Roland Götz

Pipedreams

Russia and Europe's Energy Supply

In discussing energy relations between Europe[1] and Russia, the forecasts of the European Union and the Russian Energy Strategy can serve as starting points. The Russian Energy Strategy for the period until 2020, approved by the Russian government in 2003, replaces a similar document from 1995.[2] However, the new Energy Strategy is more than just a future projection of current trends. It is meant to set the course for Russia's energy policy and to guide the government's energy policy for the foreseeable future.
The Strategy proceeds from certain assumptions concerning the economic development of the world economy and Russian economic development until 2020. An "optimistic" scenario assumes that, due to far-reaching reforms and a favourable external economic environment and in particular to growth in the world economy of 3.5 percent per annum, Russia's gross domestic product (GDP) will triple between 2000 and 2020. A moderate scenario assumes that the world economy will grow by 2.5 percent per annum and Russian GDP will double between 2000 and 2020. Concerning Russia, the optimistic scenario assumes

---

Roland Götz (1943), Dr. oec. publ., Head, Research Unit Russian Federation, CIS, German Institute for International and Security Affairs (Stiftung Wissenschaft und Politik), Berlin

OSTEUROPA 2005, Sketches of Europe, S. 279–311

annual economic growth of 6.2 percent during the same period, which can certainly be considered too high. At the same time, the assumptions concerning the prices of energy sources are more convincing in the optimistic scenario than in the moderate one.

The following analysis is based on the optimistic scenario of the Russian Energy Strategy. It implies a relatively high level of production of energy sources and correspondingly high exports and outlines the maximum contribution of the Russian energy sector to Europe's long-term energy supply. Russia will remain Europe's main energy supplier until 2020, but in the course of time more and more European energy imports must come from other supplier countries.

The Russian oil sector

After the collapse of the planned economy, the restructuring and extensive privatization of the oil sector proceeded quite rapidly. The plants that were originally subject to the ministries of geology and the oil industry were at first united under the financial holding Rosneft, which after 1992 began to establish about a dozen integrated stock companies.[3] These companies, due to the notorious "credits for shares" exchange procedure, in turn fell under the control of newly established private banks after 1995 and eventually came to be owned by the "oligarchs".[4] Since that time the Russian oil sector has consisted of a number of vertically integrated companies, dominated by banks, with complicated structures of ownership. In addition to banks and individual private financiers, shares are held by the Russian state (including regional bodies), by managers and staff and by foreigners. Only the oil company Rosneft is still entirely state owned. In most cases the structures of

ownership are not transparent and there is no effective control of the management; the laudable exception has been Yukos under its former chief Mikhail Khodorkovskii. The oilfields remain state property. The Russian state exerts its influence on the oil industry by means of export controls and requirements for the supply of the domestic market rather than by proprietary rights.

Resources, production,investment

By the end of 2001, the Russian oil reserves (extractable deposits under current economic conditions) had a volume of 9.7 billion tons, or 6.4 percent of world reserves. Thus Russia occupies seventh place behind leading OPEC countries – Saudi Arabia, Iraq, Kuwait, Iran, the United Arab Emirates and Venezuela. However, when it comes to resources (deposits which for economic or technical reasons cannot be extracted at the moment, plus deposits assumed to exist) Russia is in first position with 14 percent of world resources.[5] Of the reserves, three quarters are concentrated in the northern part of western Siberia.

After the collapse of the planned economy, oil production declined from its peak in the 1980s (550 million tons per annum) to approximately 300 million tons. This was due to the closure of existing oilfields and a dramatic decline in new exploration, both of which happened in the context of the restructuring of the industry. But it was also a delayed consequence of Soviet mismanagement, which ruthlessly exploited the oilfields under the pressure of the plan and was thus unable to counterbalance the exhaustion of the large fields by opening up newly discovered fields. Western Siberia prematurely became an "old oil region" where many oil wells were closed because they were exhausted, because

further exploitation would have required great efforts to inject water and gas under pressure.[6]
The Russian Energy Strategy assumes a second peak of production for 2020, which will nearly reach the Soviet peak volume of the 1980s: about 550 million tons (see Table 1). Some forecasts are even more optimistic than those of the optimistic scenario of the Energy Strategy. These are based on assumptions concerning oilfields in eastern Siberia which are known but so far unexploited, as well as anticipated new discoveries.

Domestic consumption

According to the Russian Energy Strategy, the domestic consumption of crude oil will rise only slightly from 185 million tons in 2000 to 235 million tons in 2020, which means an annual rise of 1.2 percent, while in the optimistic scenario an average economic growth of 6.2 percent is anticipated. This means that the annual growth of domestic oil consumption is expected to be 4 percent less than the growth of GDP, which would represent a considerable energy saving effect. However, it is doubtful whether such a big reduction of oil consumption intensity can in fact be achieved. On the other hand, continuous economic growth of more than 6 percent per annum over a period of almost 20 years seems rather unlikely. But if we assume a more likely average economic growth of 3-4 percent per annum, an increase in domestic oil consumption of something in excess of 1 percent per annum does not seem unrealistic. The domestic consumption of oil depends on the oil price on the Russian domestic market, which, unlike the gas price, is not state controlled. The Ministry of Economy has committed the oil industry to obligatory supply, about which, however, no further details are known.

Foreign trade

The volume of oil exports, which was 145 million tons in 2000, will increase to more than 300 million tons by 2020. Exports to Europe are to increase in the period 2000-2020 by little more than 30 million tons, from 127.5 million to 160 million tons or by 1.1 percent per annum. An increase on the same scale is expected for exports to the CIS countries, while oil exports to other countries like the United States and China, which have been low so far, will rise to about 100 million tons in 2010. Thus the increase in oil exports will clearly shift from West to East. Accordingly, the Energy Strategy expects the highest increase rates of oil exports in eastern Siberia.

According to the forecasts of the U.S. Energy Information Administration (EIA) and the European Commission, the European requirement for oil imports in the period 2000-2020 will increase by about 180 million tons, assuming moderate growth in oil consumption; this will be caused by an increase in consumption combined with a decline in oil production in Europe.[7] According to current plans and forecasts, Russia's contribution to this increase in imports will be less than 20 percent. Consequently, more than 80 percent of Europe's additional import requirements must be covered from other world regions.[8] However, Russia will remain the most important individual oil supplier for Europe (EU-30), though its share will decline slightly from 30 to 27 percent.

