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Current State and Prospects of the Russian Energy Sector

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Contents

List of Tables and Figures

Summary

Russia and four other CIS countries – Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan – are important energy producers and possess substantial reserves, particularly as far as natural gas is concerned. Russia alone accommodates about one quarter of the global gas reserves and is the world's biggest gas producer. Although in terms of oil reserves the CIS countries lag far behind the Middle East, Russia has established itself – along with Saudi Arabia – as one of the world's two leading oil producers and exporters. However, unlike Saudi Arabia, Russia is not an OPEC member. Its relations with OPEC so far have been largely a history of non-cooperation, as Russia on several occasions took advantage of the OPEC's production cuts and expanded its market share, whereas the prospects of future cooperation appear equally problematic for a number of climatic and political reasons.

The prospects of the Russian energy sector are to be seen against the background of the newly adopted 'Energy Strategy until 2030', which appears to be in line with the government's announced programme of modernization and innovation. The key problems tackled in the Energy Strategy are the so far generally insufficient exploration and investments in the new hydrocarbon fields. This is due to a number of factors such as the rising state involvement in the oil sector, the confiscatory tax regime, and the low domestic tariffs for gas. As a result, the 'years to depletion' ratio for both oil and gas has recently been declining, the initially impressive increase in oil production has slowed down considerably, while gas output was stagnating before falling markedly in the wake of the global crisis. Deposits in the traditional energy-producing areas – Western Siberia and European Russia – are largely depleted. The depletion ratio of the main oil deposits stands at some 70%, while the three main gas deposits have reported declining production volumes since 1999. The fields which would enable maintaining or raising production volumes in the years to come lie predominantly in remote and technologically and climatically challenging areas such as Eastern Siberia, the Far East, the north of European Russia, and the Arctic and Pacific sea shelf. In many of these deposits, oil and gas are typically found together, which raises the importance of solving the long-standing problem of associated gas flaring – a major source of inefficiency.

The development of these deposits would require the creation of appropriate production, transport and social infrastructure. The related total investments over the period until 2030 are estimated at some USD 1-3 trillion, implying that a substantial boost from the current investment levels is needed. In addition, the development of offshore gas deposits and the government plans of geographic diversification of gas exports would require the construction of LNG plants, the expertise for which within the Russian gas industry – the Sakhalin-2 LNG plant apart – has been generally lacking so far. Meanwhile, the recent global economic crisis and the collapse of energy markets have undermined the financial situation of Russian energy producers and led to the downward revision of Gazprom's investment budget. In these circumstances, attracting more foreign investment and related

know-how, and more private capital in general, appears to be indispensable for the government plans to materialize. To this end, the government has already resorted to tax holidays for selected oil deposits, and further measures are reportedly on the agenda, including a gradual liberalization of the gas sector. According to current plans, the share of FDI in the Russian energy sector in 2030 should climb to 12% of the investment stock. Needless to say, intensifying the existing 'Energy Dialogue' between Russia and the EU and deepening the mutual investment penetration would be highly instrumental in achieving these goals.

The government's target is to increase, by the year 2030, oil production by 10% and gas production by some 40%, with half of the latter to be provided by the so-called 'independent' (from Gazprom) producers. The increase in the oil output would be largely channelled to domestic consumption, while crude exports should stay flat and those of oil products rise only marginally. At the same time, the planned tax reforms should facilitate a shift in the structure of the Russian energy export mix away from crude oil towards higher value-added oil products. In contrast to oil, half of the additionally produced gas should be exported: gas exports are to rise by about 50%. In turn, the rise in domestic gas consumption will be constrained by the planned tariff hikes, which should facilitate the substitution of gas by coal and nuclear energy, and induce energy-saving behaviour. The announced target is to lower the energy intensity of the economy by about three times and bring it close to the levels observed in developed countries with similar climatic conditions. Domestic gas savings resulting from higher energy efficiency, but also reduced flaring and leakages, should further improve Russia's gas export prospects – along with the increased supplies from Central Asia and particularly Turkmenistan, where Russia has been recently successful in advancing its presence.

The Russian government's target of exporting up to 20-25% of energy to the potentially promising Asian-Pacific region (including China) by 2030 mirrors the EU's stated objective of diversifying its energy supplies away from Russia. However, so far the results in this respect appear to have been mixed at best. While the geographical diversification of Russian oil exports has been slowly advancing and will be boosted further by the Eastern Siberia Pacific Ocean oil pipeline, the diversification of gas exports has been constrained by the price disagreements with China and the limited progress with LNG. In any case, given the envisaged sizeable overall increase in Russian gas exports, such diversification – even if successful – is unlikely to 'crowd out' Russian gas exports to Europe. This implies that Europe will almost certainly remain Russia's biggest energy export market in the medium and long run.

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Current state and prospects of the Russian energy sector

Introduction

The importance of energy issues has risen dramatically in the past few years. Up until the middle of 2008, world energy prices soared, partly reflecting market speculation but also the strong import demand. In the European Union, the problem had an additional dimension, given its extensive reliance on energy imports, a high proportion of which was coming from Russia and other CIS countries. Therefore, the developments in the energy sectors of these countries (particularly Russia, which is the world's biggest gas producer and one of the two biggest producers of oil) have been of increasing relevance for Europe. Most notably, insufficient investments into the exploration and development of new deposits, coupled with Russian domestic technological and institutional inefficiencies, have raised growing concern within Europe over the likelihood of a 'supply crunch' scenario as well as over the potential consequences of Russia's energy export diversification efforts from Europe towards Asia.

The global economic crisis and the dramatic contraction in energy import demand in Europe have put these issues in a new perspective. While the fears of a supply crunch in the near-term have subsided, the newly emerged financial constraints within Russia have put into question the necessary investments which are indispensable for the functioning of the Russian energy sector in the medium- and long run.

These issues are analyzed in the present chapter dealing with the current state and the future prospects of the Russian energy sector. After a brief overview of the oil and gas reserve potential of Russia and other CIS countries, the chapter focuses on the most pressing problem areas characterizing the Russian energy sector, including the high degree of depletion of existing reserves, the reasons behind the recent slowdown and stagnation respectively in the Russian oil and gas production, and the high energy intensity of the Russian economy. The future prospects of the Russian energy sector are outlined against the background of the newly adopted 'Energy Strategy until 2030'. Finally, several relevant aspects of Russia's external energy relations – including with the EU, OPEC, and the Asian-Pacific region – are discussed.

The role of Russia and other CIS countries in the world reserves

The availability of reserves is crucial to assessing the energy potential of any country or region. However, the definition of available reserves is not straightforward. The most

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common measure used is the so-called 'proven reserves'. Given that the domestic methodology of assessing reserves in the CIS countries dates back to the Soviet times and largely disregards economic considerations,[1] it appears reasonable to resort to independent estimates. Figures 1-4 give the estimates of proven reserves of oil and gas for the five energy-rich countries of the Commonwealth of Independent States: Russia, Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan (CIS-5) and the world regions taken from the BP Statistical Review of World Energy.

As can be seen from the figures, the Middle East is by far the biggest location of proven global oil reserves of 1.2 trillion barrels, accommodating nearly 60% of them, whereas the CIS-5 account for just 10%. Within the CIS-5, the bulk of oil reserves is concentrated in Russia and Kazakhstan: these two countries accommodate 79 billion and 40 billion barrels of proven oil reserves, corresponding to 6% and 3% of the world total, respectively. However, in terms of natural gas, the dominance of the Middle East is not as pronounced, and the five countries of the CIS do not lag much behind: the two geographic regions account for 41% and 30%, respectively, of global proven gas reserves totalling 185 trillion cubic metres (cm). Russia alone accommodates over 43 trillion cm of proven natural gas reserves (some 23% of the world total), while Turkmenistan concentrates another 8 trillion cm (4% of the world total). These data can be interpreted in a way that Russia's role as a potential supplier in the long run is far greater for natural gas than for oil.

The volumes of available reserves do not say much unless they are put in relation to the actual production and consumption volumes. Figure 5 indicates when proven reserves will be exhausted assuming the 2008 production levels. Judging by this indicator, the world oil reserves should suffice for some 40, and natural gas reserves for some 60 more years. Across the world regions, the Middle East tops the list as the potential future supply source of both oil and gas. However, some of the CIS countries perform well on this account as well, e.g. Kazakhstan in the case of oil (70 years) or Turkmenistan in the case of gas (120 years). Russia's gas reserves (72 years) appear to be decent, while the situation with oil (22 years) is apparently more problematic.

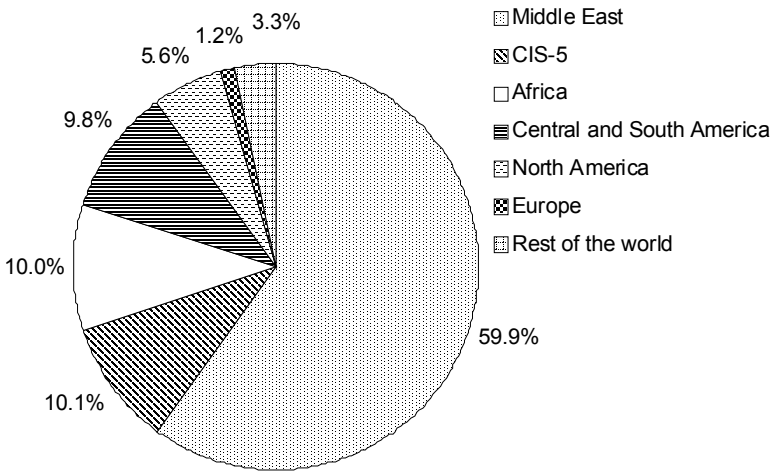
At the same time, the figures reflecting the 'years to depletion' are to be treated with caution. This is not only because they assume constant production volumes until the last barrel of oil/cubic metre of gas, but also because of the problems with the definition of 'proven reserves'. The latter are defined as reserves which can be recovered with reasonable certainty (assuming 90% probability) given

1. current geological knowledge;
2. current technology; and
3. current prices.

[1] See e.g. OECD (2006).

Figure 1

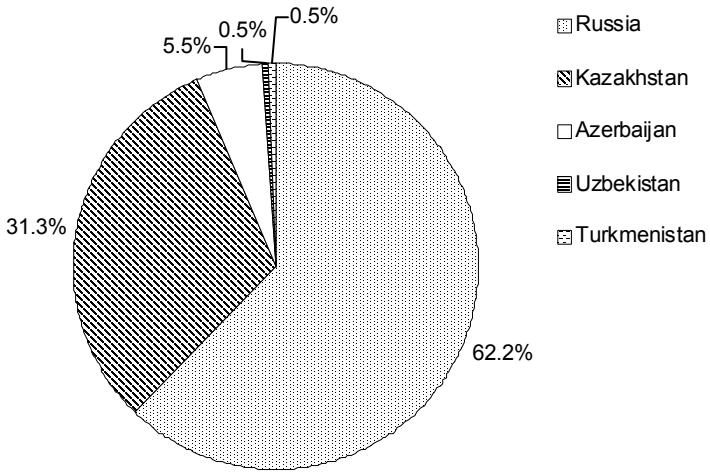
Global proven oil reserves by region, end of 2008, in % of world total



Source: BP Statistical Review of World Energy and own calculations.

