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Russia's Oil Exports

Economic Rationale
Versus Strategic Gains

Adnan Vatansever

As Russia expands its oil export network and the future destination of its oil exports becomes increasingly uncertain, Washington needs to promote transparency, stability, and predictability.

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Summary

Russia, the world's largest oil producer, is vigorously promoting the development of new outlets for oil exports. While the recent launch of a long-awaited cross-border oil pipeline between Russia and China has received most of the publicity, it is a part of a much larger Russian initiative aimed at developing new oil export infrastructure in almost every possible direction: Asia, the Baltic Sea region, the Black Sea region, and the Arctic. This export strategy will have considerable policy and economic implications for Eastern and Central Europe and even the United States.

There are questions, however, about Russia's need for all these projects. Bottlenecks in reaching foreign markets did justify building new export infrastructure during the past decade, but they are no longer an issue. Furthermore, the growth in Russia's oil output has slowed down considerably in the past five years, and it is widely assumed that the prospects for substantial growth in the future are weak.

Unless Russia undertakes a monumental task in energy conservation in its transport sector and achieves a major breakthrough in oil field development, the potential to further expand crude oil exports above current volumes remains limited. Some room for additional crude exports could emerge if Russia exported fewer refined products and more crude oil, but this would require abandoning a long-standing government strategy of promoting value-added exports. This raises several critical questions: What drives Russia's efforts to add new export capacity? Is its policy economically rational? What are the broader strategic benefits?

In reality, the economic rationale for Russia's drive for new export outlets is limited. Individual projects may provide some financial benefits, but when analyzing both the country's geology and economics it's clear that Russia will have more export pipelines than it needs. Parts of its oil export network will have to remain either underutilized or rely on oil from the Caspian countries, particularly Kazakhstan. Absent an assurance for crude deliveries from Kazakh sources, Moscow's policy will be a costly one as it will further raise the costs of operations for Russia's oil sector.

Yet, Moscow perceives substantial strategic gains in pursuing its policy. Each of its new oil export projects is likely to bring rewards ranging from positioning Russia as a strategic energy partner with China to gaining additional leverage when dealing with oil transit countries and Caspian producers. Additionally, some of Russia's efforts to negotiate oil projects are part of a larger energy bargain—they often support Moscow's objective of acquiring a leading role not

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only in oil markets, but also in gas markets and the export of nuclear power technology.

Russia's oil export strategy has significant implications. Importers of Russian oil in Eastern and Central Europe and current transit countries will feel the heat of Russia's growing ability to redirect its oil supplies to new destinations. Several prospective transit countries will also face significant choices while negotiating a more comprehensive energy deal with Russia. Kazakh oil producers are likely to emerge increasingly dependent on Moscow on issues related to moving oil through Russian pipelines.

The United States may start receiving more crude oil from Russia, but this will not address the energy security concerns associated with its dependence on oil imports from unstable regions. Instead, Russia's oil export strategy could have significant repercussions for U.S. interests—indirectly—through Washington's allies in Europe.

As Russia expands its oil export network and the future destination of its oil exports becomes increasingly uncertain, Washington needs to promote transparency, stability, and predictability. These goals could be advanced through active diplomacy in three specific areas:

- Establishing a platform for sharing information on oil production and export trends in Russia and the Caspian Sea region.
- Supporting the government of Kazakhstan in pursuing stable export routes for its growing supply of crude oil.
- Supporting initiatives aimed at reversing the flow of oil through the Odessa–Brody Pipeline connecting Ukraine's coast on the Black Sea to its border with Poland. This would carry Caspian oil to Europe and thus enhance oil supply security in Eastern Europe.

Introduction

Russia has emerged as the world's largest oil producer as Saudi Arabia has cut back its production to meet the quota requirements of the Organization of the Petroleum Exporting Countries (OPEC). In 2009, for the first time since 1991, Russia took the top spot, accounting for 12.5 percent of global oil output. It maintains its status as the main non-OPEC oil supplier, and its output is equivalent to a third of OPEC's total oil production.

As Russia has taken this prominent place in global oil markets, its leaders have been vigorously promoting the development of new outlets for oil exports. They have put their energy behind several major infrastructure projects that will secure additional oil export capacity for Russia in almost every possible direction: China and the Far East, the Baltic Sea region, the Black Sea region, and the Arctic.

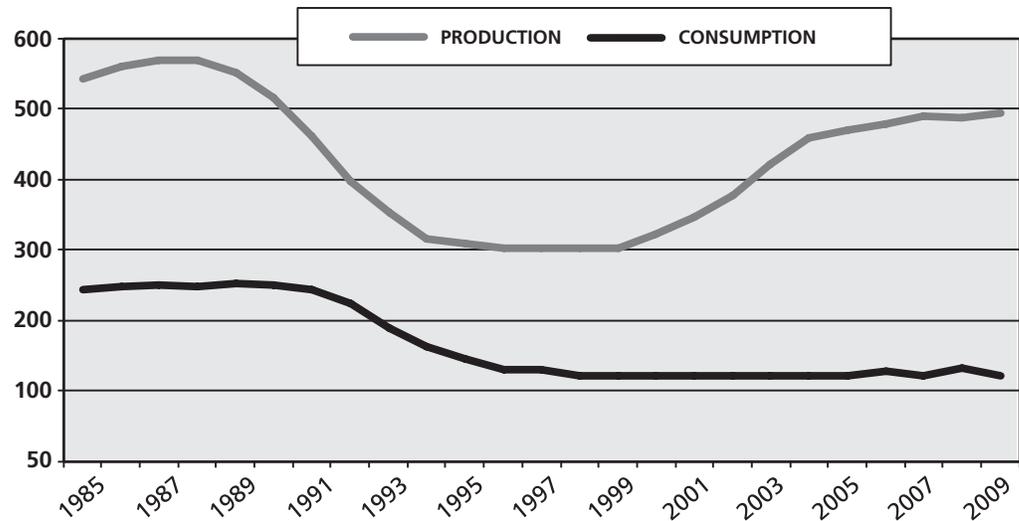
But are all these projects really needed? Russia's oil output growth has slowed considerably in the past five years, and the prospects for substantial growth in the future are widely assumed to be weak. The potential to further expand crude oil exports above the current volumes remains limited. This raises several critical questions about Russia's future oil strategy: What drives Russia's efforts to add new export capacity? Is the policy economically rational? What are the broader strategic benefits? This paper addresses these questions and looks into the possible implications.

Russia has emerged as the world's largest oil producer, accounting for 12.5 percent of global oil output.

Russian Oil and Exports: A Brief History

Oil has a long history in Russia. Russia was one of the earliest countries to produce oil, and by the end of the nineteenth century, it accounted for nearly a third of the world's oil output. As oil's prominence as an energy source grew, so did the Soviet Union's emphasis on developing its own reserve base. This effort was a resounding success—by the 1980s, the Soviet Union had emerged as the undisputed leader in global oil production. When its oil output peaked in 1987, the USSR produced 624 million tons of oil, ahead of the United States and Saudi Arabia. The Russian Federation accounted for more than 90 percent of the USSR's oil output—570 million tons during the peak year (figure 1).

