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RUSSIA'S OIL SECTOR: WOUNDED BUT STILL WORKING

Russia's Global Energy Role—Working Paper No. 3

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EXECUTIVE SUMMARY

- **Existing sanctions have severely limited the Russian oil industry.** They have limited its access to the key markets for its oil and oil products, cut off access to Western technologies, severed partnerships with international oil companies, isolated Russia's government and companies from Western capital markets, and made it difficult to procure spare parts and consumables for existing equipment. They have also created uncertainty about the future and the possibility of further sanctions.

- Nevertheless, **Russia's oil exporters have so far been successful in diverting crude oil exports** to China and India **and, according to some reports, in sending oil products to North Africa.** For this purpose, Russia has amassed a so-called shadow fleet of tankers while also making new transportation and payment arrangements that have in some cases allowed its oil exporters to evade the price cap mechanism imposed by the G7 and the European Union.

- Though high oil prices made 2022 a profitable year for Russian oil companies, their **capital available for investment in new production seems set to decrease,** due to new taxes, higher interest rates, and informal official pressure to boost social spending and to fund politically important projects.

- If Russian oil production declines, OPEC will be the only viable alternative in the 2020s, and policymakers around the world will need to achieve a complex and delicate balance: on the one hand promoting energy security, which would encourage investment in fossil fuel production, and on the other seeking to contain climate change, which would deter that investment by increasing investor concerns about potentially stranded assets in the fossil fuel industry in the next decade. **If policy decisions discourage new Western investment in production while Russia's production erodes, Russia's hand may strengthen, despite the country's many challenges.**

Russia's invasion of Ukraine, and more particularly US and Western sanctions in response to the invasion, have had significant impacts on the Russian oil industry and its prospects. While it is impossible to know how the conflict will evolve, opportunities for a settlement that wholly removes the sanctions seem limited. Accordingly, this analysis assumes a protracted status quo, meaning no regime change in Russia and enduring confrontation between Russia and the West, akin to long-term Western tensions with Syria, Iran, and North Korea.

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Background

In May 2021, the Russian government adopted the General Scheme for the Development of the Oil Industry to 2035.[1] Although the government has prepared similar strategy documents every five years, the 2021 version was a watershed—unlike previous versions, it acknowledged the coming sunset of the oil era and the eventual decline of Russian oil production.[2] The strategy's underlying assumptions were that the energy transition and widespread decarbonization efforts would produce a long-term decline in global oil demand following a peak in the 2030s. On this basis, the document stated that Russia should accelerate work to monetize its hydrocarbons and start to consider "expiry dates" for new oil and gas investments that might become stranded assets. Though the strategy forecasted a much slower decline in oil demand than International Energy Agency and United Nations Framework Convention on Climate Change reports prepared for the COP26 climate summit in Glasgow, the change in the tone was noticeable.

The strategy set out several scenarios for oil production in Russia, depending on investment levels and the price environment. The principal scenario assumed flat production levels compared to Russia's 2019 volumes, gradual reorientation toward Asia-Pacific markets, and a steady share of oil products in the export mix. It acknowledged that achieving these outcomes would require effort both to develop new production areas and to deploy new technologies in existing oil-producing regions.

Russia's invasion of Ukraine—and US and Western sanctions aiming to apply economic pressure on Moscow—have significantly affected the country's oil industry. Existing sanctions have severely restricted Russian oil companies' access to the key markets for their oil and oil products, cut off access to Western technologies, severed partnerships with international oil companies, isolated Russia's government and firms from Western capital markets, and made it difficult to procure spare parts and consumables for existing equipment. In addition, the current political climate has created uncertainty, especially surrounding the threat of new and tougher sanctions. This uncertainty makes long-term planning and investment even more difficult.

That said, Russian oil companies' capital allocation priorities have changed considerably too. Because their options for international expansion are extremely limited, and the exodus of international shareholders has all but removed pressure for increased dividend payments and a shift toward low-carbon investments, oil company managers are in general more predisposed to pursue huge long-term capital-hungry domestic projects. This might encourage Russian oil companies to focus on major projects in frontier areas, such as East Siberia and the Taimyr Peninsula.

1 «Правительство утвердило генеральные схемы развития нефтяной и газовой отраслей до 2035 года,» Коммерсантъ, May 15, 2021, https://www.kommersant.ru/doc/4815290.

2 «Добылое и думы,» Коммерсантъ, April 8, 2021, https://www.kommersant.ru/doc/4763122.

It is important to understand that the war came as a great surprise to Russia's business community. Prior to Russia's invasion, Russia's Central Bank and Economy Ministry asked leading Russian companies to run stress tests for hypothetical sanctions due to a crisis around Ukraine. Neither provided any details on what the crisis might be, and most companies assumed that Russia might recognize secessionist forces in Ukraine's Donbass and send troops there. Few if any expected or planned for the all-out war that followed, which meant that the stress tests fell far short of reality.

