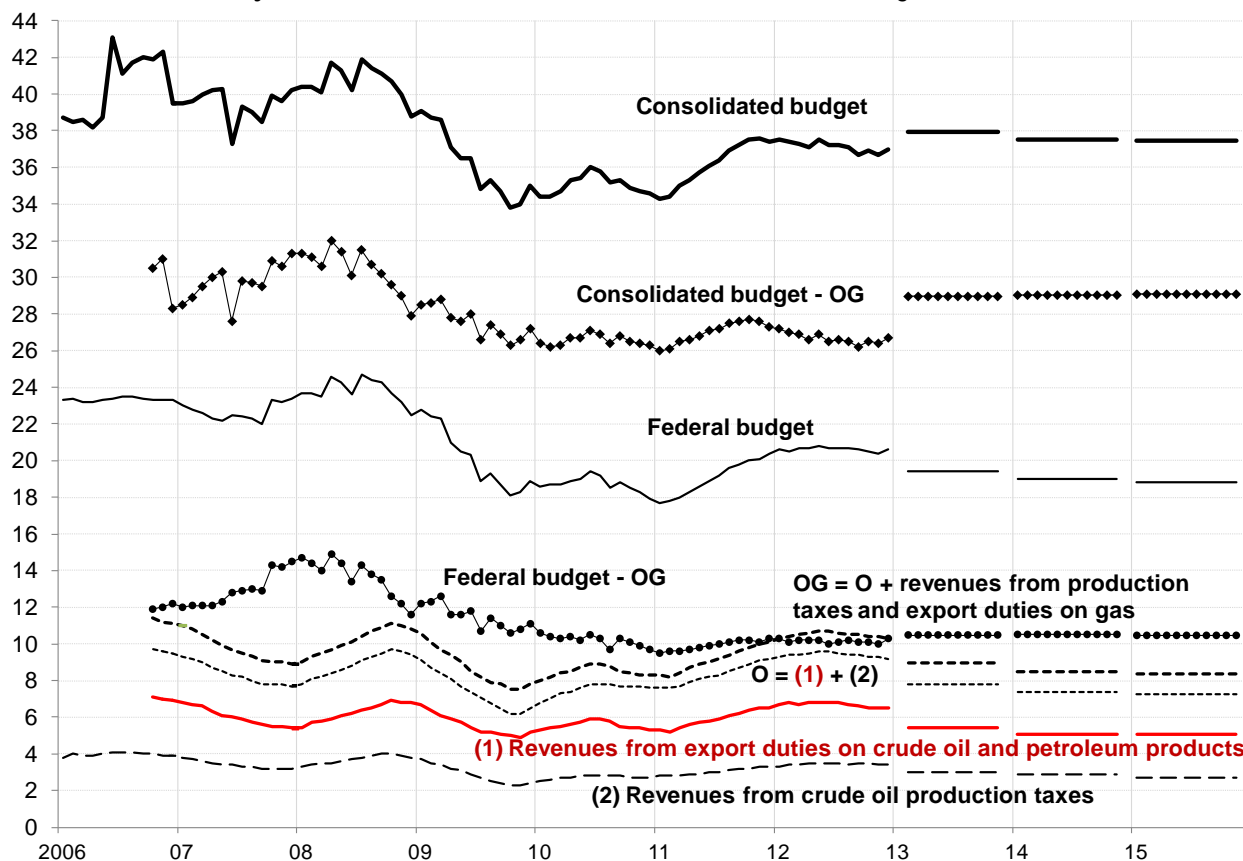
<sup>17</sup> The federal budget revenue shares were over 40 % (oil taxes only) and 50 % (gas revenues also included).



Production of refined petroleum products should increase, but exports are likely to fall as domestic consumption rises.

Under the current policy framework for Russia's state finances, budget revenues from oil are expected to develop so modestly over the next few years that their share of GDP should decrease notably. The current budget framework assumes an oil price of about \$100 a barrel, or some \$10 less than the average realised oil price in 2012. The oil price required to balance the federal budget will stay at around \$105, even with the scheduled restraint on growth in budget spending.