Figure 2

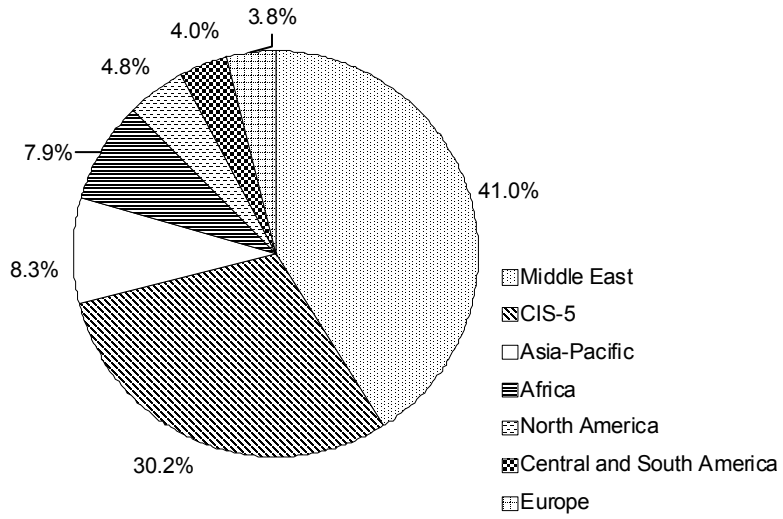
Proven oil reserves in the CIS-5, by country, end of 2008, in % of CIS-5 total



Source: BP Statistical Review of World Energy and own calculations.

Figure 3

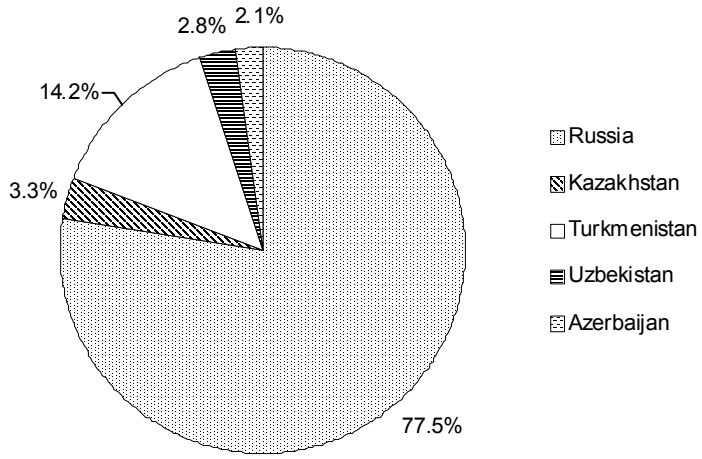
Global proven gas reserves by region, end of 2008, in % of world total



Source: BP Statistical Review of World Energy and own calculations.

Figure 4

Proven gas reserves in the CIS-5, by country, end of 2008, in % of CIS-5 total



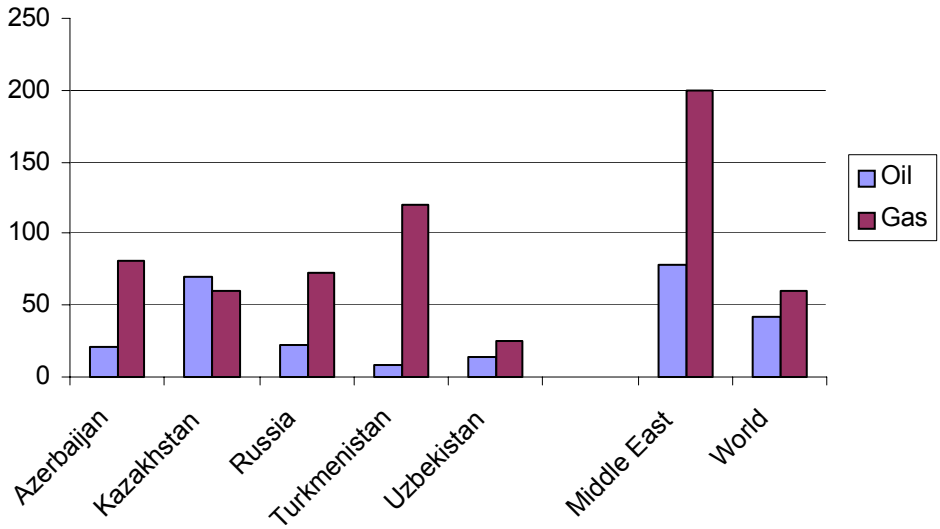
Source: BP Statistical Review of World Energy and own calculations.

Point (1) refers to the physical availability of reserves which may change e.g. thanks to the discovery of new fields or to the upgrades of estimates for the existing ones. The issue of physical availability is also partly reflected in point (2), as long as newly available technologies allow to extract hydrocarbon resources which might have been known before but whose extraction was technically impossible. Besides, points (2) and (3) reflect also

economic considerations. Thus, new extracting technologies may be more cost-efficient, allowing the recovery of previously overly expensive resources to become economically profitable. Clearly, higher output prices have a similar effect. Changes in points (1)-(3) automatically lead to changes in 'proven' reserves. While geological knowledge and technology usually change only slowly, energy prices tend to be volatile already in the short run and, even more importantly, they often create new expectations of medium-term price levels and thus affect investment decisions. The exhaustion of easily recoverable and cheap hydrocarbon resources leads, under the conditions of unchanged demand, to temporary supply bottlenecks and therefore higher prices. This, in turn, makes it economically profitable to recover more problematic resources so that they now fall into the category of 'proven'. Hence, there is a sort of an automatic mechanism ensuring that the physical recovery of 'proven reserves' does not necessarily lead to their depletion – even if there are no new field discoveries.[2]

Figure 5

Years to depletion, as of 2008



Source: BP Statistical Review of World Energy and own calculations.

Against this background, it is little surprising that the global proven oil reserves over the past thirty years have nearly doubled (from 670 billion barrels in 1980 to 1260 billion barrels in 2008), and those of natural gas more than doubled (from 80 trillion cm in 1980 to 185 trillion cm in 2008). Russia's proven oil reserves, according to BP statistics, have risen since 1998 by around 40%, although the proven gas reserves have been remarkably stagnant, pointing to the persistent bottlenecks in exploration and modernization within the Russian natural gas industry. Generally, it appears plausible that a sustained higher price level and/or advances in available extraction technology make hydrocarbon production economically profitable in the hitherto challenging (technologically, climatically or

[2] See e.g. Nakicenovic (2004).

otherwise) geographic regions, e.g. in Eastern Siberia or off-shore on the Arctic shelf, thereby automatically leading to an upward revision of the Russian 'proven reserves'.

Russia's reserve potential: problem areas

At the same time, the pace of increase in the Russian hydrocarbon reserves has been recently lagging behind the production pace, resulting in a gradual decline of the 'years to depletion' indicator (see Figure 6). For oil, the number of 'years to depletion' has declined between 1997 and 2008 from 22 to 17; the corresponding decline for natural gas has been from 84 to 72 years. The main reason behind has been the insufficient geological exploration of hydrocarbon deposits in Eastern Siberia, the Far East, Yamal and the Arctic shelf, which in the case of oil has been amplified by the rapidly increasing production. One manifestation of the insufficient exploration activities is the fact that investments into the oil and gas sector over the past five years stood at just 60% of the levels envisaged in the government 'Energy Strategy until 2020' adopted back in 2003.

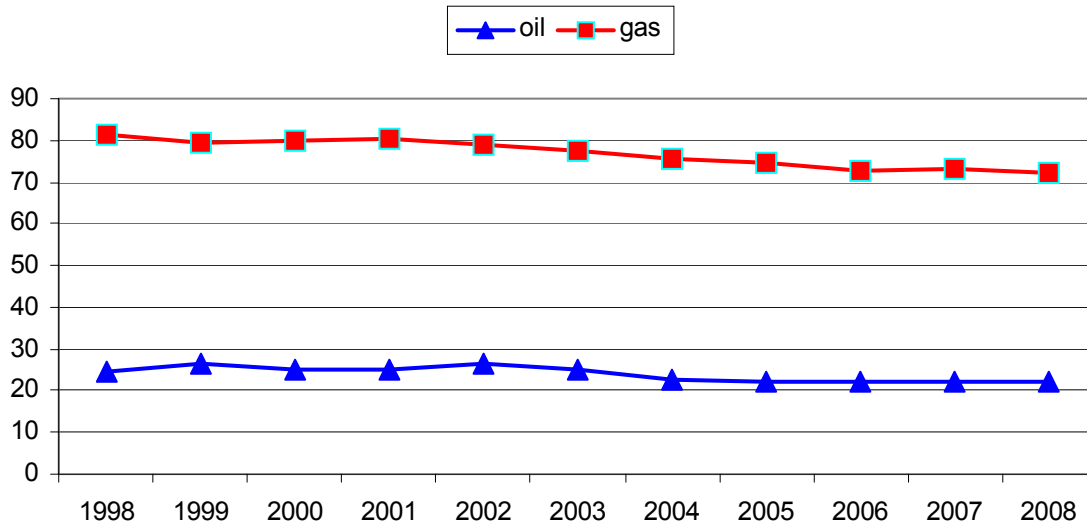
Meanwhile, according to official estimates, over 50% of the traditional oil deposits are by now depleted. The corresponding share for the European part of Russia stands at 65%, and for the Ural-Volga region (eastern part of European Russia) at more than 70%. The deposits in West Siberia – the main oil-producing region in Russia – also exhibit a high depletion ratio. The biggest oil deposits accounting for 77% of the overall oil production in the country have a depletion ratio of nearly 60% and 8-10 'years to depletion'. As a result, oil production is increasingly focusing on the medium-sized and small deposits, which are normally more technologically challenging. The share of 'difficult' deposits is growing and ranges currently between 30% and 65% depending on the oil company. Finally – and most importantly – the bulk of oil deposits lies in the geographically, climatically and technologically challenging areas: Eastern Siberia, the Far East, as well as on the Arctic and the Far East shelf (see Figure 7).[3] In these deposits, oil and natural gas are typically found together, which raises the importance of solving the existing technological problems such as the problem of gas flaring (more on that, see below). All these factors make oil production and transportation more expensive and require considerable investments. For instance, Ivanter et al. (2007) estimate that over the next two decades, the mean oil production costs in Russia will grow from around USD 55 per tonne now to USD 80-85 per tonne by 2030.[4]

[3] Besides, these remote areas account for more than 80% of Russia's *prospective* oil resources. Globally, Russia is the second biggest location of prospective oil resources (behind Saudi Arabia) and accounts for 13% of the total – see Nekrasov and Sinyak (2007).

[4] To quantify the developments in the oil sector, we use both barrels (unit of volume) and tonnes (unit of weight). Generally, the conversion factor between them depends on the oil density and thus varies by oil blend; one tonne of Russian *Urals* blend corresponds to 7.27 barrels.

Figure 6

Russia's oil and gas reserves: years to depletion, 1998-2008



Source: BP Statistical Review of World Energy and own calculations.

The structure of Russian gas deposits is generally more favourable, although the share of technologically challenging deposits is rising here, too. Although over 70% of proven gas reserves are concentrated in Western Siberia, the three main traditional fields in the region – Medvezhye, Urengoy and Yamburg – are already 65-75% depleted, and their output has been recently falling. Maintaining and expanding the gas production volumes would require putting into operation the new fields in the north of Western Siberia (Yamal peninsula). Besides, around 15% of proven gas reserves are located in off-shore areas.[5] Thus, similarly to oil, the general problem is that the bulk of prospective gas deposits is located in climatically challenging areas, often far away from the existing gas industry centres. Besides, many of them are endowed with low-pressure, fat, condensate and helium-containing gas. These components are a valuable raw material for chemical production; therefore, the processing of these gas types requires the creation of an appropriate infrastructure. All this will inevitably lead to the rising production costs: from around USD 15 per thousand cm today to USD 27-28 per thousand cm by 2030, according to Ivanter et al. (2007).