The first weeks of the war were shocking, as the industry initially expected an abrupt and complete end to any ties with the West. The first economic sanctions on Russia were relatively mild and appeared incremental to the 2014–2015 sanctions that followed Russia's seizure of Crimea rather than dramatically harsher. At that time, decisions by Western counterparties to terminate their business with Russia, to refuse to buy oil and oil products, and to cease providing equipment and services were more painful. In the first months after the 2022 invasion, Russian oil production fell by almost 9% because of the loss of the Western market. Russian oil and oil product exporters had to sell at hefty discounts to global prices, though surging global oil prices amid shortage fears more than compensated for the decline in volumes.[3] By summer, however, Russia's crude exporters started to reorient toward Asia, oil product exports to Europe continued without much trouble, and discounts became much smaller.

Although the United States introduced an embargo on Russian oil (as well as liquified natural gas and coal) two weeks after the Russian invasion,[4] America was a small market for Russia that imported around 3% of Russia's crude in 2021.[5] Russia's leading export market, Europe, did not ban oil and oil products until December 2022 and February 2023, respectively. In parallel, the G7 and European Union developed a price cap mechanism intended to deprive Russia of some of the profits from its oil trade with countries that did not join the embargo. Member states announced this in late 2022.[6] The mechanism blocked firms in participating countries from providing shipping and insurance

3 Ahmad Ghaddar, "Russian Crude Production Plunges by Nearly 9% in April, OPEC+ Data Shows," Reuters, May 17, 2022, https://www.reuters.com/business/energy/russian-crude-production-plunges-by-nearly-9-april-opec-data-shows-2022-05-17/.

4 The White House, "Fact Sheet: United States Bans Imports of Russian Oil, Liquified Natural Gas, and Coal," March 8, 2022, https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/08/fact-sheet-united-states-bans-imports-of-russian-oil-liquefied-natural-gas-and-coal/

5 Observatory of Economic Complexity, "Crude Petroleum in Russia," https://oec.world/en/profile/bilateral-product/crude-petroleum/reporter/rus#:~:text=In%202021%2C%20Russia%20exported%20%24113B%20in%20Crude%20Petroleum.,South%20Korea%20(%246.24B).

6 European Commission, "G7 Agrees Oil Price Cap: Reducing Russia's Revenues, While Keeping Global Energy Markets Stable," December 3, 2022, https://ec.europa.eu/commission/presscorner/detail/en/IP_22_7468.

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services to Russian oil cargoes if price exceeded a certain level. The governments involved initially set this price cap at $60/barrel at a time when market prices were above $90/barrel. Since companies based in the participating states provided insurance for about 95% of Russian oil delivered by tanker and for over 50% of the tankers,[7] G7 and EU leaders expected that Russia would have few alternatives to accepting prices under the cap.

Nevertheless, Russia worked diligently to evade the cap, in part by amassing a shadow fleet of several hundred tankers, formally owned by unknown companies in exotic jurisdictions, and by providing insurance and reinsurance for the oil trade through state-backed entities. At the same time, Russia has diverted over 90% of its oil exports to China and India sent additional oil products to North Africa, the Middle East, and Latin America. Russia's effective netback revenue may be below the price cap (also in part because of lower oil prices), but Russian oil exporters have largely evaded the cap.[8]

New constraints

Looking ahead, three new constraints are likely to affect Russian oil firms' outlooks and operations:

- Market availability
- Capital availability
- Technology availability

Russia has already faced these constraints to a modest extent—but each has sharply worsened in the wake of February 2022. For example, Western governments blocked many firms from accessing Western capital markets following Russia's 2014 seizure of Crimea and military support for separatists in eastern Ukraine. Despite this step, however, Russian banks had sufficient liquidity, the overall Russian economy had a sufficient capital surplus to provide capital to oil companies, and the ruble remained a stable currency with no capital controls. As a result, many international investors continued to buy ruble-denominated bonds and syndicated loans, which remained accessible via Euroclear. Russian oil companies also explored Asian capital markets. Russia likewise has confronted an embargo on some technologies since 2014. This has most notably affected equipment for shale oil and deep water development, but since these embargoes were imposed on a project-by-project basis, Russian firms were able to acquire some of the same equipment and technology that they could not obtain

7 Columbia University Center on Global Energy Policy, "How the Price Cap on Russian Oil Will Work in Practice," November 30, 2022, https://www.energypolicy.columbia.edu/publications/how-price-cap-russian-oil-will-work-practice/.