Table 1 Exports of fossil fuels 2000-2020 according to the Russian Energy Strategy 2003

	2000	**2020**	**Difference 2000-2020**
Oil (million tons)			
Overall Exports	145	303	158
Exports to CIS states	17	50	33
Exports to Europe*	128	160	33
Exports to China/ Southeast Asia/U.S.	1	93	93
Natural gas (billion m³)			
Overall Exports	194	281	87
Exports to CIS states	60	50	-10
Exports to Europe*	134	165	31
Exports to China/ Southeast Asia/U.S.**	0	66	66

Deviations in summation are due to rounding.
** Europe here means Western and Eastern Europe including Turkey, but excluding the CIS states. **Partially liquid gas.*

Table 2 Russian Oil on the European Market

	2000	**2020**	**Increase 2000-2020**
Net imports of EU-30 (million t) of these, imports from Russia (million t)	428 128	>600 160	~180 ~30
Russian share (percent)	30	27	17

EIA: International Energy Outlook 2003, May 2003; European Commission, Directorate-General for Energy and Transport, European Energy and Transport Trends to 2030, Paris 2003.

While 88 percent of Russian oil exports went to Europe in 2000, this share will, according to the forecast of the Energy Strategy, be reduced by 2020 to approximately 50 percent. In contrast, the share of the United States and the Far East, which in 2000 amounted to no more than 3 percent, will be one third or even more by 2020. Thus the Russian Energy Strategy expects a diversification of Russian oil exports, which, from the Russian point of view, will contribute to reducing dependence on a small number of importing countries.

The natural gas sector of the economy

With a share of 25 percent in the worldwide production of natural gas, Gazprom is the largest gas producing corporation in the world. It was established in 1989 by a merger of the state- owned plants subordinate to the Soviet Ministry of Gas Industry. Unlike the oil industry, the Russian gas industry was not split up into individual companies. Until 2005, 38 percent of the capital stock of the corporation was owned by the Russian Federation, 50 percent by Russian companies and individuals and 12 percent by foreigners. In 2005, the Russian government announced plans to increase its share to 51 percent. An unknown number of shares is held by the former and current management of the company.[9] Moreover, Gazprom is said to hold 20 percent of its own stock.[10] The monopoly of Gazprom on the Russian market was confirmed in 1992 by a presidential decree which entrusted the company with the quasi-sovereign function of supplying the domestic and foreign markets. The mixture of official functions and private interest is still characteristic of the self-image of Gazprom, as will be demonstrated below.

For a while, the only independent competitor of Gazprom was the Itera company. After the replacement of the head of Gazprom, Rem Vyakhirev, by Aleksei Miller, Gazprom succeeded in largely forcing this competitor out of the Russian market. Moreover, natural gas is also produced in Russia by oil companies and other independent gas companies. But although these competitors of Gazprom are licensed for about 30 percent of the gas reserves, their share in gas production is only 6-7 percent, because selling gas is not profitable at the low prices and high transport costs imposed by Gazprom. So the prospects of Gazprom's competitors managing to develop their gas production are favourable only in case of a liberalization of the Russian gas market, which would go along with an increase in domestic prices. At the moment 80 percent of the gas produced by oil companies is associated gas, which cannot be mixed in pipelines with "dry" natural gas but has to be processed. The processing is a quasi-monopoly of Sibur, a daughter company of Gazprom, as long as the oil companies do not build their own gas processing plants. For now, the officially fixed price for associated gas does not permit the oil companies to use this gas in a profitable way, and as a result, 25 percent of it is being flared.

In the context of the "gas alliance" suggested by Russian President Vladimir Putin, a long-term commitment of Turkmenistan to supply gas to Russia is becoming visible. In early 2003 Gazprom and the Turkmen company Turkmenneftegaz concluded, in the framework of an interstate agreement, a gas delivery contract with a term of 25 years and an overall volume of 2,000 billion m^3. The volume to be delivered annually will be 5 billion m^3 from 2005 and approximately 100 billion m^3 from 2010. The price is fixed at $44 per 1,000 m^3 until 2006, and thereafter, there

will be new negotiations or world market prices will be valid.[11] From 2006, the 36 billion m³ of gas which Turkmenistan delivers to Ukraine will also be bought by Gazprom.[12]

Resources, production, investment

Having (at the end of 2001) 47.6 trillion m³ of natural gas, Russia has the largest reserves in the world, followed by Iran (26 trillion m³) and Qatar (14.4 trillion m³).[13] Its share of overall world reserves is about 30 percent, and those of Iran and Qatar are 16 percent and 9 percent respectively. As far as resources are concerned, Russia is even further ahead. The main regions of Russian gas production extend from the Caspian depression northwards, covering areas north of the Caspian Sea near Astrakhan, in the Volga-Ural Basin near Orenburg, in the Timan-Pechora Basin on the western side of the northern Urals, in the west Siberian Basin east of the northern Urals, on the Yamal Peninsula, in the Kara Sea and in the Russian part of the Barents Sea. Other areas of gas production are in the areas of the upper and lower course of the river Lena and in the northern part of Sakhalin Island. As the costs for the construction of pipelines for natural gas (unless liquefied) are higher – in terms of the specific energy content – than those for oil pipelines, it is only profitable to exploit large gas fields at a maximum distance of 4,000-5,000 km from the consumers.[14]

The fields in western Siberia will remain crucial for Western Europe's natural gas supply. By 2015 at the latest, a noticeable decline of production in these fields can be expected, as the three west Siberian "giant fields" Urengoi, Yamburg and Medvezhye (supplying some 85 percent

of total Russian gas in 2000) were exhausted in 2000 by 50 percent, 26 percent and 68 percent respectively.[15] The decline in production will be compensated at best by 2020 by the continental Russian giant field Zapolyarnoe, which started production in 2001.[16] An increase in gas production requires exploiting the last giant deposits on the Yamal Peninsula and in the Barents Sea (Shtokman field), which have not yet been opened up. This will be a great challenge in terms of extreme climatic conditions and technical feasibility.