These problems are explicitly acknowledged in the government 'Energy Strategy until 2030', which was adopted in November 2009 and outlines the priorities for the development of the Russian energy sector in the short, medium and long run (see Table 1).[6] The main difference of the new strategy from the earlier 'Energy Strategy until 2020' adopted in 2003 – apart from the re-defined timeframe – is that it is tailored to the

[5] The role of off-shore deposits is even higher (some 40%) as a share of Russia's total *prospective and forecast* gas resources. The latter are estimated at over 160 trillion cm – nearly four times more than the Russian 'proven' gas reserves, and represent more than half of the *global* prospective gas resources.

[6] See Ministry of Energy of the Russian Federation (2009).

government's efforts to pursue modernization and innovations, which are reflected in the 'Concept of Long-term Social and Economic Development until 2020' adopted in November 2008. The new Energy Strategy envisages that by 2013-2015, thanks to more active exploration activities, the speed of increase in proven reserves should accelerate and nearly match production volumes, resulting in near-stabilization of the 'years to depletion' indicator. In particular, proven reserves of oil are expected to rise until 2030 by some 80-100 billion barrels (depending on the progress in oil extractability) and those of natural gas by 16 trillion cm. The anticipated increase in oil reserves should be accounted for by the three basins: West Siberia, Timano-Pechora (northern part of European Russia), and Leno-Tunguzskiy basin in Eastern Siberia, albeit far away from the 'East Siberia-Pacific' oil pipeline currently under construction. Eastern Siberia and the Far East alone are expected to account for an increase of over 20 billion barrels, which should enable the projected rise in production. In turn, the main gas deposits to be developed are on Yamal peninsula and the Arctic (Barents, Kara and Pechora seas) shelf.

Figure 7

Russia's major oil and natural gas basins

Generally, the focus is on developing hydrocarbon resources in the eastern parts of Russia (Eastern Siberia and the Far East) and the Arctic shelf, which are supposed to make up for the forthcoming decline in production from traditional deposits, particularly in the period after 2015. This would require a creation of appropriate production, transport and social infrastructure in these under-developed and geographically remote regions. Another

problem is the high degree of equipment amortization, which stands at 60% in the gas industry and 80% in the oil refining.

According to the official Energy Strategy, the required total investments are estimated at some USD 2.4-2.8 trillion over the period until 2030 in the prices of 2007. However, other available estimates appear to be lower: e.g. the World Bank (2010) estimates the required investments at USD 1.15 trillion, of which USD 920 billion is accounted for by the oil sector, including refining, and USD 230 billion by the gas sector. In turn, Nekrasov and Sinyak (2007) assess the overall investment needs at no more than USD 950 billion, including up to USD 570 billion for oil and USD 385 billion for gas (at 2000 prices). For that, not only more private investment into the oil and gas sector, but also more foreign capital and know-how will be needed. The Strategy reckons that by 2030, FDI will account for at least 12% of total investments into the Russian energy sector. Among the envisaged instruments are e.g. preferential taxation of production from offshore deposits, state guarantees and tax holidays for the pay-off period of investments, reduction of administrative barriers to exploration, and at a later stage the increased use of private-public partnerships (although at the first stage, i.e. up until 2015, the Strategy targets the rising role of the state, which should provide the necessary financial means under the crisis conditions).

Among the measures in this vein already implemented was inter alia the amendment of the mineral extraction tax on oil as of 2007. In particular, mineral extraction tax holidays were introduced initially for new field developments in Eastern Siberia (for the first 10 years or the first 25 million tons of production) and subsequently for three other geographic regions: the Arctic continental shelf (10 years or 35 million tons), Azov and Caspian seas (7 years or 10 million tons), and the north of Western Siberia (7 years or 15 million tons). In addition, an oil field depletion coefficient was introduced, with heavily depleted fields receiving preferential treatment.[7] Besides, since January 2009, the cut-off price for levying the mineral extraction tax on oil was raised from USD 9 to USD 15 per barrel, and as of 1 December 2009, oil produced from the 13 East Siberian deposits was exempted also from export duty, while in January 2010 the list of eligible deposits was expanded to 22.[8]

More generally, starting from 2012 the authorities reportedly plan to replace the current predominantly revenue-based taxation system of the oil sector with a profit-based system, which should encourage the development of costly deposits in remote areas. Also, in order to attract foreign investors into the exploration and development of Yamal deposits, the government is planning to scrap the mineral extraction tax on gas (standing currently at

[7] See Goldsworthy and Zakharova (2010).

[8] Otherwise, the export duty on crude oil is adjusted monthly depending on the oil price level and stands currently at some USD 37 per barrel.

USD 5 per thousand cm, or some 10% of the reported gas production costs on Yamal) and has pledged to upgrade the region's poor infrastructure.[9]

Table 1

Selected quantitative targets of Russia's 'Energy Strategy until 2030' [1)]

	2008	2015	2022	2030
Oil, million tons				
Increase in reserves	.	1854	5597	5122
Production	487.6	495	525	535
Share of East Siberia and Far East in production, %	3	12	14	19
Domestic consumption (refining)	236	239	260	311
Refining depth, %	72	79	83	90
Crude oil exports	243	244	252	248
Share of eastern direction in exports, %	8	11	15	25
Natural gas, billion cubic metres				
Increase in reserves	.	4100	5400	6500
Production	664	745	837	940
Share of new deposits in production, %	2	14	23	39
of which:				
Yamal	0	6	9	24
East Siberia and Far East	2	8	14	15
Share of 'independent' producers in production,[2)] %	17	20	26	27
Domestic consumption	457	519	564	641
Exports	241	294	341	368
Share of Asia-Pacific in exports, %	0	12	17	20
Share of LNG in exports, %	0	5	11	15
Other				
Energy intensity of GDP, as % of 2005	.	<78	<57	<44
Per capita domestic energy consumption, as % of 2005	.	>110	>120	>140
of which:				
electricity	.	>113	>143	>185
transportation fuel	.	>123	>141	>170

1) Unless otherwise indicated, the figures below represent the upper bound of the targeted range. – 2) 'Independent' gas producers are vertically-integrated oil companies and gas producers other than Gazprom.

Source: Ministry of Energy of the Russian Federation (2009).

Trends in oil production

Table 2 presents oil production in individual world regions and in the five CIS countries. As can be seen from the table, the global oil market is largely dominated by the Organization of Petroleum Exporting Countries (OPEC) – a price cartel which has been usually able to manipulate prices by adjusting production quotas. The thirteen OPEC countries[10]

[9] The recent (September 2009) showcase of Yamal projects by Russian premier Putin to prospective foreign investors is to be seen against this background. Among the possible investors are Shell, Total, ExxonMobil and Kogas (South Korea), which could invest into the planned LNG plant – see gazeta.ru, 24 September 2009, 'Yamalu mnogo nado'.

[10] Currently, OPEC includes Algeria, Angola, Ecuador, Gabon, Iran, Iraq, Kuwait, Lybia, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.

(comprising in the first line countries of the Middle East) accounted in 2008 for nearly 45% of the world oil production – the finding which should not come as a surprise against the background of the Middle East's dominance in terms of oil reserves and the fact that oil in these countries is generally very cheap to produce. The CIS-5 accounted in 2008 for a mere 15.5% of the world oil output – comparable to the shares of e.g. North America or Africa. However, over the past decade, the CIS countries have proved to be an extremely dynamic region in terms of expanding their oil output, and have been an important driving force behind the recent global expansion of oil production. More than two thirds of the 6.9 million barrels per day (mn bpd) global production growth recorded between 2000 and 2008 has been accounted for by the five CIS countries. The bulk of this increase represents the growing output by Russia, which up to 2008 was the world's second largest oil producer and exporter behind Saudi Arabia. In 2009, Russia overtook Saudi Arabia and – with the output of 9.93 million bpd[11] – became the world biggest oil producer. In the first few months of 2010, production was growing further, reaching by March 2010 10.1 million bpd (+3.3% year-on-year).

Table 2

Oil production in 2000-2008, by country and region[1)]

in thousand barrels per day

	2000	2001	2002	2003	2004	2005	2006	2007	**2008**	*2008 share of total*
Azerbaijan	282	301	311	313	315	452	654	869	**914**	*1.1%*
Kazakhstan	744	836	1018	1111	1297	1356	1426	1484	**1554**	*1.8%*
Russian Federation	6536	7056	7698	8544	9287	9552	9769	9978	**9886**	*12.4%*
Turkmenistan	144	162	182	202	193	192	186	198	**205**	*0.3%*
Uzbekistan	177	171	171	166	152	126	125	114	**111**	*0.1%*
CIS-5	**7883**	**8526**	**9379**	**10337**	**11244**	**11678**	**12160**	**12642**	**12671**	*15.5%*
Other Europe & Eurasia	7067	6924	6910	6636	6335	5864	5438	5177	**4921**	*6.0%*
Middle East	23516	23006	21623	23357	24788	25262	25499	25168	**26200**	*31.9%*
Africa	7804	7897	7994	8402	9268	9846	9992	10320	**10285**	*12.4%*
Asia Pacific	7874	7813	7836	7750	7804	7845	7810	7862	**7928**	*9.7%*
North America	13904	13906	14069	14193	14137	13696	13732	13638	**13131**	*15.8%*
South & Central America	6813	6722	6619	6314	6680	6899	6866	6636	**6685**	*8.5%*
Total World	**74861**	**74794**	**74431**	**76990**	**80256**	**81089**	**81497**	**81443**	**81820**	*100.0%*
of which: OPEC	32569	31914	30318	32136	34658	35736	36007	35714	**36705**	*44.8%*
of which: Saudi Arabia	9491	9209	8928	10164	10638	11114	10853	10449	**10846**	*13.1%*

1) Includes crude oil, shale oil, oil sands and NGLs (the liquid content of natural gas where this is recovered separately).

Source: BP Statistical Review of World Energy and own calculations.

Probably more importantly, Russia is by far the largest world oil producer and exporter outside OPEC. Since it accounts for just 12% of the world oil production, it is essentially a price taker – unlike OPEC. In fact, Russia has benefited greatly from staying outside the

[11] According to Energy Information Administration.

OPEC, as it was not bound by the production quotas self-imposed by cartel members, and thus was able to rapidly expand its production and export volumes, taking advantage of the soaring oil prices up until 2008. In particular, between 2001 and 2005, Russia was expanding its oil output by some 10% per year and accounted for nearly half of the increase in global oil production in those years. Almost all of it was channelled to exports, while Russia's own oil consumption has been nearly stagnant.

Table 3

Natural gas production in 2000-2008, by country and region[1)]

in billion cubic metres per year

	2000	2001	2002	2003	2004	2005	2006	2007	**2008**	*2008 share of total*
Azerbaijan	5.1	5.0	4.7	4.6	4.5	5.2	6.1	9.8	**14.7**	*0.5%*
Kazakhstan	10.4	10.5	10.2	12.6	20.0	22.6	23.9	26.4	**30.2**	*1.0%*
Russian Federation	528.7	526.2	538.8	561.4	573.3	580.1	593.8	592.0	**601.7**	*19.6%*
Turkmenistan	42.5	46.4	48.4	53.5	52.8	57.0	60.4	65.4	**66.1**	*2.1%*
Uzbekistan	51.1	52.0	51.9	52.0	54.2	54.0	54.5	59.1	**62.2**	*2.0%*
CIS-5	**637.8**	**640.2**	**654.1**	**684.1**	**704.8**	**718.9**	**738.7**	**752.8**	**774.9**	*25.3%*
Other Europe & Eurasia	301.3	306.6	313.5	317.7	327.7	319.3	312.1	300.5	312.4	*10.2%*
Middle East	208.1	233.3	247.2	262.9	285.1	319.9	339.1	357.6	381.1	*12.4%*
Africa	130.1	131.3	135.3	144.8	155.2	175.6	192.6	204.4	214.8	*7.0%*
Asia Pacific	272.1	282.4	300.6	322.3	336.8	362.6	378.5	396.3	411.2	*13.4%*
North America	763.2	779.4	762.8	766.6	752.8	743.6	764.0	778.7	812.3	*26.7%*
South & Central America	99.7	104.3	106.0	117.1	131.7	137.9	151.1	155.0	158.9	*5.2%*
Total World	**2412.4**	**2477.4**	**2519.4**	**2615.5**	**2694.1**	**2777.8**	**2876.1**	**2945.3**	**3065.6**	*100.0%*

1) Excluding gas flared or recycled.