Figure 1. Russia's Oil Production and Consumption, 1985–2009 (million tons)



Source: BP Statistical Review 2010

The collapse of the Soviet Union coincided with a comparably dramatic collapse in Russia's oil sector. By 1996, production was down to 303 million tons—47 percent below its peak level. Inefficiencies inflicted by Soviet production methods, a severe collapse in investment spending, and restrictions on foreign companies willing to undertake larger Russian oil projects contributed to the collapse. By the end of the decade, however, Russia's oil industry witnessed a solid turnaround. This has been widely attributed to the restructuring and privatization of the oil sector during the 1990s, the increased use of Western technology that allowed rejuvenating old oil fields, and the substantial rise in oil prices after 1999.

The collapse of the Soviet Union coincided with a comparably dramatic collapse in Russia's oil sector.

For decades, oil exports have been critical for the leadership in Moscow. During the Soviet period, the Russian Soviet Federative Socialist Republic (RSFSR) was a principal source of oil supplies for most of the rest of the Soviet republics as well as the Communist Bloc overall. This oil, delivered at a substantial discount, was a key ingredient in maintaining the health of the bloc's centrally planned economies. As part of this strategy, the world's longest oil export pipeline, Druzhba (Friendship), was built in 1964 in order to secure crude oil for East Germany, Poland, Czechoslovakia, and Hungary.

In the meantime, oil emerged as an increasingly important source of hard currency for the Soviet leadership, as exports to market economies in Europe expanded. According to the All-Russia Research Institute for Complex Fuel and Energy Problems under the Soviet State Planning Committee, oil exports accounted for 39 percent of the USSR's total hard currency revenues in 1985.

Revenues from oil exports remained essential for the post-Soviet Russian economy as well. During the economic collapse of the 1990s, these revenues were critical for the Russian federal budget, despite the extraordinary decline in Russia's oil output. What helped to maintain significant oil revenues was principally the parallel contraction of domestic oil consumption. As a result of a massive economic restructuring and a slump in demand, Russia's own oil consumption was cut by half during the 1990s—from 250 million tons in 1990 to 124 million tons in 2000. Likewise, Russian oil companies shifted the direction of their crude oil exports away from the countries belonging to the Commonwealth of Independent States, where oil was usually sold at a discount, and toward more lucrative markets in Europe. As consumption remained flat during the 2000s, while production increased, oil export volumes grew rapidly.

Finally, it is worth noting that the geography of Russia's oil industry has also shifted during the past few decades. Initially, the core of the industry was in the Volga-Urals region located in the southern part of European Russia. As its production peaked during the 1970s, the focus shifted to West Siberia, which has remained the heartland of Russia's oil business. However, as explained below, this region's production has been declining in the past few years, while major Russian oil producers have gradually stepped up their efforts to look for opportunities in new regions of the Russian Federation—East Siberia, the Far East, and the Arctic.

Major Russian oil producers have gradually stepped up their efforts to look for opportunities in new regions of the Russian Federation—East Siberia, the Far East, and the Arctic.

How Much Oil Is Russia Exporting, and How?

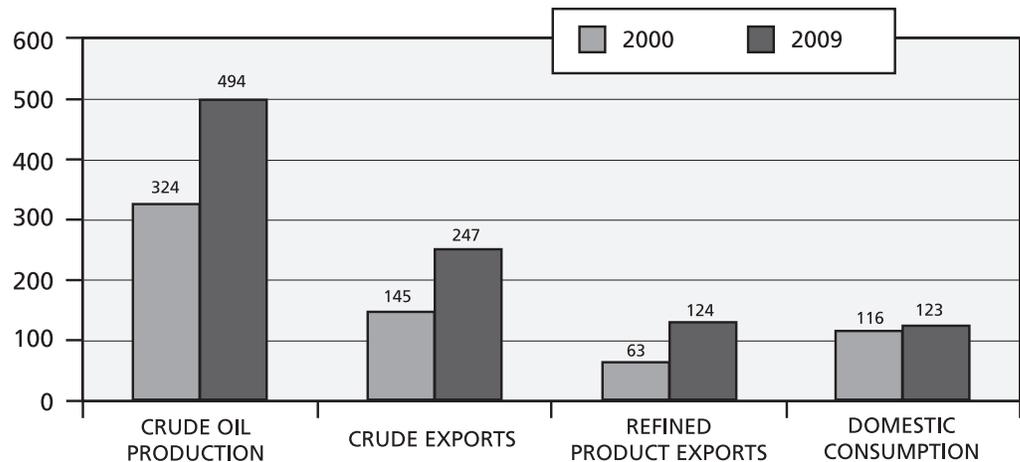
Three main factors determine the amount of Russian crude oil exports: the level of crude production, trends in the domestic consumption of petroleum products, and the size of petroleum product exports. There is a continuous trade-off between crude oil exports and the amount of oil refined in Russia's refineries. The presence of sufficient export capacity is an additional element, which, if absent, ultimately affects how much oil Russia is able to export.

In 2009, Russia produced 494 million tons of crude oil and condensate. One half of this output, 247 million tons, was exported. The other half was processed into petroleum products, of which 124 million tons were sent abroad. The rest of the refined products was consumed domestically.

A comparison with the beginning of the decade illustrates the dramatic growth in Russian oil exports; 102 million more tons of oil was exported in 2009 than in 2000. This growth was largely driven by the rapid surge in crude

oil production, particularly during the first half of the decade. Also, the fact that growth in domestic consumption remained limited helped Russia to allocate more crude for exports (figure 2). The growth in crude exports would have been even more pronounced had refined product exports not doubled during the decade.

Figure 2. Key Trends in Russia's Oil Sector, 2000 and 2009 (million tons)



Source: Federal State Statistics Service

As Russia's oil sector grew, it went through a considerable redirection of export crude oil flows—a process that is far from complete (see below). There were two main changes. First, the relative importance of the main outlets linked to the network of the national state-owned pipeline operator, Transneft, changed substantially. In 2000, the Druzhba Pipeline was the largest outlet, shipping 52.4 million tons of Russian crude. Black Sea ports linked within Transneft's network handled an additional 43.1 million tons coming from Russian oil fields. Exports via the Baltic ports Butinge and Ventspils stood at 16.7 million tons. The balance, 32.8 million tons, was shipped to former Soviet republics or bypassed Transneft's network. By comparison, in 2009, the Baltic port Primorsk was Russia's single most important outlet, accounting for about 70 million tons of its crude exports. The volumes of the shipments going through Transneft's other two main destinations, the Druzhba Pipeline and the Black Sea, rose only slightly, to 56 million tons and 47 million tons, respectively (table 1).