The cost of opening up the two Arctic offshore gas fields would be tens of billions of dollars, which is far beyond the financial capacity of Gazprom.[17] Whether and when foreign gas companies will be ready to engage in the two regions will depend on whether the planned Production Sharing Agreements (PSA) meet the interests of all the parties involved.[18]

The gas-producing capacities of the Russian oil companies, which so far have not been granted access to the pipeline network run by Gazprom, do not seem to have been properly considered in the Energy Strategy. As much as about 30 billion m³ every year of associated gas from oil production, which so far is either used for heating or is just being flared because of the lack of transportation capacity, could be used much more efficiently. Moreover, the well-funded Russian oil companies could replace the financially weak Gazprom in exploiting the 500 minor gas deposits which have not been opened up so far. In spite of lower daily output and higher running costs compared with the large "old" fields, the exploitation of these fields requires much less investment. In 2003, the output of the independent companies was about 70 billion m³, but the companies say that they could produce 170 billion-250 billion m³ if the price were raised to $50-55 per 1,000 m³,

provided the independent companies and/or the gas producing Russian oil companies are granted access to the pipelines run by Gazprom on fair terms.[19] This has been promised by Gazprom, but there are good reasons for scepticism in view of the way in which the independent producers are currently at the mercy of Gazprom.

Investment in the natural gas branch of natural gas increased in the 1999-2001 period from just under $1 billion to more than $2 billion per annum.[20] According to the Energy Strategy, it will rise by 2020 to an average of $10 billion per annum, amounting to a total of $170 billion-$200 billion. Such a level of investment activity can only be attained if the gas sector is made much more attractive for foreign investors than it has been up until 2005.

Domestic consumption

According to the Russian Energy Strategy, the domestic consumption of gas will grow only slightly from 390 billion m^3 in 2000 to 500 billion m^3 in 2020, which means an annual rise of 1.3 percent. This means that the annual growth of domestic gas consumption is expected to be 4 percent less than the growth of GDP. However, it is doubtful whether such a big reduction of gas consumption intensity can in fact be achieved.

In Russia a great deal of energy (mostly natural gas and electricity, both of which are relatively cheap) is wasted in all phases of production, transportation and consumption. This is mostly due to outdated and poorly serviced production and transport equipment and the inadequate isolation of buildings. The very low domestic price of natural gas has a particularly negative impact on the technological evolution of the gas sector.[21] There is no incen-

tive to save gas by means of modernization of the production and processing plants and gas power stations. In Russia the loss of energy in the production of electric and thermal power from natural gas accounts to as much as 60 percent, while in Western Europe much less is tolerable. Technical innovation would enable Russia to save 40 billion-100 billion m³ of natural gas per annum.[22] It must be doubted whether such large-scale technical improvement will be feasible without raising the domestic price of natural gas.

Whether coal and nuclear power will be able to increase their share in the production of energy by 2020, as envisaged in the Russian Energy Strategy, will largely depend on domestic pricing policy. The low gas price has so far been keeping coal and nuclear power out of the domestic market while stabilizing the share of natural gas. The domestic price of natural gas is only one fifth of what is paid for it as an export on Russia's western borders, and only half of the price of gas delivered to Kazakhstan and – dependent on the season – three to five times cheaper than heavy oil which is used in thermal power plants.[23] According to the Russia-WTO agreement the domestic gas price, which was $24 in 2003, will rise only slowly to $38-42 in 2006 and $49-57 in 2010.[24] The domestic price of natural gas is a key parameter of Russian energy policy. A sufficiently high price provides profits on the domestic market which can be used to finance investments without using up resources from the state budget. Thus an adequate price for natural gas would serve the rational exploitation of natural resources, which the Russian leadership still fails to appreciate fully.

Foreign trade

The rapidly increasing demand for natural gas in Europe is due to the intention to replace coal and oil with "clean" natural gas for ecological reasons, and also to the advancing "gasification" of European areas. While European oil imports are likely to increase in the period between 2000 and 2020 by approximately 40 percent, EU-30 gas imports will increase (medium economic growth scenario) by more than 200 percent, or in the low growth scenario by 150 percent (EIA forecast). This is a result of both an increase in consumption of 50-75 percent and the stagnation or decline of Europe's own gas production. This drastically widening gap between increasing consumption and declining production of gas will make European demand for gas imports leap by approximately 300 billion m^3, on a scale that far exceeds Russia's intentions and potential.

What are Russian plans for supplying the European gas market? While the overall volume of Russian gas exports is to increase between 2000 and 2020 by 87 billion m^3 (45 percent), exports to the extended European Union will only rise by 31 billion m^3 (23 percent). Thus, according to the Russian Energy Strategy, the intended increase of Russian gas production will predominantly be used for exports to regions outside Europe. This corresponds to the fact that the increase of gas production is expected not in western Russia, but in eastern Siberia and the Far East, from where gas can be transported either overland or – in the form of liquefied natural gas (LNG) – by ship to Southeast Asia and the United States. An analogous shift to the East is also expected to account for the increase in oil production.

Table 3 Russian Natural Gas on the European Market

	2000	**2020**	**Increase 2000-2020**
Net imports of EU-30, total (billion m³)	200	500	~300
of these, imports from Russia (billion m³)	134	165	~30
Russian share (percent)	67	33	10

EIA: International Energy Outlook 2003, May 2003; European Commission, Directorate-General for Energy and Transport, European Energy and Transport Trends to 2030, Paris 2003.

While about 70 percent of European (EU-30) gas imports came from Russia in 2000, this share will be only 50 percent in 2010 and less than 30 percent in 2020. The remaining deficit of 70 percent will then have to be covered by a multitude of supplier countries, though no exact forecasts are possible for the period after 2010. Europe will increasingly find itself compelled to import gas from North Africa, the Middle East and Central Asia, partly in the form of liquefied gas.

While the slight decline in the share of Russian oil in European imports is not a cause for concern, the foreseeable marked decline in the share of Russian natural gas in European imports raises some questions. How can Europe's additional demand for natural gas be satisfied in the future? Apart from deliveries of liquefied gas, pipeline suppliers can only be North Africa, the Middle East or the Caspian region, as pipeline deliveries are economically

efficient below 4,000-5,000 km. Algeria, alongside Russia the main external supplier of Europe, will probably be able to increase its deliveries by 2020 from approximately 60 billion to 120 billion m³. In this case Algeria could increase its gas deliveries to Europe by twice as much as Russia has envisaged in its Energy Strategy. Libya, too, will be able to increase its so far limited exports from 1 billion m³ to a possible volume of 30 billion-40 billion m³ by using the new Green Stream pipeline. Future gas exports from Egypt to Europe will go via the Jordan pipeline to Turkey and in addition will be realized by LNG projects, thus reaching a possible volume of 30 billion m³ in 2020. Nigerian gas deliveries to Europe will be realized only in the form of LNG, because transportation via Algeria is too expensive. Other supplies, which are at present insignificant but will increase in the future, will come to Europe from Trinidad and Venezuela and from the Middle East (excluding Iran). Given these assumptions, gas supplies to Europe from these regions will by 2020 have increased by approximately 250 billion m³ compared with 2000, which means that North Africa, the Middle East and the Caspian region together will deliver more natural gas to Europe than Russia.