Figure 1. Revenues to the government budget from oil and gas taxes and other sources for 2006–2012; Russian finance ministry estimates for 2013–2015 (% of GDP, 12-month average)



Sources: Finance ministry and BOFIT.

Oil taxation was designed to channel a substantial part of windfall oil export earnings to the state coffers. As a result, Russia's oil and gas sector pays a higher share of taxes than other economic actors – especially when oil prices are high. The oil sector's tax burden presently equals more than half of the sector's contribution to GDP, assuming the sector generates about a fifth of Russian GDP. Duties imposed on exports of oil and petroleum products grab a sizeable share of the export earnings; nearly a third in 2012. Thus, this share also returned to its pre-crisis peak. Even after being taxed straight for oil production and exports, oil companies have managed to show profitability and figure among the economy's largest payers of profit taxes (even if such revenues have relatively minor impact on state finances overall).

Oil production still requires massive investment, so there is low enthusiasm for any further increases in oil taxation as such a move would increase uncertainty around planned investments. The energy ministry has tended to share this view with the oil companies, even acknowledging that maintaining oil output at current levels might require tax cuts for the oil industry. Individual oil

production areas and fields have received the advantage of tax breaks on production and exports. Only modest changes in tax policy in this regard are planned for the near future – the share of oil production subject to production taxes will rise a bit to almost 90 % of total oil production, while the part of oil exports subject to a duty will fall slightly to just over 83 % of total oil exports.

Russia has sought to limit the growth of budget spending and the state's heavy reliance on oil to finance spending through the implementation of explicit budget rules at the federal level. These rules also set limits on government spending at regional and local levels because the other levels have little opportunity to borrow on their own and are quite dependent on federal budget transfers for funding. In the years leading up to the 2009 recession, Russia approved a budget rule that limited the "non-oil" federal budget deficit to 4.7 % of GDP.<sup>18</sup> Application of the rule was postponed during the recession. Thus, in 2012, even though Russia's state finances showed a small surplus, the non-oil deficit was about 10 % of GDP.

The looser rule currently in use says that federal budget spending should be determined by budget revenue estimates based on the average oil price for a longer period in recent years.<sup>19</sup> Spending can exceed the revenue calculation by up to 1 % of forecast GDP. This spending rule, agreed as part of state fiscal policy for 2013–2015, has been slightly softened in the 2013 federal budget but is used as such from 2014 onwards. If oil and gas revenues are greater than expected, the excess revenues will be diverted into the state Reserve Fund. After the Reserve Fund grows from its current level of around 4 % of GDP to 7 % of GDP, half of the excess oil and gas revenues can be dedicated to funding public fixed-term projects.

The inadequacy and uncertainty surrounding oil tax revenues means that the government has to increasingly consider other revenues sources to fund the budget. The current fiscal policy frame seeks to increase other revenues so that their share of GDP should rise substantially in 2013. The federal authorities will raise the natural gas production tax, but limits to this stem from the need to encourage considerable investment to meet gas production targets. Thus, in the next couple of years, the biggest increases to budget revenues are scheduled to come from taxes completely outside the oil and gas sector, e.g. better collection of value-added taxes and increases in excise taxes. Over the longer run, the largest general taxes are candidates for increase, if needed. The corporate profit tax and VAT are not high compared to most other large economies, and Russians pay a very low flat labour income tax. How much they might rise depends on how severe Russia's leadership would find the need for money to pursue various government programmes and other promised expenditures.

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<sup>18</sup> Difference of budget revenues from other than oil and gas and budget expenditures.