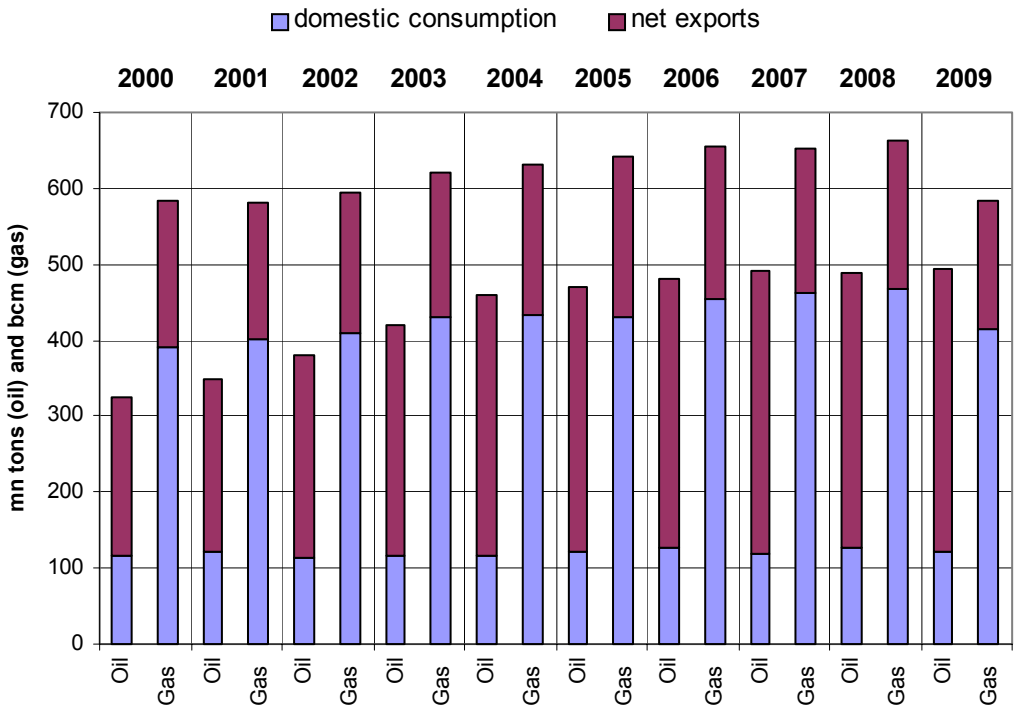
Source: BP Statistical Review of World Energy and own calculations.

However, as illustrated by Figure 8, over the last few years the pace of expansion by the Russian oil sector declined markedly, and, after reaching the peak of around 10 mn bpd in 2007, in 2008 the country's oil production fell slightly, to 9.89 mn bpd. This turnaround came before the current financial crisis took full swing and the global oil prices plunged dramatically in the second half of 2008. The reasons for this are widely disputed.[12] It appears however that it reflects a combination of technological and institutional factors. In particular, the vibrant production growth in the previous years had been enabled by access to relatively cheap deposits (primarily in Western Siberia) and the existing infrastructure dating back to the Soviet times: maintaining that pace would require large-scale investments in more distant and technologically and climatically challenging locations (notably in Eastern Siberia).

[12] A good overview of competing explanations is given e.g. by Clifford Gaddy and Barry Ickes – see Gaddy and Ickes, 'Russia's slowing production: policy failure or strategic decision?', in: Centre for European Reform (2008), pp. 61-70.

Figure 8

Russia's oil and gas: production, consumption and exports, 2000-2009[1)]



1) The gas production figures are higher than those in Table 3 because the Russian statistics include flared associated gas – more on that, see section 'The potential for energy saving and the gas tariff reform'.

Source: Own calculations based on data from the Central Bank of Russia and the Russian Statistical Office.

Also, changes in the structure of the Russian oil sector over time played a role as well. The Russian oil sector had been almost entirely privatized during the 1990s, largely in the wake of the controversial 'loans-for-shares' schemes, bringing the share of public sector in oil production from 80% in 1995 to just 13% in 2003-2004, and private oil companies were eager to maximize their profits by expanding production. These short-term incentives were particularly strong given the generally poor protection of property rights in Russia. However, after the biggest oil company Yukos (of Mr. Khodorkovsky) had gone bankrupt, with its assets largely taken over by the state-owned Rosneft, and another big private oil company Sibneft (of Mr. Abramovich) had been acquired by the state-owned Gazprom, the state share rose markedly, reaching 52% by now. This partial (re-)nationalization has arguably reduced the profit-maximizing incentives and has hampered the efficiency of the Russian oil sector, thereby contributing to its less impressive performance over the past few years.

Finally, as argued in Goldsworthy and Zakharova (2010), the peculiarities of the fiscal regime in the Russian oil sector have also played a role.[13] With its emphasis on taxing

[13] Currently, the system relies primarily on three taxes: the volume-based mineral extraction tax (adjusted depending on the world oil price and the exchange rate), the oil price-based export duties (with the separate rates for crude oil and oil products), and the standard 20% corporate income tax. According to the estimations of Goldsworthy and Zakharova (2010), these three taxes combined provide the government with 90 cents from each additional dollar of export earnings in case the Urals price exceeds USD 25 per barrel for a field with oil depletion below 80%.

volumes and revenue rather than profits, it was very instrumental for fiscal purposes as it left few possibilities for tax evasion, but it simultaneously constrained investments into the increasingly high-cost oil fields. According to the recent estimates by the Russian Energy Ministry, 36% of old oil fields and 93% of new fields were loss-making under the existing tax regime. On the other hand, Gaddy and Ickes argue that this fiscal regime has represented not a policy error but rather a deliberate choice of the Russian government aiming to reduce the country's exposure to the risk of falling oil prices in the future and the 'addiction' to oil more generally – although the priorities of the newly adopted 'Energy Strategy' hardly appear to be consistent with the latter explanation. On the contrary, as already mentioned, in 2009 the Russian oil production hit a new record, boosted by the recently granted tax benefits mentioned in the previous section and the rouble devaluation in the wake of the global crisis. This increase largely represents oil coming from the new deposits in Eastern Siberia, first of all Vangorskoye oil deposit belonging to Rosneft.

The newly adopted 'Energy Strategy until 2030' envisages growth in Russian oil production by 2030 by some 10%, to 535 million tons. This increase will be thanks to the Timano-Pechora basin, Yamal peninsula, a number of areas of East Siberia as well as the continental shelf of the Arctic seas, the Russian sector of the Caspian sea, and the Sakhalin shelf (Sakhalin-1 and Sakhalin-2 projects). At the same time, production will fall in the traditional areas: the Volga-Ural region in the European part of Russia and in the Khanty-Mansi district in West Siberia – the main oil-producing Russian region nowadays. In the short and medium run, oil production in West Siberia is projected to fall by about 2% per year. This increase will almost entirely translate into higher refining volumes, whereas the exports of crude oil are projected to stagnate at the current level of around 240-250 million tons and even fall marginally in the long term. On the one hand, this scenario is in line with the government strategy to promote exports of oil products rather than those of crude oil.[14] At the same time, the refining volumes will also grow due to the rising domestic consumption, in particular that of motor fuel. Accordingly, the depth of refining is to be raised by 2030 to 90% (from 72% now), which would require both an upgrade of existing refinery capacities, first of all in Kirishi and Tuapse, and the construction of new capacities in Tatarstan and the Far East. To this end, the government is planning to unify export duties on refined products in order to stimulate investments into refining. Last but not least, the prospects of raising oil output will be greatly helped by reducing the pipeline leakages amounting, according to various estimations, to between 5 and 7% of production.[15]

[14] A certain upgrade of the Russian energy export structure has already taken place. The exports of crude oil have been increasingly replaced by the exports of oil products following the hike in the export duty on crude oil relatively to the export duty on oil products.

[15] See Kovacovska (2007).

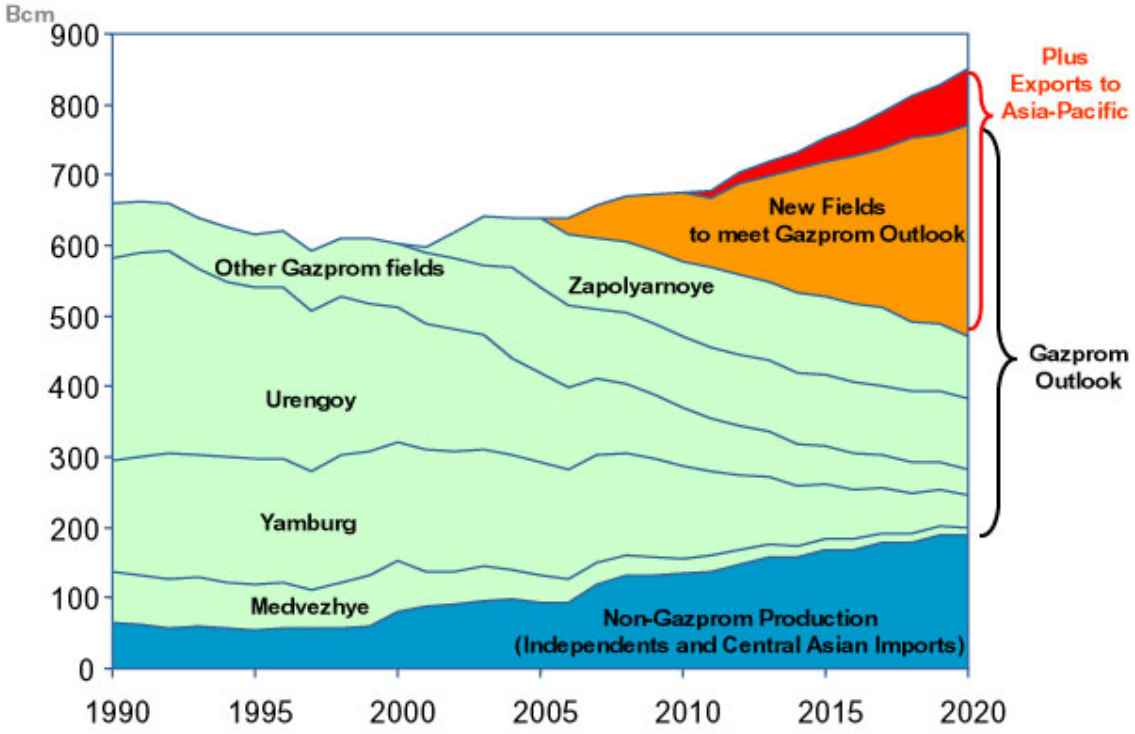
Trends in natural gas production

Inefficiencies are even more characteristic of the strongly monopolized gas sector of the CIS countries, which is dominated by state-owned companies. Still, even though their recent dynamics of gas production has been less vibrant than that of oil, their weight in the global gas output is much higher. With around 25% of global gas production, the CIS-5 is leading the world (at par with North America), and their contribution to the global production increase since 2000 (+27%) since 2001 has been roughly in line with this share – see Table 3. In Kazakhstan and Azerbaijan, gas production between 2000 and 2008 nearly tripled, in Turkmenistan it soared by over 50%, although in Uzbekistan it rose by 20% and in Russia by only 13%. Still, with the share of nearly 20% (as of 2008), Russia is the biggest gas producing country in the world.