Iran will presumably become, like Algeria, a major supplier of gas if its giant southern Pars field is connected to the European gas infrastructure; this, however, is only likely to happen after 2015. Around 60 billion-100 billion m³ can be delivered from Iran to Europe beginning in 2020, and approximately 150 billion m³ from 2025.

Table 4 Gas Exports to Europe from North Africa, the Middle East and the Caspian Region 2000-2020 (billion m³)

	2000	**2010**	**2020**	**Difference 2000-2020**
Algeria	60	85	120	60
Azerbaijan		15	30	30
Egypt		26	31	31
Iran		10	30	30
Iraq		10	20	20
Libya	1	11	27	26
Nigeria	1	15	20	19
Qatar/UAE/Yemen	2	9	16	14
Trinidad	1	5	10	9
Turkmenistan			10	10
Total	65	186	314	249

Sources: Andreas Seeliger, Angebotsoptionen für den Europäischen Erdgasmarkt. Ausgewählte Ergebnisse des Modells EUGAS bis 2025, Köln 2003; Jens Perner, Die langfristige Erdgasversorgung Europas. Analysen und Simulationen mit dem Angebotsmodell EUGAS, München 2002; Manfred Hafner, Future Natural Gas Supply Options and Supply Costs for Europe, and the Role of the Mediterranean in Supply and Transit, 2002, Robert Schuman Centre, Observatoire Méditerranéen del l'Energie/Sonatrach, Medsupply, Developments of Energy Supplies to Europe from the Southern and Eastern Mediterranean Countries, June 2003.

Transportation of Russian oil and gas

Following the export forecast of the Russian Energy Strategy, transport capacities for crude oil will have to be doubled by 2020. While Russian oil transport capacities have already siffered from considerable bottlenecks in recent years, the gas pipelines on the whole still have some free capacity. However, there are no transport capacities so far for gas exports towards the East or for the export of liquefied gas.

Primarily with regard to the development of Russian energy supply for the United States, Russian oil companies proposed in late 2002 to build a pipeline from the west Siberian oilfields to Murmansk so that large tankers could sail from this ice-free and deep-sea harbour to the U.S. east coast. The costs were estimated, depending on the route, to be around $9-15 billion. The Murmansk pipeline project, favoured first of all by the oil company Yukos, met with considerable opposition from the state-owned Russian pipeline company Transneft. Transneft not only denied the need for and profitability of this export route, but also opposed its financing by the private sector. As an alternative to Murmansk, Transneft favours the extension of the port of Indiga (west of the mouth of the river Pechora) as an oil exporting port, which could be reached by a pipeline which is shorter than the one leading from the west and north Siberian oilfields to Murmansk. This would, however, require the construction of a completely new infrastructure in Indiga and the use of ice-breakers during the winter. Whether Murmansk or Indiga, a large oil port on the shore of the Barents Sea would permit significant Russian oil exports to the United States which in the long run could account for 10 percent of U.S.

oil imports. In the meantime, Russian oil companies such as Lukoil and Rosneft are making efforts to build a transport system in the oil-producing area of Tima-Pechora, including the offshore oilfield Prirazlomnoe, which would make it possible to transport oil from different ports on the Barents Sea to Murmansk. Moreover, it is planned to build a pipeline from the west Siberian Vankor oilfield to the port of Dikson on the Kara Sea.

In the Soviet era and still during the 1990s, oil exports by ship went through the Baltic ports of Ventspils (Latvia) and Butinge (Lithuania) and through Black Sea ports. When the Baltic states turned towards the European Union and NATO, the Russian state-owned pipeline company Transneft started to search for new export routes avoiding the Baltic ports. The option of extending the existing pipelines leading from Russia to Ventspils and Butinge was not taken up, allegedly for commercial but in fact for political reasons. In late 2002 Transneft stopped the supply of Ventspils altogether. Since then the Latvian oil port has been supplied with Russian oil and refinery products by train only. The Lithuanian oil terminal Butinge, in which the Russian company Yukos holds a majority share, avoided the fate of Ventspils and Butinge is even said to be extending its export capacity.[25]

Instead Transneft concentrated on the development of the Baltic Pipeline System (BPS),[26] which connects the oil ports on the Gulf of Finland, Primorsk and Vysotsk, with the oil-producing regions of western Siberia and Timan-Pechora. The BPS was started in 2001 and had reached a capacity of 42 million tons in March 2004; there are plans to expand its capacity to 62 million tons. A shortcoming of Primorsk and Vysotsk is, however, the fact that they freeze up in winter and there is a danger of accidents in the shipping lanes made by the ice-breakers. Transneft justi-

fies the development of the Baltic pipeline system on economic grounds, stating that this helps to save expenses for transit through foreign countries. But there are good reasons to suspect that dropping the Baltic export terminals is seen in Russia as a geopolitical benefit, irrespective of economic and ecological considerations.[27] In particular, ecological dangers are aggravated by the substantial increase of oil transports from the Baltic Sea ports. Passing through the shallow, narrow and crowded Kadet channel south of the Danish island of Falster is dangerous for heavy tankers with a deep draught. Russia has, after all, obliged itself to stop the passage of tankers with only one wall through the Baltic Sea after April 2005.

The Druzhba oil pipeline: Russian oil to Europe

Pipeline transport is the most important method for the supply of Western Europe with Russian oil. The main export pipeline for Russian oil in a western direction, the Druzhba (Friendship) pipeline with its overall capacity of 85 million tons per year, starts from Samara and is divided at the Russia-Belarus border into three branches. One smaller branch goes to Latvia, branching off to the Lithuanian Baltic ports and to the Lithuanian refinery at Mažeikiai. The northern, main branch goes via Poland (the refinery at Płock) to Germany (the refinery at Schwedt on the Oder). A southern branch goes through northern Ukraine to Hungary and Croatia, with a further branch to Slovakia and the Czech Republic. The full capacity is utilized only in the northern branch leading to Germany. The lines going to Latvia and Lithuania are not in use at present. The southern Druzhba branch is not working to capacity, because demand for Russian oil in Hungary, the Czech Republic and the Balkan countries has declined.