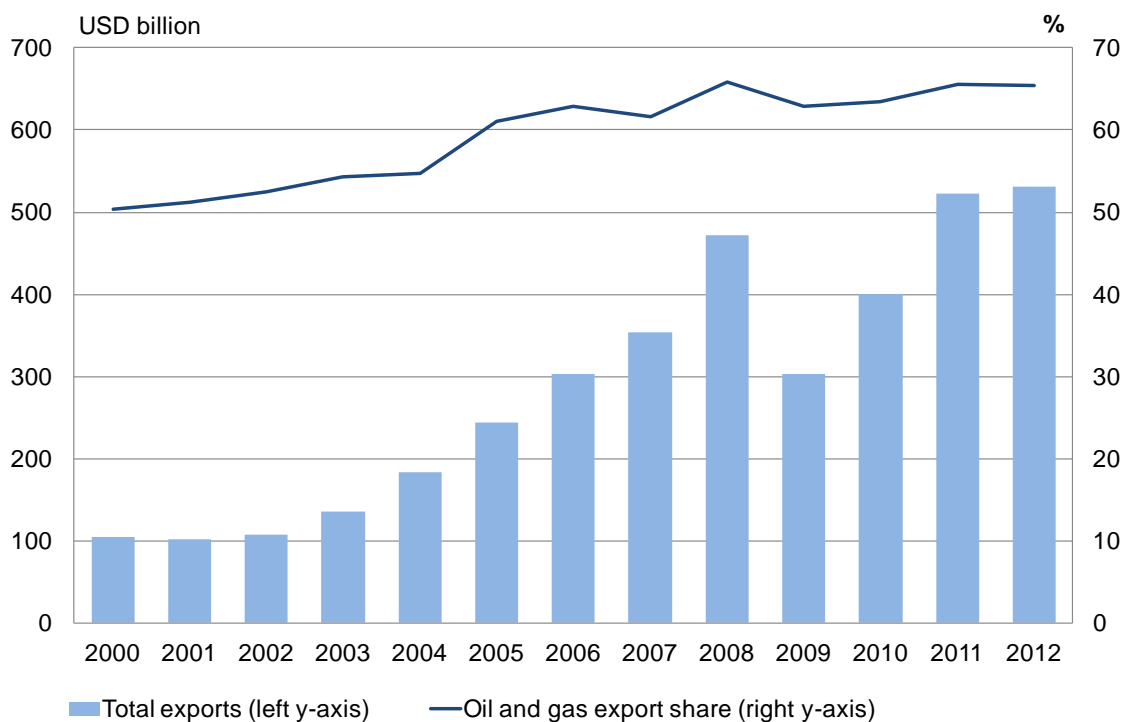
<sup>19</sup> The figure used for 2013 is the five-year average for 2007–2011. One year will be added to this average every year until 2018 when it reaches the contemplated ten-year average of 2007–2016 and then advance the period each year thereafter.

## Heli Simola

### Current account surpluses to vanish despite oil revenues

The oil and gas sector plays a crucial role in Russia's external balance. The value of Russian exports of crude oil, petroleum products and natural gas has increased nearly seven-fold over the past decade, reaching \$350 billion (nearly 20 % of GDP) in 2012. At the same time, the share of oil and gas in Russia's total goods exports rose to around two-thirds (Figure 1). Russia's other exports are also largely commodity-based including metals, which prices often track oil prices. Huge revenues from oil exports allowed Russia to run current account surpluses throughout the 2000s, even if imports increased sharply during the decade. However, when oil prices plummeted during the global financial crisis, Russia's current account surplus in 2009 contracted by nearly half from a year earlier.

Figure 1. Value of Russian goods exports (USD billion) with oil & gas sector share (%).



Source: Central Bank of Russia.

The direction of Russian capital flows in recent years has largely reflected trends in oil prices. High oil prices tend to attract capital to Russia in the form of direct investment and even more so in the form of credit. Ahead of the financial crisis, foreign investment flowed to Russia as a result of brisk economic growth and high oil prices. Oil revenues helped stabilise state finances and boost Russia's creditworthiness ratings, which, in turn, made access to international credit markets easier for Russian firms. Private sector indebtedness grew rapidly. Over the past two decades, there were only a few years before the financial crisis when the private sector brought more capital into the country than it exported.