In Russia, the natural gas sector is dominated by the state-owned Gazprom (50% in state ownership), which has accounted for over 80% of domestic production over the last few years. Gazprom is the biggest company in Russia and the biggest gas-producing company in the world employing 376 thousand people and operating a pipeline network of 160 thousand km – the longest in the world.[16] In addition, since July 2006 Gazprom has had monopoly over gas exports from Russia.

Figure 9

Russian gas supply outlook



Source: Ramsay (2008).

[16] See Gazprom (2009).

Although Russia's overall gas production has been marginally growing over the past decade (see Figure 8), Gazprom's production has remained fairly stagnant at around 550 billion cm per year. In fact, up to 2002 Gazprom's production had been even declining for a few years in a row, although this was partly due to the relatively high initial base.[17] This bottleneck is largely resulting from the under-investment in gas exploration in the past years. The two main fields in the Nadym-Pur-Taz basin in Western Siberia – Yamburg and Urengoy, which have so far accounted for more than half of Gazprom's production – are largely depleted and have reported falling production volumes since 1999. So far, this decline has been offset by the output growth in the relatively new Zapolyarnoe and Yuzhno-Russkoye fields in the Nadym-Pur-Taz basin, the offshore Sakhalin-1 and Sakhalin-2 projects, as well as by Gazprom's takeovers of the so-called 'independent' gas producers such as Purgaz.[18] However, according to the IEA projections (see Figure 9), as a result of recent under-investment, Gazprom's production might halve in the coming decade, to around 300 billion cm in 2020 – provided no new big deposits are put into operation.

The latter are on Gazprom's agenda in the next decade: according to the current plans,[19] the production increase is to come in the first instance from the new vast deposits on the Yamal peninsula in the extreme north of Western Siberia (north of the Nadym-Pur-Taz basin). There are 26 discovered deposits on Yamal, containing 10.4 trillion cm of proven gas reserves, of which 5.8 trillion cm is concentrated in the three most important deposits: Bovanenkovskoye, Harasaveyskoye, and Novoportovskoye. Production from the vast Bovanenkovskoye field (4.9 trillion cm of proven reserves) is due to start in 2012, standing at 115 billion cm per year initially and reaching 140 billion cm per year in the longer term. Overall, production from Yamal in line with the current Gazprom's plans is targeted at 178 billion cm per year in the medium term, rising to 310-360 billion cm per year by 2030. In addition, another prospective deposit – the big off-shore Shtokman field with the proven gas reserves of 3.8 trillion cm on the shelf of the Barents Sea in the Arctic – is to be put in operation in 2016.[20] Even assuming these projects are implemented on time (a rather optimistic scenario), there have been increasing concerns – both within and outside Russia – that gas supply crunch might materialize in the years to come, meaning that Gazprom might not be able to come up with enough gas to meet both its export commitments and domestic needs.[21]

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17 The decline of gas production in Russia over the 1990s was much smaller than that of oil.

18 The biggest 'independent' producers are Novatek and some big oil companies such as Rosneft, Lukoil, TNK-BP, and Surgutneftegaz.

19 See Gazprom (2009).

20 To develop the vast Shtokman deposit, Gazprom has formed a joint-venture with Total of France and StatoilHydro of Norway, as it traditionally lacked relevant expertise in both developing offshore deposits and producing liquefied natural gas (LNG).

21 See e.g. UBS (2006) or Payar (2007).

The newly adopted 'Energy Strategy until 2030' reckons with a very substantial production growth of natural gas by about 40%, to 940 billion cm in 2030, of which approximately half is expected to come from Gazprom and the rest from independent producers. Unlike in the case of oil where the production increase is supposed to serve first of all domestic consumption, a sizeable share of the planned increase is to go into exports: the latter are about to increase by some 50%. According to the Strategy, production on Yamal peninsula is to start around 2015 and by 2030 will reach 185-220 billion cm, contributing to the overall West Siberian gas output of 608-637 billion cm. In turn, in East Siberia and the Far East production is expected to reach 132-152 billion cm, with the most important deposits being Kovyktinskoye and Chayandinskoye. In European Russia, gas production is projected to rise by 2030 to 131-137 billion cm (from just 46 billion cm in 2005) – largely thanks to the Timano-Pechora basin and the Shtokman deposit.

According to the World Bank (2010) estimates, meeting the ambitious production target envisaged in the Energy Strategy would require an estimated USD 200 billion in investments in the period until 2020 (or some USD 20 billion per year), with the bulk of it falling due in the first several years. Even maintaining the current production levels would require some USD 15 billion per year in investments – much more than what Gazprom was investing over the past decade: e.g. USD 8.6 billion in 2008 and USD 4.5 billion as annual average over the period 2001-2008.

The global crisis potentially puts the possibility of a 'supply crunch' in a longer-term perspective. In the short run, the decline in general economic activity and particularly in industry drove the demand for natural gas downwards. As a result, the natural gas production in Russia in 2009 declined by 12% and exports by 13.8% (see Figure 8). However, the lower gas export price (tied to the oil price) and lower production volumes meant also less revenue for Gazprom, potentially jeopardizing the timely start of operation of new deposits in the medium and long run, after the effects of the financial crisis on the real economy have died out and global demand for energy picks up again. Gazprom's investment budget for 2009 was cut by 17%, to USD 25 billion, resulting in the postponement of the start of production at Bovanenkovskoye and Shtokman deposits by one and three years, respectively. Besides, the company's finances continue to suffer from the under-pricing of natural gas in the domestic market: while domestic shipments account for over 60% of Gazprom's sales in volume terms, their share in revenues stands reportedly at a mere 18%. It is not until the domestic gas prices are sufficiently liberalized (more on that, see below) that Gazprom will draw any meaningful profit from sales in the domestic market.

The concerns over Russia's gas supply crunch might be of relevance for the EU, since the current gas pipeline infrastructure dating back to the Soviet times ties the European consumers to Russia and vice versa, and makes it difficult to substitute for alternative gas

sources. At the same time, there are a number of factors speaking against the 'supply crunch' scenario: the possibility of increasing supplies from Central Asia (see Box 1), the potential for energy saving within Russia as domestic gas tariffs are brought closer to external levels (more on that, see next section), the possibility of reducing leakages from the Russian gas pipeline system and the extent of gas flaring; and – last but not least – the apparently increased readiness of the Russian authorities and Gazprom to attract foreign capital under the new circumstances. Finally, as argued by some experts, preserving the system of long-term export contracts as the basis of the Russia-EU gas dialogue is crucial for the gas supply prospects in Russia, since they provide certainty about the level of European gas demand over a protracted time period and thus justify the required investments in the exploration and development of gas fields.[22]

Box 1

The role of Central Asia for natural gas supplies

In the past few years, some 30% of the Russian gas exports represented gas coming from Central Asia, notably *Turkmenistan*, which supplied around 55 billion cm per year. This is due to the existing Soviet-date infrastructure, with the currently only export gas pipeline 'Central Asia – Centre' running through the Russian territory. Although Russian gas imports from Turkmenistan were suspended in April 2009 following a mysterious pipeline blast, in January 2010 they resumed in the volume of 30 billion cm. According to some estimates,[23] given the domestic huge upstream investment needs, Gazprom's export prospects crucially depend on whether it will be able to permanently interlink the Russian gas sector with Central Asia, first of all Turkmenistan, whose gas export potential may double to around 110 billion cm – although the outlook crucially depends on the volume of investments, as the country's upstream sector 'has not seen new investment or even proper maintenance for a long time'.[24] Besides, some of it (up to 30 billion cm) is likely to be shipped to China following the 2006 deal that envisaged Chinese investments into the Turkmen gas fields and the construction of a new pipeline, which should start operating already in 2010.

However, recently, Russia has been successful at advancing its energy interests in this country, with the planned 30 bcm upgrade of the Pre-Caspian gas pipeline – as opposed to any pipeline crossing the Caspian Sea, which would enable Turkmenistan's access to Nabucco, – being the most vivid example. In return, Russia agreed to a major shift in pricing terms: since 2009, the price of Turkmen gas has been determined in line with the 'European formula' netted-back to the Turkmen border. Although this resulted in a *de facto* hike of the price charged to Gazprom, it simultaneously reduced incentives by European energy companies to purchase gas directly from Turkmenistan – an option which was hitherto actively lobbied by the EU.[25] In view of these developments, at present Turkmenistan can be hardly viewed as a region of EU energy supply diversification away from Russia.[26]

[22] See e.g. Tatiana Mitrova, 'Dynamic development in Russia's gas sector', in: Centre for European Reform (2008), pp. 71-78.

[23] See Götz (2004).

[24] See Pavel Baev, 'Asia-Pacific and LNG: the lure of new markets', in: Centre for European Reform (2008), pp. 83-92.

[25] See Konoplyanik (2009).

[26] See International Crisis Group (2007).

The importance of other Caspian and Central Asian countries in terms of gas is less pronounced, although *Azerbaijan* is expected to increase its gas production rapidly over the next few years, largely thanks to the growing output from the Shah Deniz offshore field, but also due to associated gas from the Azeri-Chirag-Gyuneshli oil deposits. In contrast, *Kazakhstan* is unlikely to establish itself as a significant gas exporter, since almost all its domestically produced gas represents associated gas from oil production and will be reinjected for reservoir pressure maintenance. Finally, *Uzbekistan* – though also a net gas exporter – consumes the bulk of produced gas domestically, and the prospects for more exports in the future appear to be limited, barring substantial new investments and/or improvements in energy efficiency. Similarly to Russia, gas flaring is a major source of inefficiency in all these countries and stands at some 16 billion cm per year, of which nearly 9 billion cm comes from Kazakhstan alone. [27]

The potential for energy saving and the gas tariff reform

The prospects of the Russian energy sector are to be seen against the background of the government's plans to reduce the energy intensity of economy. The idea behind is to boost the international competitiveness of Russian products (particularly in the energy-intensive industrial branches) and to free up additional volumes of energy carriers for exports. Indeed, despite the recent impressive progress (see Figure 10),[28] Russia still has one of the most energy-intensive economies in the world. As demonstrated by Figure 11, in order to produce one unit of GDP, the Russian economy consumes twice as much energy as the United States or the world on average, and three times as much as e.g. Austria or the EU-27.[29] This is partly a consequence of using the old Soviet-era energy-intensive technologies, but also reflects the structural backwardness and the energy-wasting behaviour of economic agents.[30]

The reduction of energy intensity is part and parcel of the newly adopted 'Energy Strategy until 2030', which takes the energy intensities of developed countries with climatic conditions similar to those in Russia (such as Canada and the Scandinavian countries) as a benchmark. Aiming at e.g. the Swedish level would require lowering the Russian energy intensity more than twice: from around 15 to 7 British thermal units (Btu) per 1 US dollar of GDP (the Canadian energy intensity is with 11 Btu much higher). Overall, the authorities estimate that the potential for energy saving in Russia sums up to 40% of the current

[27] See World Bank (2010).

[28] As illustrated by Figure 10, since its peak in 1996 the energy intensity of the Russian economy has declined by 37%. The main factors behind this impressive improvement have been the higher capacity utilization and the fast growth of the services sector. However, as argued e.g. by Bashmakov et al. (2008), the achieved rates of energy intensity decline are not sustainable, unless they are supported by specific policies.