The Adriatic pipeline, which was designed for the transport of Middle Eastern oil from the Croatian port of Omišalj on the Adriatic to Hungary and Yugoslavia, was inherited from the Soviet era. It is connected with the southern Druzhba pipeline. It is now planned to reverse the direction of flow of the Adriatic pipeline and thus to transport Russian oil to Omišalj and then on to the world market. Such plans have been under discussion since the early 1990s, but the parties involved have not so far agreed on the details of a solution.

Oil exports via the Black Sea and the Bosporus

Among the Russian oil shipping ports, Novorossiisk on the Black Sea is at present the most important one. In 2004, it had a shipping capacity of 45 million tons per year, which is expected to increase; Novorossiisk is ice-free all year round, but due to dangerous storms in the region the port cannot be used for about three months of the year. Another shortcoming of the port is the fact that the oil tankers have to pass through the Dardanelles and the Bosporus, which runs the risk of great environmental damage. In 2003, these straits were passed by no fewer than 5,500 oil tankers carrying about 150 million tons of oil. An increase up to about 200 million tons of oil is expected by 2010, as exports of Russian as well as Caspian oil continue to rise.[28] But the straits have reached their limits already, and in addition, there is a constant risk of tanker accidents near the multimillion city of Istanbul. This is why consideration is now being given to how to bypass the Bosporus, which will end up in the construction of pipelines between the Black Sea and the Mediterranean. One of the plans provides for the construction of a pipeline from the Romanian Black Sea port of Constanța to Bel-

grade, which would create a connection with the Croatian Adriatic port of Omišalj. As an alternative, pipelines could be built from Constanța or the Bulgarian port of Burgas, either through Macedonia to the Albanian port of Vlore or, on a shorter route, to Alexandroupolis in northern Greece. The shortest route bypassing the Bosporus would be a pipeline from the small Turkish town of Kiyiköy to Ibrikbaba or Saros on the Turkish coast of the Aegean.

Finished, but not yet operating, is a pipeline from the Ukrainian Black Sea port of Odessa to the southern Druzhba pipeline with a junction near the west Ukrainian town of Brody. This Odessa-Brody pipeline had been built for the transport of oil from the Caspian region (Azerbaijan, Kazakhstan) to Europe, and there were additional plans to connect it with the northern branch of the Druzhba pipeline and/or to extend it to the Baltic port of Gdańsk. But after the pipeline was finished in 2002, neither suppliers nor purchasers of oil from the Caspian region were interested in the Odessa-Brody route, so the Russian oil company TNK-BP suggested pumping Russian oil from the Druzhba pipeline in the opposite direction from Brody to Odessa and then transporting it by tanker through the Bosporus to the world market. This suggestion made the Ukrainian public, the EU and the United States suspect that Russia wanted to bar the way for Caspian oil to the West. After heated debates it seemed in early 2004 that those who favoured the original Odessa-Brody direction had won. But in mid-2004 the Ukrainian oil company Uktransnafta came to the conclusion that it could still be several years before oil from the Caspian region could go by this route, so they declared their readiness to accept the suggestion of "reverse utilization" of the pipeline.[29] Following the Kiev "orange revolution", the original concept

of oil transport from south to north is now expected to be realized.

Kazakh oil has been pumped since 2001 through the pipeline of the Caspian Pipeline Consortium (CPC), which stretches for over 1,500 km from the Kazakh Tengiz oil field to the Russian Black Sea ports of Novorossiisk and Tuapse. In its first phase it has a capacity of 28 million tons per year, which is to be increased by 2008 to more than 67 million tons per year.[30] This not only requires an adequate extension of the shipping capacity of the ports of Novorossiisk and Tuapse, but also raises the problems mentioned above in connection with the further transport of oil through the Black Sea to the Mediterranean.

The Baku–Tibilisi–Ceyhan oil pipeline (BTC), which is designed for the transport of Caspian or Azerbaijanian oil to the world market with a capacity of 50 million tons per year, is seen as a possible alternative to CPC.[31] Russia has also declared its interest in the utilization of the BTC for oil transport to the Mediterranean, because the Baku–Novorossiisk pipeline, which along with the Baku–Supsa pipeline also transports Azerbaijanian oil to the West, could be used to pump Russian oil in the opposite direction, from Novorossiisk to Baku. However, Transneft is somewhat sceptical about this idea, and its president, Semën Vainshtok, would prefer to refrain altogether from oil transport through foreign territory.[32]

Oil from Russia's east for China and Japan

There are no pipelines so far for the transport of Russian oil to Southeast Asia. Only China receives a certain amount of oil per year by rail (5 million–6 million tons in 2004). Because of the high demand it is planned to increase oil transport to China by rail to 30 million tons in

2007.[33] The Russian company Yukos had suggested building an oil pipeline from Angarsk (Lake Baikal) to Daqing in China. Since the arrest of Khodorkovskii, the plans for the Angarsk–Daqing pipeline have become obsolete. The Russian government and Transneft now prefer a pipeline route to Nakhodka, the Russian port on the Japanese Sea with a capacity of 50 million tons per year. Finally, a route with branches to both Daqing and Nakhodka is under discussion. But this "compromise variant" would not only be the most expensive one, it also presupposes that in eastern Siberia there is an adequate amount of 80 million tons per year to be produced, which experts doubt.

Gas from Siberia to Germany

The system of essential Russian natural gas pipelines to the West begins with two branches in the large west Siberian natural gas fields in the southeast of the Yamal Peninsula. The central southern branch (Brotherhood) runs through Ukraine, Slovakia and the Czech Republic to Austria and ends in Germany. One branch goes through Ukraine and Moldova via Romania and Bulgaria to Turkey. The northern branch (Polar Light) goes through Belarus and joins the southern branch in Ukraine. A third branch (Union) goes from the gas fields in the Volga-Ural region near Orenburg to Ukraine, where it joins the central branch. The part of the Yamal–Europe pipeline which begins on Yamal Peninsula and ends in Central Russia (Torzhok) has not been built yet. This route, with a length of several thousand kilometres would not be needed if gas liquefaction plants were built in Yamal which would make it possible to ship liquid natural gas worldwide. Because of unsettled problems of LNG transportation through ice-

ridden waters, Gazprom has postponed the opening up of the gas fields on the Yamal Peninsula for the time being.