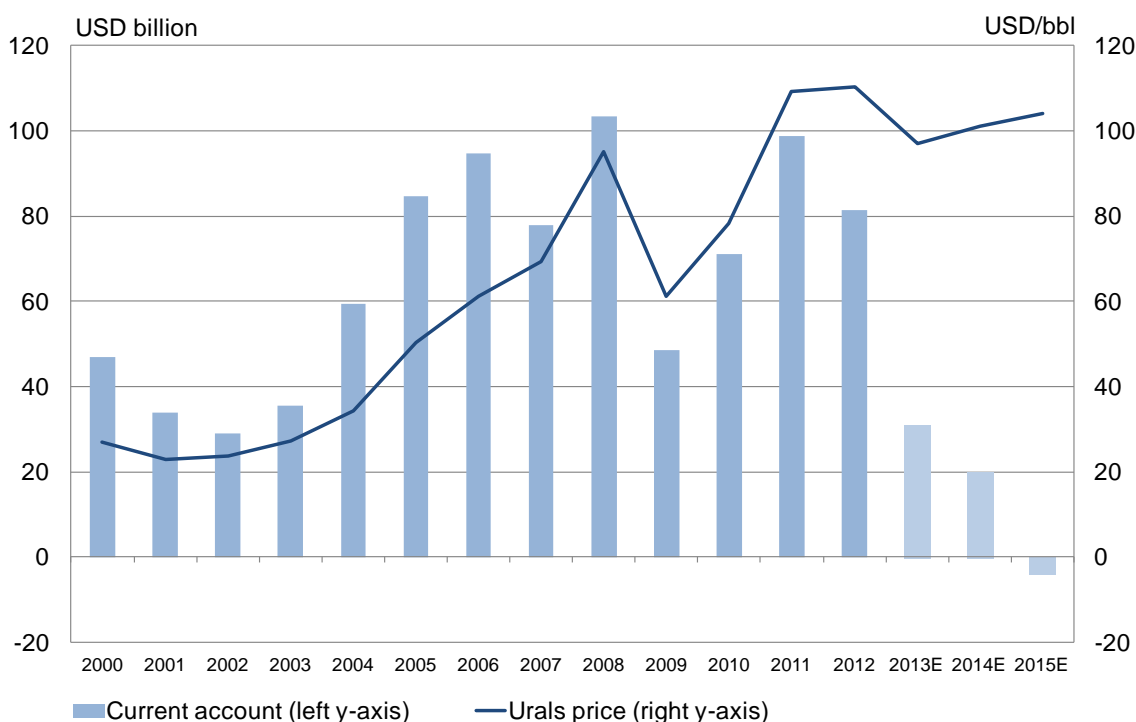
The high price of oil before the financial crisis induced huge inflows of foreign exchange into Russia in the form of export earnings and capital flows. The flood of foreign currency caused

Russia's currency reserves to balloon as the CBR strived to prevent excessive ruble appreciation by purchasing massive amounts of foreign currency. The central bank has recently adopted a more flexible exchange rate policy and announced plans to gradually phase out exchange rate steering altogether as it moves to a monetary policy regime based on inflation targeting. When changes in the oil price are more closely tied to the ruble's exchange rate, observers expect larger swings in the ruble's external value.

The trend in the value of Russian exports depends to a large extent on the oil price as the volumes of oil and gas exported from Russia are unlikely to increase much in coming years. Russian officials currently estimate (based on forecasts used e.g. in drafting the current budget) that the oil price will remain roughly around its current level of \$100 a barrel over the next few years and that the value of exports will increase slowly. In contrast, imports are expected to increase rapidly in coming years as domestic demand – especially consumption demand – continues to rise. A large part of domestic demand growth is expected to be met with imports as domestically produced goods cannot compete against imports or do not exist.