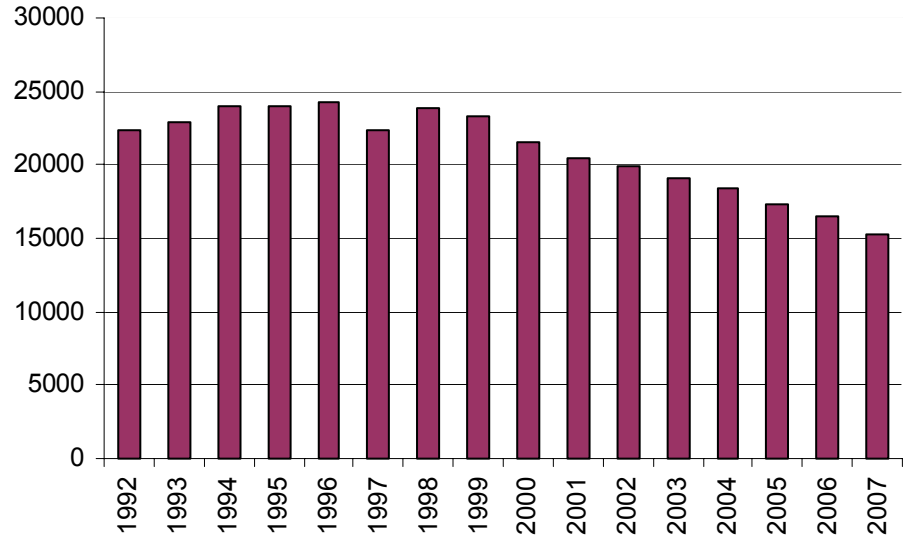
[29] Measured in purchasing power parity terms. An alternative measure using market exchange rates would yield an even bigger gap, since the existing technological inefficiencies and structural backwardness (the relatively high share of energy-intensive sectors) would be complemented by the currency under-valuation.

[30] Another reason behind the high energy intensity in Russia could be the probably underestimated extent of the shadow economy.

consumption level and is split relatively evenly across sectors: 18-19% of the overall potential falls on the residential sector, 13-15% on electricity generation, industry and transportation each, 9-10% on heating, construction and services each, 5-6% on fuels production, gas flaring, and energy supplies to public institutions each, and 3-4% on agriculture.

Figure 10

Energy intensity of the Russian economy[1)], 1992-2007

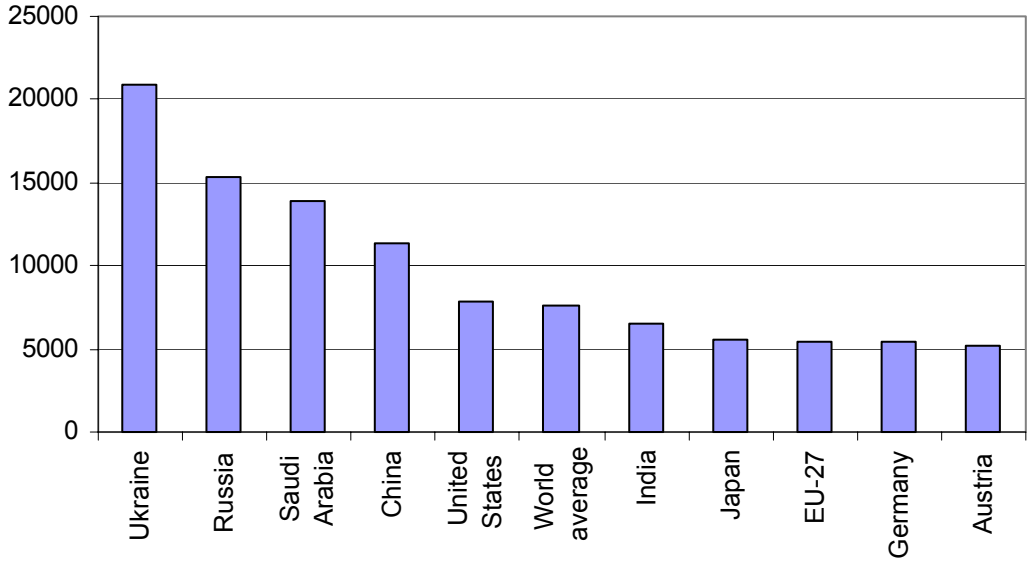


1) Total primary energy consumption in British thermal units per 1 US dollar of GDP at 2005 PPP.

Source: Energy Information Administration.

Figure 11

Energy intensity of selected countries/regions[1)], as of 2007



1) Total primary energy consumption in British thermal units per 1 US dollar of GDP at 2005 PPP.

Source: Energy Information Administration.

The goal of reducing the energy intensity is to be achieved inter alia by (a) raising the technological energy efficiency, and (b) by structural change away from energy-intensive sectors. For the latter, investments into the energy sector as a share of total investments are to decline more than twice, although in absolute terms they are to rise in order to enable the sector's modernization. It is expected that the structural change will occur both across sectors (more services and less industry) and within industry itself: the share of energy-efficient branches, such as machine-building, food-processing and textiles, in total industrial output is to rise to more than 50% by 2030. More specifically, the Strategy envisages a number of measures to raise the energy efficiency, including:

- promoting private investments into energy-saving projects;
- tightening technical requirements for various types of equipment as far as energy efficiency is concerned; and
- gradually liberalizing domestic energy tariffs in order to induce energy-saving behaviour.[31]

The latter point has particular implications for the gas sector given that natural gas accounts for 53% of primary energy consumption in Russia. Historically, domestic gas tariffs in Russia were kept at very low levels. E.g. up until 2004, they stood at below USD 30 per thousand cm, corresponding to a mere 20% of the then EU level. Given the relative importance of gas as an energy source and the highly monopolized structure of the domestic market for gas (with the state-owned Gazprom dominating production and distribution), the Russian state used low gas prices and the related low electricity prices as a tool of social policy (to mitigate the adverse social impact of transition) and also to maintain the international competitiveness of the energy-intensive industrial branches such as metals and chemicals. This typically led to the accusations against Russia of export dumping, especially from the EU. No wonder, one of the key Russia's commitments envisaged in the WTO-related bilateral protocol signed with the EU in 2004 was raising domestic gas prices to the level of some USD 50 per thousand cm within a few years, while the electricity tariffs were planned to be raised accordingly. By 2006, this target was largely achieved. However, the gas price in Europe increased in the meantime as well (following the surge in the oil price, to which the gas price is linked), so that the relative position of Russia vis-à-vis the EU hardly changed.

In 2006, the Russian government adopted a five-year strategy to raise domestic gas tariffs for both industrial and residential consumers to ensure by 2011 the so-called 'netback parity' with exports to Europe, i.e. domestic price equalling the European price minus transportation costs and the export duty. The purpose of the tariff hikes was to provide energy-saving incentives and induce the substitution of gas by other fuels, particularly coal

[31] Regulated tariffs apply only to the natural gas supplied by Gazprom. Prices charged by 'independent' gas producers – who meet around one-quarter of Russia's domestic demand for gas – are not regulated.

and nuclear fuel. As a result of the already implemented tariff adjustments, gas in the domestic market has become more expensive relative to coal (the price ratio between these two fuels has grown from 0.6 to 1.1), although this has not translated into the targeted changes in the structure of fuel mix, at least so far.[32]

The dramatic surge in the world oil price up until the middle of 2008 and the related surge in European gas prices raised the reform benchmark once again and thus made the reform overly ambitious. Ironically, the subsequent developments in the opposite direction – the collapse of the world energy prices in the wake of the global economic crisis – have resulted in further delays, as the planned tariff hikes were moderated in order to alleviate the impact of the crisis on the domestic economy. Even after the already implemented hikes, in 2009 domestic gas tariffs for industrial consumers in Russia still stood at around USD 70 per thousand cm – less than one-third of the European average price of USD 250 per thousand cm. Partly, this was due to the rouble devaluation at the onset of the crisis.

The new 'Energy Strategy' sticks to the principle of ensuring netback parity in gas prices between domestic and export sales and aims at the further gradual liberalization of the domestic gas market. The long-term goal is to lower the share of natural gas in the primary fuel mix from 53% to 46-47% and in electricity generation from 70% to 60-62% by 2030. Simultaneously, the share of nuclear energy and renewables (including hydropower) is to rise from 11% to 13-14%. For that, Russia will have to import even greater volumes of uranium, mostly from Kazakhstan. The stated idea behind partially replacing natural gas by coal and other energy sources is to bring the structure of fuel mix broadly in line with the existing structure of deposits, with the aim of improving the country's energy security.

In the chapter 'The Russian gas price reform and its impact on Russian gas consumption', the potential for energy saving in the Russian economy is assessed based on the earlier experience of Central and East European countries, which in the 1990s underwent 'energy price shocks' of a similar magnitude. According to these estimates, the planned tariff hikes may result in savings of between 60-120 billion cm of natural gas by 2020, corresponding to up to one quarter of domestic gas consumption.

Low gas tariffs apart, there are other sources of energy inefficiency which are unlikely to be addressed by a mere price liberalization.

1. Some 50-60 billion cm of associated gas per year is flared away, the bulk of it representing gas of 'independent' producers,[33] for whom natural gas is merely a by-product of oil production and who face severe infrastructural constraints to sell this

[32] In another move aimed at gradual liberalization of the gas market, an electronic gas trading platform has been set up, which processed some 10 billion cm of gas.

[33] However, only 15 billion cm of flared gas per year are reported officially – see Murray (2006).

gas – notably discriminatory access conditions to the Gazprom pipeline network.[34] For instance, according to the World Bank's estimates,[35] in 2005 55 bn cm of gas was flared away in Russia, resulting in reported losses in excess of USD 10 billion.

The newly adopted Energy Strategy addresses this issue and sets the target that by 2013-2015, 95% of associated gas is to be utilized in gas-processing plants.[36] To this end, the Strategy aims at creating the necessary legislative basis to ensure (a) priority access of electricity obtained from associated gas to wholesale electricity markets, and (b) priority access to pipelines of dry gas obtained from associated gas. Also, duty-free imports of equipment for associated gas utilization and faster equipment depreciation are envisaged, while regulations on the utilization of associated gas are to be tightened.

2. According to various estimates, between 12 and 25 billion cm of gas per year is lost due to leakages in the Russian transmission and distribution systems.[37] In order to minimize these losses, pipelines need to be upgraded and properly maintained, their corrosion prevented, compressor efficiency improved, and – last but not least – a reliable metering system installed, which would reduce the reportedly wide incidence of gas theft.[38]

   IEA's estimates suggest that the volume of gas flared and leaked from pipelines in Russia could be reduced at least by half, corresponding to savings of at least 30 billion cm per year.[39] Instrumental in solving these problems would be a profound restructuring of the gas sector, including possibly breaking-up the monopoly of Gazprom and allowing more competition. Although the 'Energy Strategy' envisages a gradual liberalization of the domestic gas market in general terms by curtailing somewhat the currently privileged position of Gazprom vis-à-vis the 'independent producers', the details of such liberalization remain to be seen.

EU–Russia energy dialogue [40]

The recent price disputes between Russia, on the one hand, and the transit countries Ukraine and Belarus, on the other hand, and the related episodes of disruptions in energy flows to the EU have given ground to concerns over the reliability of Russia (and the transit

[34] All strategic gas pipelines in Russia, including those for exports, belong to Gazprom; the latter also owns export monopoly for gas.

[35] See World Bank (2008).

[36] This is of particular relevance for the prospective deposits of Eastern Siberia, where oil and natural gas are typically found together.

[37] See World Bank (2010).

[38] At present, gas meters are often either faulty or missing altogether.

[39] See e.g. Murray (2006).