The overall capacity of this Ukrainian gas transport system, inherited from the Soviet era, is about 140 billion m³; approximately 130 billion m^3 is currently transported through the system. To this one must add a new stretch of the long-distance Yamal-Europe pipeline from Torzhok (Tver region) via Belarus and Poland to Germany, the first branch of which will have a capacity of 33 billion m^3 after completion.[34] Another parallel pipeline with the same capacity is to be built as soon as a corresponding demand is seen. The new Blue Stream gas pipeline, connecting southern Russia through the Black Sea with Turkey, has a capacity of 16 billion m^3 per year – which is far from being used at present. Thus, the overall capacity of the pipeline system for gas exports to all European countries (including Turkey) amounts to 190 billion m^3. With the reconstruction of the Ukrainian pipeline system and the construction of a second Yamal–Europe pipeline it could be increased by another 60 billion m^3.[35]

An extension of the Ukrainian pipeline network would require relatively modest expenditure to supply Germany with additional gas from Russia. In this context the obvious thing to do is to increase the capacity of the Torzhok-Dolina gas pipeline (near Uzhhorod) by compressor stations to its nominal capacity of 28 billion m^3. Even the forwarding of Russian gas via Germany to Britain would be possible. The reconstruction of the Ukrainian gas transit network, including the supply lines leading to Turkmenistan and Uzbekistan, would provide additional export capacity for Russian natural gas at relatively modest cost. But this would require settling the question of whether and in what way the state-owned Ukrainian gas network can be opened for private investors.

A north European gas pipeline (NEGP), also known as North Transgas or Baltic Sea pipeline, has been under discussion since the 1990s. It is expected to go from the Russian Baltic port of Vyborg to Greifswald in Germany, with possible extensions to Denmark and Britain and branches to Sweden and into the Russian Kaliningrad region under consideration.[36] British BP, German Ruhrgas and Wintershall and the Dutch Gasuni have shown their interest in this pipeline, the overall cost of which is estimated at some $6-10 billion. In December 2000 the EU Commission gave the project the status of a Trans European Network, and in 2002, it classified it as a priority project in the framework of the Russia–EU energy dialogue, thus releasing EU funds for project studies.[37] In June 2003, President Putin and Prime Minister Tony Blair confirmed that Russia and the United Kingdom intend to cooperate in the construction of the Baltic Sea pipeline. During the visit of German Chancellor Gerhard Schröder on 8 July 2004, it was announced in Moscow that the E.ON group with its subsidiary company Ruhrgas and the Russian Gazprom have declared their intention to jointly finance the part of the pipeline between Vyborg and Greifswald. But surprisingly, at the Hannover Fair on 10 April 2005, in the presence of Putin and Schröder, BASF/Wintershall and Gazprom announced their agreement to cooperate in financing and building the pipeline. The cost of the construction of its offshore part with a length of 1,200 km will be $2.4 billion, which is twice as much as an onshore pipeline of the same length would cost. There had initially been plans to use gas from the fields on the Yamal Peninsula and in the Barents Sea, but it is now planned to fill the Baltic Sea pipeline with gas from the new Yuzhno-Russkoe field in western Siberia.

A much cheaper alternative to the Baltic Sea pipeline would be the construction of a second gas pipeline parallel to the western Yamal pipeline from Torzhok to Germany, and/or the extension of the Ukrainian pipeline system. Most of the reasons for the expensive offshore pipeline can be found in the political field, and in particular in the relationship between Russia and its western CIS partners. In the 1990s, the transit countries Belarus and Ukraine caused a lot of trouble for Russia and Gazprom. Gas was drawn from the transit pipelines without permission and the national gas companies of Belarus and Ukraine were paying for their gas with long delays, thus accumulating considerable amounts of debt. Gazprom reacted with an attempt to get control of the gas transport systems of the two neighbouring countries.[38] In Ukraine this has been resolved for the time being with the creation of a "Gas transport consortium" to manage the Ukrainian gas network with Russian and German participation. In Belarus Gazprom tried to take over the national gas company Beltransgas, but encountered resistance from President Lukashenko.[39] So Gazprom could easily manage without using the Beltransgas net for exports to Europe, and the NEGP could serve at least as a partial substitute for gas transit through Belarus. Given the relatively high costs of the offshore pipeline, which can be cost-efficient only in a long-term perspective by saving transit fees, German national interests in the Baltic Sea pipeline are not really clear.

Gas from the Barents Sea – to Europe or to the U.S.?

One project which has been under discussion for many years now is the Shtokmanovskoyegas condensate deposit, 550 km off the coast of the Kola peninsula in the Barents Sea. There are plans to develop this deposit by building an offshore pipeline to the mainland at Murmansk, where the

gas would be liquefied and then exported by ship. The overall cost of the project is estimated by the Russian side at several dozens of billions of dollars. Apart from the Russian companies Gazprom and Rosneft, Conoco (U.S.), Total (France), Statoil and Norsk Hydro (Norway) and Fortum (Finland) have also declared their interest in the project. The construction of a gas liquefaction plant would make it possible to supply gas to the United States. However, these plans are dependent on an agreement between Gazprom and its foreign partners concerning the financial details of a possible production-sharing agreement.[40] It seems that Gazprom prefers the Shtokmanovskoye project to the opening up of gas deposits on the Yamal Peninsula.[41]

Russian gas for Southeast Asia

A gas pipeline is to be built by a consortium led by ExxonMobil, from the Okha gas field in northern Sakhalin to Japan (Sakhalin-1), crossing the island from north to south and then going offshore to Japan. A second project, run by Shell (Sakhalin-2), provides for the construction of a gas liquefying plant at the southern end of Sakhalin, from where LNG can be shipped by tanker.

TNK-BP plans to invest $12 billion in the construction of a 4,000 km pipeline from the Kovykta natural gas field (west of Lake Baikal) to northeast China, and then via North Korea or alternatively through the Yellow Sea to South Korea with an offshore branch to Japan.[42] This pipeline would be 600 km shorter and $2 billion cheaper if it went through Mongolia, but this option is strongly opposed by China. Having large gas deposits of its own, China is not able to buy enough gas to make the pipeline profitable without an extension to South Korea.

A gas OPEC instead of a liberal gas market?

Russia's Gazprom has taken measures to bar the Central Asian gas producing countries Turkmenistan, Uzbekistan and Kazakhstan from the direct export routes to the West and to act as the only intermediary for Central Asian gas exports to Europe. Moreover, Gazprom is making efforts to extend the pipelines from the Turkmen gas fields to Russia. The next step in planning is the construction of a new pipeline connection from Alexandrov Gai on the Kazakh-Russian border, via Novopskov on the Ukrainian-Russian border, to Uzhgorod on the Ukrainian-Slovak border. This pipeline, with a length of 1,500 km, will cost $2 billion and is for the time being the main project of the Russian-Ukrainian-German gas transport consortium which is to manage and develop the Ukrainian gas network.