Table 1. Top Three Export Routes via Transneft's Network to Markets Outside the Commonwealth of Independent States, 2000 and 2009 (million tons)

Region	2000	2009
Baltic Sea	20.8	70.1
Druzhba	52.4	55.7
Black Sea	43.1	46.7

Source: Nefte Compass, Interfax

The other major development during the past decade has been the growing role of East Asia and Russia's Arctic ports in Russian crude oil exports. In 2009, shipments to East Asia rose to nearly 25 million tons, according to Interfax. Arctic ports have also become increasingly significant, with shipments soaring from close to nil to more than 8 million tons during the past decade.

What has made it possible to accommodate the growing export volumes, as well as the substantial redirection of crude oil flows, has been the surge in Russia's export capacity resulting from its investment in new pipelines and export terminals. The Baltic Pipeline System has likely had the greatest impact during the decade. It was launched in 2001 and its capacity was increased in several phases. It allowed Russia to largely bypass the ports of the Baltic republics in favor of its own port at Primorsk. It also helped to draw some Russian crude shipments away from other western destinations, namely, from the Druzhba Pipeline and Ukraine's Odessa port on the Black Sea. The construction of new infrastructure on the Arctic coast and on the Pacific coast also helped to accommodate growing crude exports.

What changed the least was that Transneft maintained its firm control over the transportation of crude oil. With a few minor exceptions, the Kremlin blocked efforts by private oil companies to build their own pipelines, perpetuating Transneft's role as the state's means for controlling the oil industry overall (box 1).

The Baltic Pipeline System, launched in 2001, has likely had the greatest impact in accommodating and reorienting growing Russian crude oil exports.

Box 1. Transneft's Monopoly—Costly for the Oil Sector?

Transneft, established as a state-owned company in 1993, is the legal successor of the USSR Ministry of Oil Industry Main Production Department for Oil Transportation and Supplies (Glavtransneft). Today, it controls a vast network of crude oil and petroleum product pipelines in Russia. Transneft claims that its 50,000-kilometer-long pipeline network transports about 93 percent of Russia's oil. In effect, it has a near monopoly position in shipping Russian crude both domestically and to export markets.

The Russian state owns 78 percent of Transneft's equity and 100 percent of its voting shares. In July 2010, the Russian government included Transneft in its ambitious new privatization program, which aims to secure 1.8 trillion rubles (about \$58.5 billion) for government coffers by 2015. But, in October 2010, government officials made clear that Transneft would not make the final list of companies for privatization. Critics argue that this decision may perpetuate inefficiency and decisions that do not always match the transportation needs of Russia's oil sector.

The state's dominant role in oil transportation is in stark contrast with the rest of the oil sector, where private companies as well as foreign partners play a significant role. At the beginning of the past decade, Transneft's monopoly faced a substantial challenge when private companies offered to build a major pipeline that would carry about 50 million tons of oil annually from Western Siberia to the port of Murmansk in the north. The Russian leadership eventually opted to maintain Transneft's monopoly.

While the Russian government has maintained a crucial means of control over the oil sector through Transneft, its position has come at a substantial cost. Transneft has been slow in reacting to the needs of the oil sector, and its investment plans are widely criticized for being conducted without properly accounting for key trends in Russian oil development. Through 2005, Transneft failed to match the rapid growth in Russian oil output by providing sufficient capacity for exports. This led to frequent bottlenecks that oil companies tried to overcome by using alternative and costly means for shipping their crude abroad. More recently, as this study examines, the company has been developing costly export infrastructure projects that are not fully justified. Transneft has borrowed extensively and raised transport tariffs to cover project costs. This has been a growing cause for concern for Russian oil companies, which have to bear the actual cost.

Is There a Bottleneck for Crude Oil Exports?

Bottlenecks in infrastructure provide a major impetus for an expansion in export capacity. As Russia is poised to considerably expand its oil export infrastructure, a key question is whether the Russian Federation is faced with bottlenecks in crude oil exports.

During the 2000s, in the midst of surging oil production, there were indeed periods when the major producers confronted serious difficulties in finding export outlets for their crude oil. They were forced to resort to costly

solutions. Shipping via railcars was one way to avoid Transneft's bottlenecks. Another typical response was to shift toward exporting refined products instead of crude. This option also required no access to Transneft's crude oil pipeline network.

But in the past few years, infrastructure bottlenecks have been less of an issue. Several developments explain this outcome. First, the growth in oil production slowed down, averaging 1.5 percent a year between 2005 and 2009. This was markedly below the annual average growth of 8.5 percent in the preceding five years. Second, as explained above, new export infrastructure helped to accommodate growing volumes of crude oil shipments. Third, after 2005, new fiscal incentives prompted Russian oil companies to focus even more heavily on the refined products in their export portfolio. Such products faced lower export duties compared with crude oil. Consequently, the exports of petroleum product increased sharply. By 2009, Russia was exporting 27 million more tons of products than in 2005. Without such incentives, a large portion of these incremental volumes would have been exported in the form of crude oil.

There is no evidence that Russian oil producers face bottlenecks any longer. In fact, several developments suggest that they are already benefiting from excess export capacity. First, as exports through the Baltic Pipeline System have grown, traditional export routes through two Baltic ports, Ventspils (Latvia) and Butinge (Lithuania), have remained idle. Transportation through parts of the Druzhba Pipeline and the Black Sea ports has also declined from its peak levels in the mid-2000s.

Second, the decline in the amount of crude oil bypassing Transneft's network provides additional evidence of unused overall export capacity. According to *Neftegazovaya Vertikal*, an analytical journal focusing on Russia's hydrocarbon sector, a mere 2 percent of crude exports bypassed the Transneft network in 2000. In 2003, when oil companies were already facing serious bottlenecks, more than 50 million tons of crude (more than a fifth of total exports) were transported abroad via alternative routes—mainly rail and rivers. By 2009, this figure was down to 25 million tons (about 10 percent of total exports). Most of these shipments bypassed Transneft's network not out of insufficient capacity, but due to a lack of access to the national operator's network in remote regions such as Sakhalin. Thus, some unused rail capacity, even though it is more expensive, appears available.

As a final point, the Russian pipeline network is now able to accommodate growing volumes of foreign crude oil transiting its territory. This is partly an outcome of the pipeline launched in 2001 by the Caspian Pipeline Consortium, which is not part of the Transneft pipeline network, though it crosses Russian territory. Today the pipeline serves as the principal export route for Kazakh crude. What provides evidence for the presence of ample capacity throughout the Transneft network is that competition for accessing it has calmed down noticeably. During periods of bottlenecks, major Russian oil producers were

actively lobbying to limit transit volumes in order to gain additional access to Transneft's network for their own crude. In more recent years, this has no longer appeared to be the case. This is true despite the fact that oil transit volumes through Transneft's network alone have surged considerably during the past decade—from 14.1 million tons in 2000 to 25.4 million tons in 2009, according to Interfax.

The Drive Toward New Export Capacity

Although bottlenecks are no longer an issue, Russia is in the process of vigorously expanding its oil export capacity. At the end of September 2010, Russia reached a major milestone when President Dmitry Medvedev and his Chinese counterpart, Hu Jintao, attended a ceremony marking the completion of the Chinese branch of Transneft's East Siberian–Pacific Ocean (ESPO) Pipeline—an ambitious project that aims to pump crude oil all the way to the Pacific coast—whose first commercial supplies will start to flow early next year.