For this reason, both Russian and international forecasts see Russia's formerly substantial current account surpluses ultimately vanishing over the next few years. CBR estimates, which use the government's budget oil price assumptions, see the current account balance slipping into negative territory by 2015 (Figure 2). At that point, it will no longer be possible to increase imports further without adding to the deficit unless capital flows into Russia are increased through such measures as increased borrowing on international markets, selling off foreign assets or attracting direct investment. Russia's shrinking current account surplus implies depreciation pressure on the ruble. The central bank's more flexible exchange rate policy should reduce import demand as prices of import goods go up. A weaker ruble could enhance the competitiveness of Russian export goods, and potentially increase exports. The impact on exports, however, might remain modest due to the dominance of oil and gas in Russian exports.

Figure 2. Russia's current account balance (USD billion) and price of Urals blend (USD/bbl)



Sources: Central Bank of Russia Bloomberg.

## Laura Solanko

### Electricity reform – pioneering capacity markets

After ignoring investment in infrastructure for electrical power generation, transmission and distribution in the aftermath of the Soviet Union, electrical power shortages and outages became a serious issue for Russia about a decade ago. Even if administratively set rates for electricity were below production cost in many places, many people ignored paying their electricity bills. At the time, the state electricity monopoly was seen as a byzantine, opaque bureaucracy, flailing about in efforts to patch decaying infrastructure. More recently, it is rare to hear complaints about a dysfunctional power system. What happened?

During 2006–2008, Russia's electricity sector underwent fundamental structural reforms to transform the operating landscape for power generation and transmission. The reforms were seen as unavoidable, given that the Russian economy and electricity consumption were growing rapidly even as existing capacity was stretched. It had become clear that the availability of electricity in Russia's major growth centres was becoming an obstacle to economic growth (Figure 1). Moreover, sporadic outages, especially in winter, caused by the decrepit power grid, were increasingly becoming a political issue. Decision-makers understood that change was unlikely to happen without radical reforms and private investment in new generating and transmission capacity. The role of the state had to shrink, state monopolies had to be dismantled and price-formation had to be deregulated.

Despite wide incredulity, this is exactly what happened. Russia's giant state-owned electricity monopoly RAO UES (United Energy Systems) was broken up into many small utilities, grid operators and brokers. Following international recommendations, the competitive parts of the sector (i.e. newly created generation and distribution companies) were privatized through public auctions during 2007–2008. New owners, in turn, committed to investing in new power generation capacity over the next ten years. The state retained ownership of the national power grid operator as well as newly created regional electricity transmission companies. These companies committed to substantial investment in the grid over the next few years. At the same time, the price of electricity on the wholesale market was gradually deregulated. The wholesale price of electricity and the price of electricity sold to businesses were effectively deregulated by early 2012. Russia introduced a dual-function electricity market, part focused on setting the price of electric power and part geared to assuring the availability of generating capacity to avoid strains on the system.

Thanks to these forward-looking reforms, the pace of investment in new power generation and transmission capacity continued throughout the economic downturn so that today threats of power shortages have largely abated. Nevertheless, connecting to the power grid is still troublesome and expensive. The World Bank survey *Doing Business 2012 – Getting Electricity* ranked Moscow second after Dhaka, Bangladesh as the most problematic city for arranging a permanent electricity hook-up to a new warehouse. Regional variations within Russia are large, but the survey found no evidence of a rapid and inexpensive new connection to the power grid available anywhere in Russia.

The structure of electricity consumption in Russia has remained stunningly constant since the 1990s. Households today still only account for a tiny share of power consumption. In Russia, as elsewhere, a large part of the end user's electricity bill comes from transmission costs. Electricity transmission and distribution costs are still administered by the Federal Tariff Service. Transmission tariffs have been raised sharply in recent years, while the pricing principles of grid operators and brokers are subject to ongoing discussion. With the rate hikes, companies in Russia

pay almost the same price for electricity as in Finland. Healthy competition in power generation would help to moderate wholesale price increases, but the rest of the electricity bill remains mainly determined by administrative action. Electricity reform in many ways has changed regulation and pricing in the sector, but the final configuration of Russia's electricity market has yet to be seen. At the moment, officials still wield considerable power to dictate company investment plans and pricing of transmission and distribution.