[40] In this chapter, only a few aspects of the EU-Russia energy dialogue are highlighted. For more details, see Havlik (2010).

states alike) for the energy supplies and gave rise to aspirations (at least in some EU member states) to diversify the EU energy supplies away from Russia. Meanwhile, the geographical proximity and the existing pipeline infrastructure largely constructed during the Soviet years largely explain the mutual dependence of Russia and the EU, as far as energy trade is concerned. Currently, all Russian exports of natural gas and a big portion of its oil exports to Europe go via the pipelines, although oil is also shipped in tankers from ports on the Baltic and the Black Seas. The exports of gas are typically carried out within the framework of the long-term contracts,[41] often concluded for several decades. These contracts usually only set the gas volumes on the 'take-or-pay' basis, while the price is tied via a special formula to the price of oil products, typically with a six-months lag.[42]

Despite the strong mutual dependence in energy trade between Russia and the EU, the extent of bilateral investments in the energy sector has been so far relatively limited. Although Russia signed the Energy Charter Treaty back in 1994, it has never ratified it (although it applies its rules on a provisional basis).[43] This effectively reduces foreign involvement in the Russian energy assets, as the Energy Charter provides essential mechanisms protecting foreign investments in the energy sector by mitigating the non-commercial risks, such as of discriminatory treatment, expropriation, and breach of investment contracts. Besides, the energy sector in Russia is defined as 'strategic', imposing official limits on the foreign participation in it. Similarly, the expansion of Russian investments in the EU energy sector has been generally constrained for political reasons, especially when it comes to investments by Gazprom, which is often (rightly) viewed as the extended arm of the Kremlin. The existing problems of investment cooperation reflect ultimately the insufficient level of political trust between Russia and some of the EU member states, largely those in Central and Eastern Europe.

Still, there are examples of both European investments in the Russian energy sector (such as the already mentioned joint-venture between Gazprom, Total and StatoilHydro to develop the Shtokman offshore gas deposit; the production-sharing agreement Sakhalin-2 on the Pacific shelf, involving Gazprom, Shell, Mitsui and Mitsubishi; the participation of BASF and EON in the development of the Yuzhno-Russkoe gas deposit, and of Wintershall in the development of the Urengoy deposit in Western Siberia; and – last but

[41] The first Western country to import Russian (Soviet) gas under such a long-term contract back in 1967 was Austria.

[42] Recently, however, the rising share of LNG in Europe and the widening gap between its price and the price of 'pipeline' gas have prompted a number of modifications. Thus, in early 2010 Gazprom's export contracts with Germany and Italy reportedly included along with the price of oil products also a *gas spot* price component. In addition, the 'take-or-pay' terms were provided with more flexibility.

[43] The reluctance of Russia to ratify the Energy Charter Treaty largely results from the divergence between Russia and the EU in the interpretation of several provisions of the Transit Protocol attached to the Charter, such as those concerning energy transit tariffs – see e.g. Andrey Konoplyanik, 'Regulating energy relations: acquis or energy charter?', in: Centre for European Reform (2008), pp. 107-115. Meanwhile, as argued by some (see e.g. Schulze, 2009), the recent episode of gas transit cuts during the Russian-Ukrainian price conflict has largely discredited the Transit Protocol (Ukraine is a signatory to the Energy Charter), raising the issue of a need of new legal framework underlying the Russia-EU energy relations.

not least – TNK-BP, the second biggest private oil company in Russia) and of Russian energy investments in Europe (the participation of Gazprom in the gas distribution networks in Germany, Italy and the Baltic states; the acquisition of Italian refinery by the Russian oil company Lukoil, etc.) Most visible is the cooperation between the Russian and EU companies in the construction of new gas pipelines such as Nord Stream (a joint-venture between Gazprom, BASF of Germany, and Gasunie of the Netherlands) and South Stream (a joint-venture between Gazprom and ENI of Italy).

Russia – OPEC: a history of non-cooperation

Neither of the CIS-5 is a member of OPEC and the recent history of relations between OPEC and the CIS producers has been essentially a history of non-cooperation, although Russia holds there a status of observer and occasionally gave in to OPEC pressure to cut oil exports to stabilize the global prices. For instance, back in 1998, the Russian government vowed to co-operate with OPEC and undertook between 1998 and 2002 three cuts in oil 'shipments'. Another cut was undertaken by Russia in response to the falling oil price in the aftermath of the terrorist attacks of 11 September 2001, although it was reversed later the same year, provoking sharp criticism from OPEC members. In spite of the above-mentioned cuts, Russia has been generally reluctant to co-operate with OPEC at the time. While the oil cartel cut its supplies by 2.5 million bpd in the course of 2001 and by another 1.5 million bpd in the first quarter of 2002 in view of the worldwide economic slowdown, Russia took advantage of the high oil prices to expand its production (and export) volumes by nearly 500 thousand bpd per year. Therefore, Russia was essentially free-riding on the OPEC cuts, taking advantage of both rising prices and growing production volumes.[44]

After 2003, the relations between OPEC and Russia changed fundamentally: the persistently strong demand for energy from the catching-up countries such as China and India – and in 2007-2008 also massive speculations in the global commodity markets[45] – drove oil prices far above the hitherto 'price corridor' targeted by OPEC (USD 22-28 per barrel), thus making output cuts increasingly irrelevant. At the same time, any substantial output increase by OPEC itself was often constrained by the existing technological bottlenecks, as many OPEC countries were already producing at full capacity – with the important exception of Saudi Arabia. Under these circumstances, Russia's expanding oil production was welcomed even by the OPEC, which was hardly interested in world oil

[44] See Astrov (2003).

[45] At their peak in the middle of 2008, oil price exceeded USD 140 per barrel. Contrary to the previous years of a relatively smooth (largely demand-driven) oil price rise, the dramatic surge in the first half of 2008 was triggered primarily by speculations in the world commodity markets – and it is therefore little surprising that it proved to be short-lived. wiiw had largely anticipated these developments – see e.g. L. Podkaminer, 'Inflation speed-up: moderate and short-lived in the NMS, more pronounced and protracted elsewhere', in: Podkaminer, Pöschl et al. (2008).

prices reaching levels which would induce an increased implementation of energy-saving technologies and/or substitution of oil by alternative fuels.[46]

The dramatic turnaround in the world oil market since the middle of 2008 in the wake of the global financial crisis[47] has brought production cuts back on the OPEC's agenda once again, and OPEC members have been recently pressing Russia to co-operate. Russia's response has been generally more accommodating than in the years before. For instance, at the end of 2008 Igor Sechin – the Russian deputy prime minister in charge of energy – signalled on several occasions a possibility to pursue co-ordinated policy with OPEC aimed at counteracting the plunging world oil prices, while President Medvedev did not even rule out that Russia might formally join OPEC. Also, at the OPEC conference in March 2009, Russia supported OPEC's decision to cut production. This should not come as a surprise given that Russia – as already mentioned – has been recently increasingly suffering from domestic production bottlenecks so that the opportunity benefits of non-cooperating with OPEC have gone down. At the same time, although the recent stagnation of oil output in Russia is effectively playing in the hands of OPEC, as argued above, it has been the outcome of unfavourable technological and institutional developments rather than of deliberate production cuts, at least so far.

While Russia's risen market share may suggest that it is now better equipped to affect the world oil prices by changing its supply volumes (in other words, Russia has become less of a price-taker in the global oil market), the prospects of its cooperation with OPEC appear to be nevertheless poor. Apart from political considerations (many of the OPEC member countries are Muslim, while Russia has been leading its own 'war on terror'), the policy of restricting oil supply in Russia might be more difficult to implement than e.g. in Saudi Arabia. As mentioned above, half of the Russian oil industry is privately-owned,[48] which makes it more difficult for the Russian government to co-ordinate its efforts with those of the OPEC governments. In fact, the idea of a strategic oil reserve – put forward recently by the Russian deputy prime-minister Igor Sechin[49] – reportedly received cold response from the Russian oil industry. The regulation of the oil sector in Russia is largely based on market mechanisms – most notably export duties and pipeline and railway tariff

[46] This is what seems to have happened in the course of 2008 in the United States where the demand for transportation in general, and energy-intensive vehicles in particular, has declined markedly – and already before the adverse impact of the financial crisis became fully felt.

[47] In the second half of 2008, the world oil price plummeted by some 70%, although it has somewhat recovered since, hovering at around USD 70-80 per barrel.

[48] Of the eight vertically-integrated companies dominating Russia's oil sector, only two – Rosneft and Gazpromneft (the subsidiary of Gazprom) – are majority-owned by the federal government, while another two – Bashneft and Tatneft – are controlled by regional governments (Bahskortostan and Tatarstan, respectively).

[49] According to a recent statement by Mr Sechin, the country's oil output might be partly channelled to the specially created state reserve, which could be operated in OPEC-like manner.

differentiation, – although the oil pipeline network Transneft is fully state-owned.[50] Finally, climatic conditions might reportedly play a role as well: in particular, shutting down and resuming production from Siberian oil wells might be a technologically challenging task. Indeed, recent months witnessed Russia expanding its market share at the expense of OPEC once again, whereas Saudi Arabia reduced its exports volumes in compliance with the recent OPEC production cuts.[51]

Box 2

How realistic is a 'gas OPEC'?

The past few years have witnessed also increased cooperation between the leading gas-producing countries. In 2001 at a summit it Teheran, the Gas Exporting Countries Forum (GECF) was founded, although it was not until December 2008 that a charter of this inter-governmental organization was adopted and fixed membership structure introduced. The stated objectives of GECF are to foster dialogue between gas producers and consumers, and to strengthen coordination between the gas-producing countries. Currently, 11 countries are participating in GECF: Algeria, Bolivia, Egypt, Equatorial Guinea, Iran, Libya, Nigeria, Qatar, Russia, Trinidad and Tobago, and Venezuela, whereas two other countries – Kazakhstan and Norway – hold an observer status.

These developments have given rise to media speculations about the possibility of creating a natural gas cartel which would be able to manipulate gas prices by adjusting supply volumes à la OPEC (and hence is customarily referred to as 'gas OPEC'). Meanwhile, the creation of such a 'gas OPEC' appears to be difficult for a number of reasons. The major reason is that the global market for natural gas is regionally much more fragmented than that for oil. Since oil can be easily shipped over big distances by tankers, there exists a fairly efficient worldwide arbitrage and something like a 'world market price'. Deviations from this price are typically small and usually caused by the varying transportation costs and the differences in the oil quality, referring in particular to the sulphur content.[52] In contrast, there are natural difficulties in the transportation of natural gas by sea. To enable sea transportation, gas has to be first liquefied (converted to LNG) and, upon arrival at the port of destination, de-liquefied, both of these procedures – despite the recent impressive progress – still being rather costly. As a result, the bulk of traded gas is still being transported via pipelines, leading to the regional fragmentation of the world gas market. For this reason, any 'gas OPEC' appears unrealistic, at least at the current stage.

The further advancement of LNG technologies and the growing role of LNG in global gas trade could make 'gas OPEC' more feasible in the future. For instance, in the European market, such a cartel could encompass the main external gas suppliers: Russia, Iran and Qatar. In fact, the possibility of a far-reaching coordination has been mentioned on various occasions by the respective countries' officials, and Gazprom announced in November 2008 the formation of a 'big gas troika' (Russia-Iran-Qatar).[53] However, so far, such coordination has been constrained by the prevalence of long-term supply contracts in Europe, which typically set supply volumes for up to 28 years in advance, with a

[50] The only major pipeline which does not belong to Transneft is the Caspian Pipeline Consortium (CPC) stretching from Kazakhstan to the Russian Black Sea port of Novorossiysk.

[51] Since the outbreak of the crisis, OPEC has cut its production by a total of 4.2 mn bpd, down to 24.8 mn bpd.

[52] For instance, the Russian oil blend *Urals* sells at a discount with respect to *Brent* produced in the North Sea, reflecting the lower quality of the former.