The ESPO Pipeline is projected to expand Russia's crude oil export capacity by 80 million tons a year.

When completed in 2014, the ESPO Pipeline will stretch 4,700 kilometers within Russia, shipping crude to China and other Asian markets, and potentially, the U.S. market as well. The pipeline is projected to expand Russia's crude oil export capacity by 80 million tons a year.

Another major project in progress is the so-called Baltic Pipeline System II (BPS-II). Launched in the aftermath of an oil transit dispute with Belarus in 2007, it runs from the Russian–Belarus border to a loading terminal in Ust-Luga on Russia's Baltic coast. Transneft claims that the project will be completed by the end of 2011, with an initial export capacity of 30 million tons a year. At a later stage, its capacity is projected to reach 50 million tons.

Two additional projects, if realized, are poised to further augment Russia's crude oil export capacity. One is the Bourgas–Alexandroupolis Pipeline (BAP), with a proposed initial capacity of 35 million tons a year (and 50 million tons a year at a later stage). This project is on hold, awaiting the final consent of the Bulgarian government. But Russian companies maintain a majority stake in the pipeline project and appear keen on realizing it. The Samsun–Ceyhan Pipeline through Turkey is another project where the Russian government has been seeking to secure a role for Russian oil companies. Its initial annual capacity is projected to be 50 million tons (and 80 million tons at a later stage). Both these projects, at least in theory, would provide Russian oil exporters with substantial new export capacity (see figures 3 and 4).

Finally, the Barents Sea has emerged as an increasingly important destination thanks to Russian investments in new terminals and ice-breakers. Traditionally, a limited volume of crude oil has been flowing from ports on the



Figure 3: Eastern Siberia–Pacific Ocean (ESPO) Pipeline



Figure 4: Selected Oil Pipelines of Western Russia and Eastern Europe

Arctic to the West. But recently, due to the thinning of the Arctic ice sheet, Sovcomflot, a leading Russian maritime shipping company, has undertaken trial shipments to Asia. At the end of August 2010, the first tanker crossed the Arctic Ocean to deliver crude oil to China. The future of Russia's northern

The future of Russia's northern route hinges on further investment in infrastructure and upstream development in nearby regions.

route hinges on further investment in infrastructure and upstream development in nearby regions. Also, its use may remain largely seasonal for some time. But for many oil traders, the route's relative importance for crude exports could only rise.

As Transneft has not announced plans to abandon any of its existing export pipelines, Russia is headed toward a substantial growth in export capacity available for crude shipments. Two projects alone, ESPO and the BPS-II, will add 130 million tons in new export capacity. If half the proposed maximum capacity of the BAP and the Samsun–Ceyhan Pipeline were to be dedicated to Russian crude oil, another 65 million tons of annual capacity would be added. The potential for the northern routes is not clear, but overall, the total new export capacity available for shipping Russian crude could be well above 200 million tons by the end of the next decade.

A Weak Economic Rationale

When examined *individually*, Russia's pipeline projects do offer some economic benefits. A major argument in support of the ESPO project is that Russia needs to respond to global oil market trends. The International Energy Agency (IEA) reports that oil demand has already peaked in the countries that belong to the Organization for Economic Cooperation and Development. Future growth in oil consumption will come mainly from emerging markets in Asia—China and India in particular. Within this context, the ESPO Pipeline serves a useful role by establishing a shorter link to Asia. It also helps Russia to diversify its export markets. This could potentially allow Russian oil companies to sell their crude oil in Europe at more competitive prices.

However, the same argument cannot apply to the BPS-II project in the Baltic region, because it will not really help Russia diversify its client base for crude oil. Instead, the BPS-II brings other financial benefits; it could potentially reduce transit fee payments to foreign countries, as it takes up some of the crude shipped through the Druzhba Pipeline or Ukraine's ports.

In the case of the BAP and the Samsun–Ceyhan Pipeline, which both would require transiting other countries' territory, the main economic rationale is rather different. During the past decade, Russian oil shippers have occasionally incurred demurrage charges due to incidents of congestion at the Bosphorus. Though these incidents have been mainly seasonal phenomena, there are concerns that they may become more frequent and intense as more Kazakh crude

oil starts flowing to Black Sea ports. Hence, a pipeline bypassing the Turkish Straits would alleviate potential congestion, allowing Russian oil companies to avoid such charges.

Yet, when Russia's current and proposed pipeline projects are viewed as a whole, the economic rationale for Moscow's export-driven capacity expansion strategy appears limited. Such a major expansion necessitates a capability for a comparable increase in crude oil production. But this is far from guaranteed.

Production is set to stabilize by the middle of next decade as recently launched new oil fields face increasing difficulty in compensating for the decline in older fields. Looking further, the baseline scenario in Russia's *Energy Strategy 2030*, a document officially approved by the Russian government at the end of 2009, envisages that production will increase by only 40 to 45 million tons by 2030. The IEA's *World Energy Outlook 2010* is more pessimistic—its New Policy Scenario predicts that Russian crude production will decline by about 50 million tons by 2030. As IEA expects that domestic consumption of oil will remain nearly flat, total export of crude oil and petroleum products will decline.

Some room for additional crude exports could emerge if Russia exported fewer refined products and more crude oil. But such a major reversal would run counter to the country's long-standing policy of promoting refined product exports instead of crude. Its policy makers have been generally inclined to favor product exports as a part of an overall effort to expand value-added exports. This has been reflected in its official energy strategy, which forecasts growth in domestic refining by 16 to 31 percent by 2030. Also, Russian refineries have already been drawing up plans for further upgrades in primary refining capacity, reflecting the government's expectations.

More recently, there have been growing calls for a recalibration of the fiscal regime in order to encourage oil companies to export more crude oil and fewer refined products. But it is yet to be seen whether a change in the official mindset will occur. Even if it does, the amount "freed" to be exported in the form of crude oil might be limited. *Energy Strategy 2030* predicts that *total* crude and product exports will remain slightly below current levels, indicating limited opportunities for growth.

The changing geography of Russia's oil production also raises concerns about the economic rationale of Moscow's grand pipeline projects. Production in West Siberia, the heartland of the Russian oil industry, has been declining for several years. The situation is similar in the Volga-Urals region—another major center for oil production. Much of the recent growth in overall crude oil output has been coming from new oil fields in East Siberia and the Far East. These trends should not look different in the future, according to the Russian government's official energy strategy.

When Russia's current and proposed pipeline projects are viewed as a whole, the economic rationale for Moscow's export-driven capacity expansion strategy appears limited.