Gazprom is pursueing a strategy of securing gas deliveries from Central Asia (primarily from Turkmenistan, Uzbekistan and Kazakhstan) for the supply of Russia and re-export to Europe. For this purpose, Gazprom managed to gain almost complete control of the gas economies of the Central Asian CIS states in 2003. By means of supply contracts it has not only reached a long-term commitment of Turkmenistan, but also of Uzbekistan, over the territory of which Turkmen gas goes to Russia. This brings benefits to Russia in many respects. First, it guarentees that the Russian domestic market will be supplied with relatively cheap gas from sources not too far away, using the existing "Central Asia – Centre" pipeline network from Turkmenistan via Uzbekistan and Kazakhstan to Russia. This network, though, is badly in need of renovation and extension. Second, Central Asian gas can help Gazprom to fulfil its export commitments to purchasers in the CIS countries

and Western Europe. Third, it prevents countries like Turkmenistan and Kazakhstan from entering western gas markets as competitors of Russia. Another effect of this strategy which is very convenient for Gazprom is that it allows natural gas delivered to Russia from Central Asia to fill the gaps resulting from foreseeable delays in the opening up of the Yamal and Shtokmanovskoe fields, at least until 2015.[43]

The strategy of Gazprom corresponds to the idea of a "gas OPEC" or a "Eurasian alliance of gas producers" suggested by Putin in January 2002. This cartel, consisting of Russia, Kazakhstan, Turkmenistan and Uzbekistan is intended not only to stabilize the gas price at a sufficiently high level, but also to neutralize the effects of the forthcoming liberalization of the European gas market and to create a stable regulatory framework for gas transport, thus counteracting the intentions of the EU to extend the liberalized gas market to the CIS. It fits into this picture that negotiations between Russia and the EU on the ratification of the Energy Charter and in particular the corresponding transit protocols by Russia came to a standstill at the end of 2003.

For European gas consumers, however, it would be beneficial if supply routes and prices were determined by competition rather than political constraint. And there are some prospects of this, notwithstanding Russian efforts. A competitor to Russia may arise in the form of gas pipelines going from Central Asia directly to Turkey. For one section, there are plans to build a gas pipeline from Baku to Erzerum, Turkey, which would run parallel to the Baku–Tiflis–Ceyhan oil pipeline. For the other section, there have also been talks about a gas pipeline from Iran to Turkey and then on to Europe. The Austrian Nabucco Company already has concrete plans to build a gas pipeline from the eastern border of Turkey via Bulgaria, Ro-

mania and Hungary to Austria with a possible continuation to the Netherlands. It would be 3400 km long and cost some €4.4 billion, the period of construction would last from 2006 to 2009, and it would have a capacity of 20 billion m^3 of natural gas per year.[44] The gas suppliers may be Iran and possibly the Central Asian CIS republics, as long as the latter are not completely linked to Russia. A third project provides for the construction of a gas pipeline from Iran to Armenia with a possible continuation via Georgia and Ukraine to Europe. To bypass Russia it would be necessary to build an offshore pipeline of 550 km from Supsa, Georgia, to Feodosia in the Crimea. If this happens, Turkmenistan could also be a gas supplier. However, it will not be easy to realize such projects, since they would inhibit both Russia's policy of a Eurasian gas alliance and the United States' containment policy towards Iran.

Translated from German by Bernd Bentlin, Berlin

---

1 For the purposes of this text, "Europe" is the whole of Europe, i.e. the European Union extended to about 30 members, exclusive of CIS countries – notwithstanding the discussion about Russia's position in Europe.

2 Energeticheskaya strategiya Rossii na period do 2020 goda, approved by the Russian government on 28 August 2003, <http://www.mte.gov.ru/files/103/1354.strategy.pdf>.

3 Heiko Pleines, *Wirtschaftseliten und Politik im Russland der Jelzin-Ära (1994–99)* (Münster 2003), p. 208ff.

4 The Russian government had by that time pawned the shares of state owned enterprises for relatively low credits, but nobody believed the pawns would ever be redeemed; see David Lane (ed.), *The Political Economy of Russian Oil*. (Lanham, Oxford 1999), p. 15ff.

5 Bundesanstalt für Geowissenschaften und Rohstoffe (BGR), "Russische Föderation", 2003, p. 29ff.; BGR, "Reserven, Ressourcen und Verfügbarkeit von Energierohstoffen 2002", 2003, Tab. 2–6, p. 316.

6 Gert Ziener, *Institutioneller Wandel und die Nutzung natürlicher Ressourcen: Steuerlich-rechtliche Ansätze zur Belebung der Erdölwirtschaft Russlands* (Freiberg 2003), p. 62ff.

[7] The U.S. Energy Information Administration, an independent statistical department within the U.S. Department of Energy, regularly publishes data about energy consumption in world regions and individual states in its International Energy Outlook, the May 2003 issue of which is here referred to; see <http://www.eia.doe.gov/oiaf/ ieo/index.html>. In the reference case of an average growth of production and energy consumption in the EU-30 area, the requirement of additional oil imports is 179 million tons, in the case of low economic growth 75 million tons, and in the case of high growth, 324 million tons. See also European Commission, Directorate-General for Energy and Transport, "European Energy and Transport Trends 2030", 2003, Appendix 2, p. 152, <http://europa.eu.int/comm/dgs/energy_transport/ figures/trends_2030/ index_en.htm>.

[8] For the forecast of international trade flows in 2025, see EIA, "International Energy Outlook 2003", Tab. 14, p. 42, <www.eia.doe.gov/oiaf/ieo/index.html>.

[9] Heiko Pleines and Kirsten Westphal, "Russlands Gasprom. Die Rolle des Gaskonzerns in der russischen Politik und Wirtschaft", Berichte des Bundesinstituts für ostwissenschaftliche und internationale Studien 33/1999, p. 6ff.

[10] "Operatsiya na yuridicheskom litse", *Opec.ru*, January 1, 2003. See also the presentation on the Gazprom Web site: <http://www. gazprom.ru/articles/article4076.shtml>.

[11] Igor Tobakov, in: <http://www.eurasianet.org/departments/insight/articles/ eav041503.shtml>.

[12] Gazprom vernulsya v Turkmeniyu, in: *Vremya novostei*, 3 April 2003.

[13] BGR, "Reserven", Tab. 3–4, p. 350.

[14] Ibid., pp. 133-134.

[15] Ibid., p. 368.