[53] See e.g. Schulze (2009).

price formula linking the gas price to the price of oil products with a 6-months lag. Therefore, any Europe-wide gas cartel would require numerous renegotiations of existing long-term contracts (although – as recent months have shown – such re-negotiations are possible). Probably more importantly, the widely diverging political interests of the above-mentioned gas producers represent an obstacle to their policies coordination and will arguably undermine such coordination in the long-term.[54]

Asia as an alternative consumer of Russian energy?

The EU's efforts to decrease its energy dependence on Russia, including the Nabucco gas pipeline project, are partly mirrored in Russia's publicly stated aspirations to diversify its energy exports away from Europe.[55] Another consideration behind Russia's diversification plans is the dependence of the current energy export shipments on transit via 'problematic' countries such as Ukraine and Belarus. A potentially alternative export market for the Russian energy carriers are the countries of the Asian-Pacific region, notably China, Japan, South Korea, but also the United States. The newly adopted Russian 'Energy Strategy until 2030' envisages that although Europe and the CIS countries will still remain the main markets for the Russian energy exports, their share will gradually fall. Instead, by 2030 the share of Asia-Pacific in the exports of crude oil and oil products is expected to rise to 22-25% (from 8% now), and in the exports of natural gas to 19-20% (from zero now).[56] Particularly China is viewed as a potentially huge and fast-growing export market lacking sufficient energy resources of its own.

The implications of such diversification (assuming it indeed takes place) would be different for oil and natural gas. In the case of gas, diversification will be accompanied by a substantial growth in the overall export volumes: even net of exports to Asia, Russian gas exports elsewhere (some 300 billion cm) in 2030 will still be 25% higher than in 2008. However, in the case of oil, whose exports are projected to broadly stagnate throughout the whole period, a higher share of Asian markets should translate into lower export volumes to Europe.

At the same time, there are reasons to believe that these ambitious targets might turn unrealistic for a number of reasons. For instance, the potentially promising Chinese market remains largely untapped, partly because of the currently poor export infrastructure. At the moment, there are no gas exports and only minor oil exports to China. The latter stand at some 300 thousand bpd (representing less than 5% of Russia's total oil exports) shipped

[54] For instance, Finon (2007) argues that due to its foreign policy goals, Russia has largely failed to develop gas alliances outside its sphere of influence in Central Asia, with Algeria being the case in point.

[55] This argument is presented, among others, by Tatiana Mitrova in her chapter 'Dynamic development in Russia's gas sector', in: Centre for European Reform (2008) , pp. 71-78.

[56] Ministry of Energy of the Russian Federation (2009).

by rail, although a 1.6 million bpd Eastern Siberia Pacific Oil Pipeline (ESPO) was put in operation at the end of 2009, with a branch going to China.[57] An advantage of the project is that the oil terminal in Nakhodka (the terminal point of the pipeline on the Russian Pacific coast) will allow shipments not only to China and other East Asian countries, but also e.g. to the western coast of the United States, thus ensuring a high degree of flexibility.

The prospects of gas exports to China appear more problematic, although a memorandum of understanding between the two countries was signed in 2006 (envisaging a start of exports already in 2011), and a new agreement between Gazprom and CNPC was signed in October 2009. According to the agreement, Russian gas to China should be shipped via two routes: some 30 billion cm via the so-called 'western' route (from fields in Western Siberia) and another 38 billion cm via the 'eastern' route (from Eastern Siberia, the Far East and the Sakhalin shelf). Thus, the total volume of Russian gas earmarked for the Chinese market in the long run stands at some 70 billion cm – broadly corresponding to the total share of 'eastern direction' in Russian gas exports envisaged in the Strategy.[58] This raises the issue whether the projected exports to China (particularly via the 'eastern route') will not be in competition with Russian gas exports to other Asian countries. Also, exports to China from Eastern Siberian deposits could potentially divert gas from the projected LNG plant in Vladivostok (more on LNG, see below).

The main reason for delays in implementing the 'Chinese' direction of Russian gas exports so far has been a disagreement over the price. At the beginning of the decade, China was insisting on a gas price of USD 30-35 per thousand cm – well below the break-even price at the Kovykta field in East Siberia (and in fact below the Russian domestic price), which was regarded as the main supply source for China.[59] A higher price would have been uninteresting to China, given the availability of cheap coal which serves as an alternative for electricity generation and accounts for 80% of China's fuel mix. At the beginning of 2009, Russia reportedly offered to create a joint venture between Gazprom and China's CNPC, whereby, in return for gaining access to gas sales within China, Gazprom showed readiness to compromise in the issue of price by offering to link it to the Japanese oil prices.[60] However, China has been advocating linking the gas price to the price of coal – unlike in Europe, where it is linked to the price of oil products. Overall, China is well placed in gas price negotiations, as it can also resort to some 10 billion cm (potentially 30 billion cm in the future) of gas from Kazakhstan and Turkmenistan.

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[57] According to the deal finalized in April 2009 after 15 years of negotiations, 300 thousand bpd of oil will be pumped to China via the ESPO pipeline starting from 2011 over the next 20 years. The Chinese government has granted a USD 25 billion loan to Russia in return for the long-term oil supplies – see e.g. Urban (2010).

[58] See gazeta.ru, 13 October 2009, 'U rossiyskogo gaza tseny net'.

[59] See Milov (2006).

[60] See Blagov (2009).

Finally, as argued by Milov (2006), the demand for energy is high first of all in the industrially developed southeastern parts of China, where the deliveries of Russian energy via network infrastructure are hindered by large distances and high costs. In meeting their energy needs, these regions will increasingly rely on LNG terminals. For this – and other – reasons, any geographic diversification of the Russian gas exports would be greatly facilitated by the increased share of LNG, which can be shipped by tankers and thus reduces dependence on the existing pipeline infrastructure, raises the market flexibility and minimizes geopolitical risks. The newly adopted 'Energy Strategy until 2030' explicitly underlines the role of LNG as a tool of export diversification: by 2030, the share of LNG is to rise to 15% of the Russian gas exports (from zero in 2008, although the first LNG plant on Sakhalin-2 was launched in February 2009, with LNG exports destined for Japan). The most recent Gazprom's plans envisage capturing a 10% share of a global LNG market by 2020, corresponding to some 50 million tons of LNG (or 70 billion cm of gas). This target is to be met by upgrading the Sakhalin-2 LNG plant to 9.6 million tons until 2011 and 14 million tons until 2014, and by putting in operation a 7.5 million tons LNG plant in Murmansk (based on gas from the Shtokman deposit) from 2014 onwards, a 15-16 million tons LNG plant in Vladivostok (based on Chayandinskoye field in East Siberia) from 2016-2020 onwards, and a 10-15 million tons LNG plant on Yamal starting from 2015-2017.

Putting all these projects onstream would require not only huge financial investments (the Yamal LNG plant alone would require an estimated USD 60 billion in investments), but also the necessary expertise which Gazprom did not possess, at least until the controversial takeover of the Sakhalin-2 PSA project from Shell in 2006-2007. Therefore, as elsewhere, it appears indispensable for Gazprom to attract strategic foreign investors.

Summary conclusions

Russia and four other CIS countries – Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan – are important energy producers and possess substantial reserves, particularly as far as natural gas is concerned. Russia alone accommodates about one quarter of the global gas reserves and is the world's biggest gas producer. Although in terms of oil reserves the CIS countries lag far behind the Middle East, Russia has established itself – along with Saudi Arabia – as one of the world's two leading oil producers and exporters. However, unlike Saudi Arabia, Russia is not an OPEC member. Its relations with OPEC so far have been largely a history of non-cooperation, as Russia on several occasions took advantage of the OPEC's production cuts and expanded its market share, whereas the prospects of future cooperation appear equally problematic for a number of climatic and political reasons.

The prospects of the Russian energy sector are to be seen against the background of the newly adopted 'Energy Strategy until 2030', which appears to be in line with the government's announced programme of modernization and innovation. The key problems tackled in the Energy Strategy are the so far generally insufficient exploration and investments in the new hydrocarbon fields. This is due to a number of factors such as the rising state involvement in the oil sector, the confiscatory tax regime, and the low domestic tariffs for gas. As a result, the 'years to depletion' ratio for both oil and gas has recently been declining, the initially impressive increase in oil production has slowed down considerably, while gas output was stagnating before falling markedly in the wake of the global crisis. Deposits in the traditional energy-producing areas – Western Siberia and European Russia – are largely depleted. The depletion ratio of the main oil deposits stands at some 70%, while the three main gas deposits have reported declining production volumes since 1999. The fields which would enable maintaining or raising production volumes in the years to come lie predominantly in remote and technologically and climatically challenging areas such as Eastern Siberia, the Far East, the north of European Russia, and the Arctic and Pacific sea shelf. In many of these deposits, oil and gas are typically found together, which raises the importance of solving the long-standing problem of associated gas flaring – a major source of inefficiency.

The development of these deposits would require the creation of appropriate production, transport and social infrastructure. The related total investments over the period until 2030 are estimated at some USD 1-3 trillion, implying that a substantial boost from the current investment levels is needed. In addition, the development of offshore gas deposits and the government plans of geographic diversification of gas exports would require the construction of LNG plants, the expertise for which within the Russian gas industry – the Sakhalin-2 LNG plant apart – has been generally lacking so far. Meanwhile, the recent global economic crisis and the collapse of energy markets have undermined the financial situation of Russian energy producers and led to the downward revision of Gazprom's investment budget. In these circumstances, attracting more foreign investment and related know-how, and more private capital in general, appears to be indispensable for the government plans to materialize. To this end, the government has already resorted to tax holidays for selected oil deposits, and further measures are reportedly on the agenda, including a gradual liberalization of the gas sector. According to current plans, the share of FDI in the Russian energy sector in 2030 should climb to 12% of the investment stock. Needless to say, intensifying the existing 'Energy Dialogue' between Russia and the EU and deepening the mutual investment penetration would be highly instrumental in achieving these goals.

The government's target is to increase, by the year 2030, oil production by 10% and gas production by some 40%, with half of the latter to be provided by the so-called 'independent' (from Gazprom) producers. The increase in the oil output would be largely

channelled to domestic consumption, while crude exports should stay flat and those of oil products rise only marginally. At the same time, the planned tax reforms should facilitate a shift in the structure of the Russian energy export mix away from crude oil towards higher value-added oil products. In contrast to oil, half of the additionally produced gas should be exported: gas exports are to rise by about 50%. In turn, the rise in domestic gas consumption will be constrained by the planned tariff hikes, which should facilitate the substitution of gas by coal and nuclear energy, and induce energy-saving behaviour. The announced target is to lower the energy intensity of the economy by about three times and bring it close to the levels observed in developed countries with similar climatic conditions. Domestic gas savings resulting from higher energy efficiency, but also reduced flaring and leakages, should further improve Russia's gas export prospects – along with the increased supplies from Central Asia and particularly Turkmenistan, where Russia has been recently successful in advancing its presence.

The Russian government's target of exporting up to 20-25% of energy to the potentially promising Asian-Pacific region (including China) by 2030 mirrors the EU's stated objective of diversifying its energy supplies away from Russia. However, so far the results in this respect appear to have been mixed at best. While the geographical diversification of Russian oil exports has been slowly advancing and will be boosted further by the Eastern Siberia Pacific Ocean oil pipeline, the diversification of gas exports has been constrained by the price disagreements with China and the limited progress with LNG. In any case, given the envisaged sizeable overall increase in Russian gas exports, such diversification – even if successful – is unlikely to 'crowd out' Russian gas exports to Europe. This implies that Europe will almost certainly remain Russia's biggest energy export market in the medium and long run.

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