On the basis of regional production trends, Russia faces a difficult trade-off. Production in the East is rising, but ESPO's planned capacity is simply too large. Many oil industry experts agree that the recoverable reserves in East Siberia are not sufficient and cannot secure the required crude oil for ESPO to operate at full capacity. Filling it will almost certainly require attracting substantial volumes of West Siberian crude. And shipping this crude through ESPO will come at a substantial extra cost. But the bigger challenge will be how to fill Russia's pipelines in the West. The existing pipelines—the BPS-II

Russia is a high-cost exporter because its vast geography requires transporting crude oil over very long distances.

and potentially one or two of the additional grand projects around the Black Sea—will be competing with ESPO for West Siberian crude, which has been declining. As a result, the proposed expansion in export capacity in Russia's west is hard to justify.

As a final point, it is worth noting that the Russian oil industry operates at substantially higher costs than the oil sector in most OPEC countries. In relative terms, Russia is already a high-cost oil producer. Furthermore, its costs are expected to rise further as the next generation of oil will be harder to develop and will require substantial new investments. Declining production at mature oil fields could also come with additional costs. In the meantime, Russia is a high-cost exporter because its vast geography requires transporting crude oil over very long distances.

Concerns about relative costs should be sufficient to ring alarm bells in Moscow, given the propensity of oil prices to fluctuate widely. A collapse in oil prices would be a nightmare for the leadership of any country that is heavily dependent on oil export revenues. But in Russia's case, the impact on the oil sector might be even more dramatic than in most OPEC countries. Though most producers in the Middle East could probably survive a perfect storm, many Russian oil fields could end up being shut down, at least for some time.

However, minimizing average transportation costs does not appear high on the Russian leadership's agenda. Oil companies are already required to subsidize the ESPO project by paying higher tariffs when shipping their crude oil toward traditional western routes. Transneft is using the subsidy to cover ESPO's costs, which, according to the company's chairman, Nikolai Tokarev, stood at 381 billion rubles (\$12.5 billion) at the beginning of 2010, while an additional 323 billion rubles (\$10.6 billion) was slated for the next stage of expansion. It will take many years to amortize the costs of ESPO and Russia's other grand pipeline projects. An additional problem would arise if the pipeline network were to remain underutilized due to excess capacity. Transneft's cost per ton of the crude transported through its network will remain high. And oil companies will need to pay the price.

Can Russia Avoid Having Excess Export Capacity?

The problem of having an excess export capacity could be alleviated if the Russian government adopts the right measures in two areas. First, a new approach leading to a breakthrough in oil development could keep the Russian oil export network fairly well utilized. This will require comprehensive reforms that will address outstanding issues in several areas: a tax reform that will facilitate greenfield development, a better exploitation of brownfields through the involvement of independent oil producers, and laying the groundwork for a level playing field for all investors (including foreign) through well-defined property rights. And to do this, the Russian government will need to break with its traditional approach of ad hoc measures aimed at assisting selected players. The old approach enhances the state's hand when dealing with oil companies but perpetuates the long-term decline of the oil sector.

Second, Russia could increase its crude oil exports if it adopts strict energy efficiency measures. A report by the World Bank estimates that Russia could save about 43 million tons of crude through conservation. This amount could be exported, partly alleviating its excess export capacity.

Energy efficiency has indeed taken its place among the policy priorities of Russian leaders. The Russian president considers improving the country's energy efficiency as a significant way to unleash its economic modernization. Saving energy has additional benefits occasionally recognized by Russian officials as well: It would bring Russia more energy export revenues, and it will improve the competitiveness of its industries.

However, the transportation sector, from which most of the savings for oil would come, has not been among the government's priority areas. Insiders in Russia's transportation sector warn that the policy debate on energy efficiency has barely touched this sector. The absence of reliable data on Russia's vehicle stock precludes getting even a healthy baseline assessment. Furthermore, despite its sizable automobile industry, Russia lags far behind its competitors in developing hybrid and alternative-fuel vehicles. It also has one of the fastest-growing automobile markets. For carmakers, it is Europe's bright spot, with sales expected to increase by 13 percent in 2010. Moreover, as Russian car ownership stands at about 200 per 1,000 people, substantially lower than in Western Europe and the United States, further growth is assured. Thus, only major gains in efficiency or a shift to alternative fuels would make it possible to save oil.

Russia could increase its crude oil exports if it adopts strict energy efficiency measures.

Strategic Gains as the Main Objective

When Russia's oil geology and economics are put together, the possibility for unused export capacity in the future remains strong. In other words, Russia may end up with more oil pipelines than its own resource base could justify. However, putting politics and strategy back into the picture leads to a different, and perhaps more comprehensive, explanation for Russia's drive toward new projects to increase its oil export capacity. Each of these projects will come at a cost. But this may well be the price Moscow is willing to pay in pursuit of broader strategic goals.

Each of Russia's four major pipeline projects is likely to help Moscow meet various strategic objectives. The ESPO Pipeline kills several birds with one stone. It helps Moscow to position itself as a strategic partner in meeting China's rapidly growing energy demand. As the pipeline has progressed with the help of loans from China in exchange for oil supplies, it has created the basis for a longer-term energy partnership. In the meantime, Russia has been cautious in maintaining a diverse client base on the receiving side of the ESPO Pipeline. By working on extending ESPO to the Pacific coast, Moscow aims to minimize its risks in the event of a decision on China's part to interrupt or limit crude oil imports via this route.

Promoting the development of the largely unpopulated eastern region of Russia is another objective that Moscow hopes to meet through the ESPO Pipeline. Building major infrastructure projects has been a long-standing Soviet and Russian policy aimed at addressing developmental issues.

Finally, as the geography of Russian oil production is shifting, the ESPO project would allow Transneft, and hence the state, to maintain its grip on the oil sector as a whole. Much of the oil in East Siberia is currently developed and exported via rail without access to Transneft's network. With the new pipeline, rail shipments are likely to decrease, and Transneft will once again call the shots.

In the case of the BPS-II, its expansion will bring additional capacity that will further improve Moscow's room for maneuvering in its negotiations with its Western neighbors. It is not clear whether Russia would choose to divert part of its crude exports from the Druzhba Pipeline to this new pipeline. But the option to do so will give Russia more leverage. The same applies to the volumes of oil exported via Ukraine's Yuzhnii terminal—these could easily be diverted if bilateral energy and political relations are strained. Additionally, the BPS-II project involves adding substantial capacity for petroleum product exports, which would allow rerouting deliveries away from ports belonging to the Baltic republics.

While the construction of the BPS-II is under way, there are early signs that Russia intends to use its potentially improved bargaining capacity when dealing with other Black Sea littoral states as well. In July, Nikolai Tokarev, the head of Transneft, stated that the BPS-II along with the ESPO Pipeline

could handle any incremental crude oil that is expected to be shipped via Black Sea ports, helping to avoid congestion at the Turkish Straits. His statement could be interpreted as a response to ongoing difficulties in negotiations with Turkey and Bulgaria on Russia's two other oil export projects—the BAP and the Samsun–Ceyhan Pipeline. In other words, Russia's future spare capacity has already become part of its negotiations on pending pipeline projects.