[16] Zapolyarnoe is to supply 100 billion m³ of gas per annum for 15 years (starting in 2005); see the statements of Gazprom director Aleksandr Ananenkov in *Tribuna*, 25 June 2003. For a less pessimistic assessment of the volume of gas production from the three giant fields of western Siberia, see IEA, "Russia Energy Survey 2002", 2002, pp. 113–114.

[17] Roland Götz, *Russlands Erdgas und die Energiesicherheit der EU* (Berlin 2002).

[18] In a Production Sharing Agreement (PSA), the division of profits between the foreign investor and the state is agreed on for the entire term of the project, which guarantees that future changes in tax legislation will have no effect. The Russian government fears that this would give foreign com-

panies unjustified privileges, and it therefore prefers open tenders. The State Duma has not approved the majority of planned PSAs in the last few years. See Sergei Pravosudov, "Neftyanoi oboroten v Rossii", *Russkii fokus*, 20 October 2003, and "Russia Sees No Future for Production Sharing Practices", <http://www.gasandoil.com/goc/company/ cnr31842.htm>. The 1999 PSA act was substantially improved in 1999 by fixing the priority of PSA regulations via the act on natural resources. In addition, the reservation of export limitation for the investor was abolished.

19 "Moda na spot proshla", in: *Vremya novostei*, 5 June 2003.

20 In 1999, investment was 22.8 billion roubles or $9 billion, and in 2001, it had risen to 64.5 billion roubles or $2.2 billion, given an average rouble/dollar exchange rate. The rouble data are taken from *The Russian Statistical Yearbook 2002*, p. 578.

21 In 2003, the Russian domestic price for natural gas was approximately $24 per 1,000 m³. The market price" was noted as $30–35 per 1,000 m³m³, although there is no such thing as a developed domestic market. The export price at the Russian border was in the same period well over $100 per 1,000 m³, which, however, includes the higher transportation costs compared with the domestic market. See "Nou-khau Gazproma", *Vedomosti*, 27 October 2003.

22 "Tsena severnogo gaza", *Gazovaya promyshlennost*, 30 April 2002.

23 "Materials of the Forum 'Russia's Gas in 2003'", in: *Neftegazovaya vertikal*, 9 June 2003; according to a statement by the deputy chairman of the Federal Energy Commission, Oleg Zhilin.

24 <http://europa.eu.int/comm/external_relations/russia/intro/ip04_673.htm>.

25 EIA Country Analysis Briefs, "Baltic Sea Region", January 2004, <www.eia.doe.gov/emeu/cabs/baltics.html>.

26 The name "Baltic pipeline system" refers to the Baltic Sea.

27 Juhani Laurila, "Determinants of Transit Transports between the European Union and Russia", *Bofit online*, 1, 2002, <www.bof.fi/bofit/fin/7online/abs/pdf/bon0102.pdf>.

28 Christopher Slaney, "Turkish Concerns for Bosporus Complicates Oil Transport Scenarios", *Washington Report on Middle East Affairs*, May 2004, <www.wrmea.com/archives/May_2004/0405034.html>.

29 "Kiew weist Pipeline-Antrag Moskaus ab", *Neue Zürcher Zeitung*, 6 February 2004, p. 5; Arkadiusz Sarna, "Odessa–Brody. The Governments European Choice", *CES Comments*, 12 February 2004, <www.osw.waw.pl/en/epub/ekoment/2004/02/040212.htm>; Margarita M. Balmaceda, "Ukraine's Energy Policy and U.S. Strategic Interests in Eurasia", Woodrow Wilson International Center for Scholars, Occasional Paper 291, <http://wwics.si.edu/topics/pubs/OP291.pdf>.

30 Interfax Petroleum Report 25/2004, pp. 28-29.

[31] See the official documentation of the BTC: <www.caspiandevelopmentandexport.com/ASP/BTC.asp>; Zurab Tevzadze, "Eksportnye marshruty i problemy transportirovki Kaspiiskoi nefti", *Tsentralnaya Aziya i Kavkaz*, 1, 2004, pp. 104–117.

[32] "Rossii ne nuzhen tranzit po innostrannoi territorii", *Kommersant*, 17 June 2004.

[33] Vwd Russland, 11 December 2003, p. 2.

[34] Isabel Gorst, "Broadening Export Strategy", *Petroleum Economist*, 5, 2004, pp. 21–23; "Razvilka s politicheskim uklonom", *Vremya novostei*, 21 June 2004; Alla Sapun, "Pravo na gazovuyu zadvizhku", *Neftegazovaya vertikal*, 2004, p. 7.

[35] See various contributions in: *National Security & Defence*, 3, 2003, and 1, 2004 <www.uceps.org/eng/section/National_Security_and_Defence/>.

[36] Vladimir Baidashin, "Gas via Baltic", *Russian Petroleum Investor*, 4, 2004, pp. 30–37.

[37] For the EU activities, see the EU-Russia energy dialogue at <http://europa.eu.int/comm/energy/russia/overview/index_en.htm> and the programme of the Trans-European Networks, <http://europa.eu.int/comm/ten/index_en.html>.

[38] Kirsten Westphal, "Russische Konzerne im postsowjetischen Raum. Transnationalisierungsprozesse zwischen (Re-)Integration and Expansion", Olga Alexandrova et al. (eds.), *Russland und der postsowjetische Raum.* (Baden-Baden 2003), pp. 122–148 (130–133).

[39] Gazprom was striving for a majority in the new joint venture, while the Belarusian side was only ready to concede a minority share. Moreover, no agreement could be reached on the value of Beltransgas assets: Gazprom estimated a value of $480 million; while Beltransgas estimated its market value at $5 billion.

[40] Sergei Glazkov, "Shtokman, Speed-Up", in: *Russian Petroleum Investor*, 10, 2003, pp. 26– 31; Andrey Nolinsky, "Shtokman project Stymied. Gas Won't Reach Europe before 2010", in: *RusEnergy*, <http://www.rusenergy.com/eng/projects/a30012002.htm>.

[41] "Interview with the deputy chairman of Gazprom, Aleksandr Ryazanov", *Neftegazovaya vertikal*, 10, 2004.

[42] Selig P. Harrison, "Gas and Geopolitics in Northeast Asia", *World Policy Journal*, Winter 2002-2003, pp. 23–36.

[43] Vladimir Socor, "In Case You Missed This Mega-deal", 27 April 2003, <www.freerepublic.com/focus/f-news/915335/posts>.

[44] For the Nabucco project, see <www.iea.org/dbtw-wpd/textbase/work/2004/investment/ses2.10.pdf>.