One of the biggest failures of the reforms has been the decision to exclude district heating production and distribution. This oversight has put cogenerating (combined electricity and heating) plants at a severe disadvantage during cold times of the year when cogeneration plants are effectively turned into must-run baseload plants irrespective of prevailing electricity price. The municipally-owned district heating networks are in poor shape and suffer from huge leakages and sporadic delivery interruptions. This forces many customers to seek out alternative ways to stay warm, which is a disaster from the perspective of energy efficiency and meeting climate change goals. Although there is discussion on how best to upgrade district heating grids, no clear policy proposals have emerged.

With the reforms, Russia now has one of the world's most progressive and innovative wholesale electricity markets. Trading on the electric power market allows for next-day delivery in a manner similar to e.g. the Nordic power exchange Nord Pool. Sellers and buyers must also trade in the capacity market, which has been designed to assure a sufficient amount of generation capacity is always available to customers. The final wholesale electricity price is a sum of the price for electric power and for capacity. Russia's capacity market is quite advanced as most EU countries with electricity trading still rely on a single price signal. In recent years, however, changes in electricity markets have increased interest in capacity markets in the EU and elsewhere. In a surprising role switch, it seems European planners could possibly take a few lessons from the Russian experience in developing their electricity markets.

Figure 1. GDP and electrical power consumption, 1995–2012



Source: Rosstat. Seasonally adjusted with E-views X12.

**Further reading:**

Solanko, Laura (2011). How to Liberalize a Thousand TWh Market? – Restructuring the Russian Power Sector. BOFIT Online 1/2011.

World Bank, Doing Business 2012, Getting Electricity;  
<http://www.doingbusiness.org/data/exploretopics/getting-electricity>

Vedomosti. Interview with Anatoly Chubais, 15.11.2012

- 2011 No 1 Laura Solanko: How to Liberalize a Thousand TWh Market? – Restructuring the Russian Power Sector  
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No 4 Vesa Korhonen, Mia Hurtt, Maija Sirkjärvi, Ilkka Salonen and Ilkka Korhonen: Venäjän integraatio maailmantalouteen  
No 5 Sergey Vlasov: Russian fiscal framework: Past, present and future. Do we need a change?  
No 6 Laura Solanko: Öljyntuottajamaiden elvytysvara on supistunut huomattavasti  
No 7 Riikka Nuutilainen and Laura Solanko: Metallien ja energian maailmankauppa kääntyi Kiinaan  
No 8 Heli Simola: Suomi hyötyy Venäjän WTO-jäsenyydestä
- 2012 No 1 Risto Herrala, Juuso Kaaresvirta, Ilkka Korhonen and Jouko Rautava: Kiinan kasvava mahti maailmantaloudessa. BOFIT Kiina-tietoisku 2011  
No 2 Heli Simola: Russian import statistics in the mirror of world exports  
No 3 Seija Lainela and Alexey Ponomarenko: Russian financial markets and monetary policy instruments  
No 4 Ilkka Korhonen, Vesa Korhonen, Seija Lainela, Heli Simola and Laura Solanko: BOFIT Venäjä-tietoisku. Venäjän talouden uusi aika  
No 5 Risto Herrala, Juuso Kaaresvirta, Ilkka Korhonen, Mikael Mattlin, Jouko Rautava and Heli Simola: Valta vaihtuu, mikä muuttuu? BOFIT Kiina-tietoisku 2012
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No 3 Heli Simola, Laura Solanko and Vesa Korhonen: Perspectives on Russia's energy sector