Tokarev's statement also underscores the point that neither the BAP nor the Samsun–Ceyhan project is actually needed for Russian oil to reach international markets. Russia's two ongoing projects, the BPS-II and ESPO, are expected to add sufficient capacity to avoid potential bottlenecks. Furthermore, both the BAP and the Samsun–Ceyhan Pipeline will need to cross through foreign territory. Since minimizing Russia's dependence on other countries has been a major driver in Moscow's energy diplomacy, why has Prime Minister Vladimir Putin been actively involved in negotiating both of them?

Here it is worth drawing a distinction between the BAP project and the Samsun–Ceyhan Pipeline project. In the case of the BAP, Russian companies have been in the driver's seat for many years. Three of them—Transneft, Rosneft, and Gazprom Neft—hold a majority stake. By contrast, Russia was literally drawn into the Samsun–Ceyhan project by the Turkish government. In October 2009, ENI and Calik Holding, the two private firms that are currently the project's leaders, signed a memorandum of understanding with Rosneft and Transneft. Negotiations on the extent and form of Russian involvement are not yet finalized.

One of the principal potential gains related to the BAP project would be that it would position Russian companies as beneficiaries of future growth in crude oil flows into the Black Sea. Given production and export capacity trends in Russia, Kazakh crude will most likely be the main candidate to utilize this additional capacity. As Kazakh crude exports keep growing during the next two decades, this project will reinforce the role of Russian companies, and mainly Transneft, in handling Kazakh crude shipments (box 2).

The Samsun–Ceyhan project could be viewed as a part of a much bigger bargain between Moscow and Ankara. For years, Moscow showed no interest in the project, while Turkish officials and the ENI–Calik partnership actively sought to secure crude guarantees. Then in 2009, Moscow suddenly offered Ankara its support. Stopping short of a binding commitment, it promised to shift part of its crude oil to fill the pipeline. Prime Minister Putin's deputy chief of staff, Yuriy Ushakov, explained what Russia expected in exchange: Ankara's consent in having the South Stream Gas Pipeline go through its economic zone. Russia's offer came in the midst of growing publicity for the proposed Nabucco Pipeline—the principal rival project aiming to conquer a share of European gas markets.

Neither side has yet come up with a binding decision. But Russia has taken an additional step by getting Turkey's consent to build the first nuclear power

The proposed Samsun–Ceyhan Pipeline remains among the favorite grand projects of the Turkish government, granting Moscow further leverage.

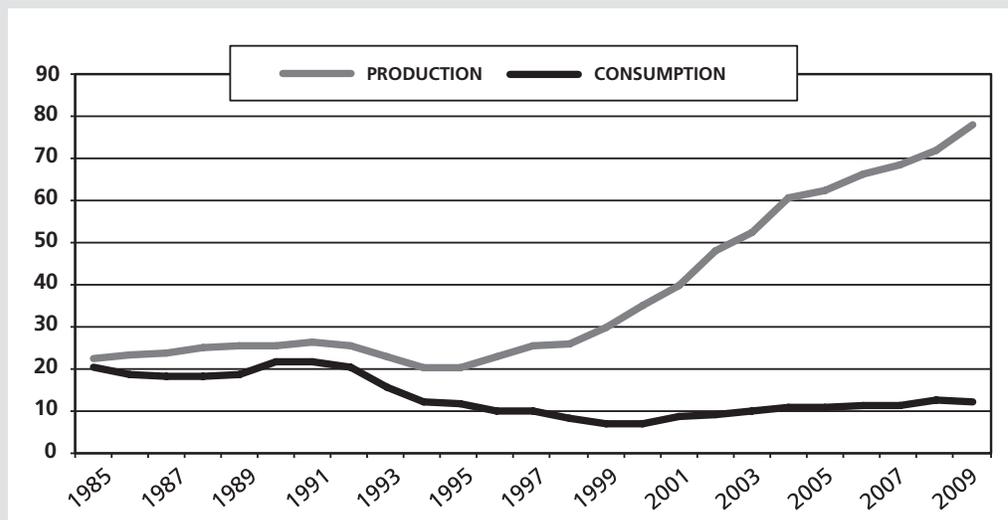
plant in the country. A \$20 billion deal was signed in Ankara in May, giving Russia full ownership of the project. The decision was probably not made in exchange for Russia's continued support for the Samsun–Ceyhan project. But it is indicative of the expanding bilateral energy partnership, to which the pipeline diplomacy between prime ministers Putin and Recep Tayyip Erdogan has remained central.

Also, it is fairly well known that both sides are inclined to consider individual projects in the context of larger energy package deals. The proposed Samsun–Ceyhan Pipeline remains among the favorite grand projects of the Turkish government, granting Moscow further leverage.

Box 2. Kazakh Oil in Search of Destinations

Kazakhstan is the second-largest oil producer among the former Soviet republics and possesses the largest oil reserves in the Caspian region. The country's production has been growing rapidly since the mid-1990s: oil output jumped from 20.6 million tons in 1995 to 78 million tons in 2009. Growth is projected to continue over the next two decades, though at a slower pace, particularly after 2025. IEA projects that Kazakhstan's annual production will reach about 140 million tons by 2020 and 190 million tons by 2025, stabilizing at slightly below 200 million tons by 2030.

**Kazakhstan's Oil Production and Consumption, 1985–2009
(million tons)**



Source: BP Statistical Review 2010

As a landlocked country with rapidly growing oil output and exports, Kazakhstan faces a serious potential challenge when shipping its crude to foreign markets. While Russia appears headed toward an excess export capacity, Kazakhstan is in an increasingly urgent need to find new capacity to handle its crude shipments abroad. The International Energy Agency (IEA) estimates that its current export capacity stands at roughly 75 million tons a year, while actual exports stood at 67 million tons in 2009. If new capacity is not added, Kazakh oil producers are likely to soon face growing bottlenecks, which could undermine Kazakhstan's oil prospects.

Currently, more than three-quarters of Kazakh crude is exported through Russian territory. Two pipelines crossing Russia constitute the core of Kazakhstan's oil export network: the Atyrau–Samara pipeline and the Caspian Pipeline Consortium's network. The pipeline to Samara was the principal export route for Kazakh oil producers throughout the 1990s. It is connected to Transneft's network, which naturally leads to risks related to Russia's tariff policy. It currently operates at nearly maximum annual capacity of 17 million tons, with plans to expand to 25 million tons during the next decade.

The pipeline belonging to the Caspian Pipeline Consortium was launched in 2001 and quickly emerged as the primary outlet for Kazakh crude. Unlike the pipeline to Samara, it is not part of the Transneft network, though it crosses Russia. Instead, it has a very diverse set of owners, including the Russian and Kazakh governments and several private companies. In 2009, it shipped 34.5 million tons of crude primarily from Kazakhstan. But it already operates at maximum capacity. At the end of 2009, consortium members decided to expand its capacity to 67 million tons; however, a final decision by investors is pending.

Given that the pipeline ends at Russia's Black Sea port Novorossiysk, such an expansion undoubtedly raises an important question: where will the oil go from Novorossiysk? While an answer to this question has yet to be given, the Russian leadership is vying to maintain further control over Kazakh crude shipments through involvement in pipeline projects bypassing the Turkish Straits.

Growing Kazakh crude exports and the dependence on outlets through Russia has prompted Kazakhstan to focus its attention on alternative routes. One of them is through the South Caucasus. In 2009, about 17 percent of Kazakh oil exports was transported from the Kazakh port Aktau across the Caspian Sea to Baku in Azerbaijan. Once oil reaches Azerbaijan, it has two main options for further shipment—the Baku–Tbilisi–Ceyhan (BTC) pipeline or Georgia's Black Sea ports.

Kazakh authorities have widely discussed prospects about further expanding shipments in this direction. To do so, they have developed a project, the Kazakhstan Caspian Transportation System (KCTS), which will allow Kazakh oil exporters a major new outlet. However, because this is a very complex project that requires balancing the interests of a highly diverse set of players, competing companies, and states, its prospects—particularly the pace of its expansion—remain unclear.

Finally, China has emerged as another important export outlet. This is not surprising, as Chinese companies have been actively investing in Kazakh oil fields in recent years. In 2009, they accounted for 19 percent of Kazakhstan's oil output. In 2006, China National Petroleum Corporation's (CNPC) involvement in Kazakhstan culminated in the construction of an oil pipeline between Atasu (Northeast Kazakhstan) and Alashankou in China's northwestern Xinjiang region.

Currently, the capacity of the pipeline is about 10 million tons, but there are plans to expand it to 20 million tons by the middle of the decade. This pipeline is Kazakhstan's only outlet that does not require paying transit fees to other countries. However, due to the long distance needed to reach markets, it has been estimated to be one of the most costly options for exporting Kazakh crude.

Implications for the United States and Its Allies

Given that Russia might well be headed toward having an excess oil export capacity and facing a possible reorientation of its oil exports, there could be significant implications for the United States and its allies. Various countries in the crude oil value chain will feel the effects differently.

The Global Oil Markets

The global oil markets will benefit from greater certainty about the total volumes of crude oil flowing from Russia. With its new export capacity, Russia will have more flexibility to respond to the potential disruptions caused by the countries across which Russia transports oil (transit countries).

What is less certain is Russia's ability to have an impact on international oil prices. Such an ability would be highly contingent on its relations with the oil cartel OPEC. So far, its reluctance, and occasionally its inability, to cooperate with OPEC has been a stabilizing factor for global oil markets. But as Moscow faces growing difficulties in expanding its oil output, while its oil production costs are rising, it may reevaluate its relations with OPEC in pursuit of higher oil prices. Thus the possibility of a potential improvement in its ability to cooperate with OPEC cannot be overlooked.

However, even in the context of redefined Russian–OPEC relations, Russia's role in international oil markets will face significant constraints. First, having the power to set global oil prices and acquiring a leading role in the cartel requires possessing excess production capacity, not necessarily excess export capacity. What matters is the total volume that a country can supply or withhold from the oil markets with relative ease. Unlike Saudi Arabia, Russia possesses no excess production capacity, and given its production prospects, it is not likely to attain one in the future. Second, Russia's economy and federal budget are heavily dependent on oil revenues, and it will take time to move away from this economic model. Russia does not have an interest in limiting its own crude oil exports.

The United States

Growing volumes of crude oil from Russia's eastern region have already started reaching the U.S. West Coast. Once the ESPO Pipeline is complete, even more oil is likely to be headed toward the U.S. market. As Russia is the largest non-OPEC oil producer and is likely to remain so during the next decade, it has the potential to secure a significant portion of the non-OPEC oil supplies sent to the United States.

Could Russian oil enhance U.S. energy security? Every so often, there have been proponents of the idea that Russian oil could displace a portion of Middle

Eastern crude oil imports. Such a displacement is indeed possible to some degree. The United States could acquire a greater diversity in its oil import portfolio as a result of imports from Russia, which could potentially strengthen business relations between American and Russian companies.

However, shifting toward Russian crude oil will be of limited value in enhancing U.S. energy security. First, crude oil is a fungible commodity transported with relative ease and traded on a highly liquid global market. This is what distinguishes it from natural gas. An importer ready to pay the international price (or at least a small premium over that price) could obtain the needed oil from the global markets. Second, even if Russian oil were to displace the bulk of U.S. oil imports from OPEC countries, the United States would still be affected by political instability and by a potential oil supply disruption in the Middle East or in other major oil-producing regions. A major disruption would raise the international (including Russian) oil price to a level that could have substantial economic repercussions. Replacing one supplier with another will not allow the United States to secure its oil at prices that are below the international price. Thus, a gradual shift away from oil altogether is the most optimal, though also the most challenging, solution to the United States' energy security problem. Finally, in the case of short-term supply disruptions, their impact on the United States' ability to meet its need for oil would be minimal, thanks to its substantial strategic reserves.

Although a redirection of Russian oil supplies is not likely to enhance U.S. energy security, it does have the potential to *indirectly* affect U.S. interests by having an impact on U.S. allies in Europe, which are either oil importers or potential transit countries. The direction and volume of Russian oil exports will also be a significant factor for the existing transit countries, such as Ukraine and Belarus, with possible implications for U.S. policy makers. Finally, Russia's new export capacity opens up new possibilities for Caspian Sea exporters, increasing the uncertainty about the direction of their future exports.

European Importers

Owing to Russia's new export routes, competition over its crude oil will get more intense. As Russia exports more oil to the Asian and the U.S. markets, its deliveries to Europe are likely to decline. Traditionally, Russian companies have had to sell part of their crude oil in Europe, their principal market, at a minor discount—\$1 to \$2 per barrel. Due to Russia's newly acquired flexibility, more importers will need to pay the world price.

Meanwhile, the ability to redirect crude oil flows away from Europe will give Russia some leverage. After all, more than one quarter (27 percent) of Europe's oil imports currently come from Russia. But this leverage will be

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limited in scope and duration. Those countries in Central and Eastern Europe that receive the bulk of their crude imports through the Druzhba Pipeline are likely to feel most of the impact. Their current pipeline infrastructure allows switching to new sources of supply in case of minor disruptions, and they have demonstrated their capacity to do so during periods of tension in Russian–Belarusian oil diplomacy. But these countries need to be prepared to invest in additional infrastructure to accommodate imports from alternative sources if Russia decides to substantially reduce shipments through the Druzhba Pipeline.

For the rest of Europe, the main challenge will be meeting its growing need for oil imports due to a projected decline in indigenous production. Redirecting Russian crude oil flows toward Asia and the United States will magnify the challenge. However, Europe in general is less likely to have difficulty finding alternative suppliers, albeit possibly at some extra transportation cost.

Current Transit Countries

Russia's current transit countries will feel the heat of its growing ability to shift its crude oil exports to alternative destinations. This is already a familiar pattern for the Baltic republics, which have seen Russian oil shipments being redi-

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rected to its own port at Primorsk. The countries crossed by the Druzhba Pipeline are likely to be the next potential candidates to lose part of the volumes transiting their territory. Yet shifting away from the Druzhba Pipeline has certain limits for Russian oil exporters. For decades, this pipeline has served as a highly cost-effective means for shipping crude oil to foreign markets. A crisis between Russia and Ukraine or Belarus, however, could change the calculus, prompting a redirection of crude flows mostly toward Russia's own terminals on the Baltic coast.

Prospective Transit Countries

Russia's prospective transit countries—Bulgaria, Greece, and Turkey—are in the midst of negotiations for crude oil pipeline projects that would allow Russia to ship crude through their territory. It is highly unlikely that both proposed projects, the BAP and the Samsun–Ceyhan Pipeline, will materialize at once. If either pipeline is to be built, it will need guaranteed crude deliveries. But given Russia's potential surplus in export capacity and its crude oil growth prospects, its companies will face difficulty in filling the pipelines alone. It is most likely that Kazakh crude will be needed for the pipelines to operate. Without Kazakh crude, filling either pipeline would require an unusual reorientation of Russian crude flows, which could not be justified by the resources invested in the BPS-II and ESPO. As a result, negotiations with Russia may lead to disappointment for these countries.

Yet, as Russia's negotiations for oil transit have generally been part of a much larger bargain, its repercussions might be far broader. A case in point is Turkey's intensifying energy partnership with Russia. If Turkey were to decide to provide its final consent for the construction for the South Stream Gas Pipeline in exchange for Russian support for the Samsun–Ceyhan project, this would jeopardize the proposed Nabucco Pipeline—a project supported by the European Union's governments and the U.S. administration. As a result, the impact on Europe's energy security could be substantial.

Caspian Sea Exporters

Kazakhstan could benefit from Russia's growing export capacity in the Baltic Sea. Its crude oil could also partially replace Russian crude going through the Druzhba Pipeline. Meanwhile, Caspian Sea exporters will face fewer risks related to congestion at the Turkish Straits if at least one of the proposed bypass projects is built. But, overall, Kazakh oil exports will be subject to uncertainties related to Moscow's policy on crude oil transiting its own territory and/or pipelines. Azerbaijan's own oil exports, however, will hardly be affected as long as the Baku–Tbilisi–Ceyhan Pipeline continues to operate.

Policy Recommendations

In these circumstances, Washington's interest argues for promoting transparency, stability, and predictability. These goals could be advanced through active diplomacy in three specific areas. First, Washington could initiate the establishment of a platform for information sharing between Russia and the former Soviet republics in the Caspian Sea region. This is necessitated by the significant degree of uncertainty about the longer-term direction of Russian crude oil flows. It is also needed in order to better inform prospective stakeholders about potential crude flows. Currently, regional governments have indicated a substantial lack of preparedness for dealing with this uncertainty and have generally shown a lack of awareness about Russia's impending excess oil export capacity. For instance, officials in Ankara have been involved in energy negotiations with Moscow with excessive hopes for Russian crude deliveries for the proposed Samsun–Ceyhan project.

The proposed platform should focus on exchanging detailed information on crude oil development in the former Soviet space and on export capacity. Other stakeholders—such as current and prospective transit countries, the EU member states, and China—could also benefit from participating in the platform. But broadening the platform should not come at the expense of effective and timely exchanges of information.

Russia will need to be convinced that maintaining uncertainty will not be in its long-term interest. For this purpose, the platform could serve a role

in developing coherent regional scenarios for crude oil exports. Moscow and Astana in particular will need to coordinate efforts in developing such scenarios. This will help to minimize investment risks in new upstream and

transportation projects, while assuring that incremental volumes of crude will be accommodated at minimal costs.

Second, Washington's diplomacy should expand its focus on Kazakhstan, which has prospects of emerging as a major global oil supplier. Most of the future growth in oil supplies from the former Soviet republics will come from this country. By the IEA's estimates, Kazakhstan will be

producing about 200 million tons in 2030, up from 76 million tons in 2009. The bulk of incremental volumes will go for exports.

As Kazakhstan's oil supplies continue to grow, it will need greater access to new outlets. Currently, most Kazakh crude oil is exported via Black Sea ports, mainly through the pipeline belonging to the Caspian Pipeline Consortium. This trend is expected to carry on as the partners in the consortium continue expanding the pipeline's capacity. If there is ever congestion at the Turkish Straits, it will most likely be Kazakh crude that will suffer most of the consequences, paying prohibitive charges for delays.

Potential bottlenecks for Kazakh crude oil call for more active involvement by Astana in international pipeline negotiations. However, Kazakh companies have acquired no role in the proposed BAP or the Samsun–Ceyhan project, while the Kazakh government has been equally absent from Black Sea energy diplomacy. Even though mostly Kazakh crude will fill these pipelines, Moscow and Russian companies have been the principal players vying for a role in their construction and operation.

Washington should support Astana in its pursuit of stable export outlets for Kazakh crude oil. As Kazakhstan is heading toward becoming one of the leading non-OPEC oil suppliers, it deserves greater autonomy and flexibility in selecting the routes for its future crude exports. Acquiring a stronger stake in resolving future bottlenecks around the Black Sea is where Washington and Astana could start working together.

Finally, the idea for reversing the direction of the so-called Odessa–Brody Pipeline, a long-forgotten opportunity, deserves more attention. This pipeline stretching between the Ukrainian cities of Odessa on the Black Sea coast and Brody near the Ukrainian–Polish border was built at the beginning of the decade. It was originally intended to carry Caspian Sea crude oil to Europe but failed to obtain delivery guarantees. As a result, its direction of flow was reversed in 2004, allowing Russian companies to ship their crude to the Black Sea. However, it has lost its importance as an export route for Russian companies, as Russia's export capacity has expanded in the past few years. As a result, even flowing in the reverse direction, it has remained substantially underutilized.

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Reversing the Odessa–Brody Pipeline could have several potential benefits. Since it has a connection to the Druzhba Pipeline, the Central European countries, worried about a potential decline in Russian supplies, could access a major alternative source—Caspian crude oil. And Caspian producers, mainly Kazakh oil exporters, would gain further flexibility in their oil exports. Additionally, Ukraine, and possibly Belarus, could also benefit from improved energy security amid prospects for declining oil deliveries and the transit of Russian crude.

Washington, along with Brussels, could support a new feasibility study of the potential benefits of reversing the flow of the Odessa–Brody Pipeline and for the construction of a potential new spur line from Brody to Poland—the largest EU member country in Eastern Europe. Washington should also focus its diplomatic efforts on bringing the various stakeholders together as needed for the realization of the project.

In sum, as Moscow builds new crude oil export routes and the uncertainty about the destination of its future exports grows, Washington can take the following steps in pursuit of enhanced stability for oil supplies and improved energy security for its allies in Europe:

- Establish a platform for sharing information on oil production and export trends in Russia and the Caspian Sea region.
- Support Astana in pursuing stable export routes for growing volumes of Kazakh crude oil.
- Support initiatives aimed at reversing the direction of the Odessa–Brody Pipeline.

Further Reading

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