8 Ben Aris, "How Big Is Russia's 'Ghost Fleet' of Oil Tankers?" bne IntelliNews, February 26, 2023, https://intellinews.com/how-big-is-russia-s-ghost-fleet-of-oil-tankers-271123.

for shale development via their low-permeability sandstone operations.

Russia voluntarily accepted limits on production levels when the Russian government joined OPEC+ in 2017. These limits had particularly severe consequences in 2020–2021. Yet Russian oil companies continued to assume that international oil companies would reduce their investment in oil production in response to political and public pressure to reduce emissions, and that this would over time yield a larger market share for OPEC+ in general and Russia in particular.

Markets

From 2022 onward, Russian oil companies have been cut off from their traditional European markets, which had received close to half of Russia's crude oil and oil products. The companies have had to look for alternatives, and so far they have been successful in diverting their crude oil exports to India and China. It remains to be seen where and how Russian oil products will reach markets, though reports suggest that some have gone to North Africa, possibly for reexport to Europe.[9] Russia apparently has been able to amass a fleet of tankers to facilitate its crude movements and arrange for payment mechanisms, allowing it to circumvent the price cap mechanism, at least to some extent.[10]

Initially, the Western coalition's goal was to keep Russian crude oil and oil products in the market while making it more expensive for Russia to sell them, thus limiting Russian income. As the world adjusts to the shock of abrupt changes in the oil trade patterns, and if new sources of supply appear, the Western coalition might tighten trade restrictions on Russian crude by imposing lower price ceilings, strengthening controls around price cap adherence, and threatening or imposing secondary sanctions on dissenters. Such measures would aim to limit the market niche available to Russian producers; if adopted, these measures might create a ceiling for Russian production and constrain the appetite for future investment and final investment decisions on major projects in Russia. Of course, these policies could also affect supply and prices in global markets.

Capital

Capital availability may constrain the Russian oil industry too. Russian oil companies had a boon year in 2022 due to the combination of lower tax levels (based on the low Urals prices Russian officials had expected prior to the Kremlin decision to invade Ukraine), comfortable realized export sales prices, and high domestic prices. Yet it is unlikely these conditions will endure. First, Western governments will likely gradually tighten sanctions. Second, the Russian government

9 Tsvetana Paraskova, "North Africa Is Buying Up Russian Diesel after EU Ban," OilPrice.com, February 27, 2023, https://oilprice.com/Energy/Energy-General/North-Africa-Is-Buying-Up-Russian-Diesel-After-EU-Ban.html.

10 Julia Horowitz, "A Mysterious Fleet Is Helping Russia Ship Oil Around the World. And It's Growing," CNN, March 1, 2023, https://www.cnn.com/2023/03/01/business/russia-oil-shadow-fleet/index.html.

is getting smarter about the real prices fetched by Russian oil even as it becomes more desperate for revenue, meaning that Russian officials are likely to impose a higher tax load.[11]

At the same time, the government will likely be tempted to curb the growth of domestic fuel prices, which could seem an easy target for a quick domestic political win. Likewise, as the state budget becomes tighter, the oil companies may face increasing pressure to boost social spending and fund noncore projects, effectively paying additional shadow taxes. Capital availability in Russia might decline significantly too, as the government runs up deficits to finance its war. Thus, while Russian oil companies could borrow as much as they needed at near-zero rates (including ruble borrowing) before the war, higher post-invasion interest rates could increase drastically. There was an influx of funds to Russia's domestic capital markets in 2022, as global capital markets were all but closed for Russian savers, but this was a one-off event.

Technology

Oil exploration, development, production, transportation, and refining are high-tech businesses that depend upon multiple key technologies, highly specialized equipment, and competent personnel who can plan and execute every aspect of development and operations. It is true that Russia's oil industry has been heavily dependent on Western technology providers—but the reality of this situation is complex and often misunderstood and mischaracterized.

Before Russia's war in Ukraine, the country's oil industry was closely integrated into the global oil and gas universe. As an important component in a larger global system, Russia's oil sector was quick to deploy new technologies, many of which originated in Western firms and relied upon Western equipment and materials. Western service providers—meaning oil field services companies like Halliburton or Schlumberger, as well as equipment vendors like GE Oil and Gas—facilitated much of this technology transfer.

Yet when these Western service providers set up the Russian operations, they often began by taking over Russian oil field services companies, including both their equipment-manufacturing plants and their engineers and technicians. Russia has 43 specialized oil and gas universities and university departments, from which around 40,000 to 45,000 specialists have graduated each year since 2000.[12] This system has made Russia one of the principal sources of trained staff for international oil field services companies globally—not only in Russia.

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11 James Politi, Anastasia Stognei, and Derek Brower, "Russia's Energy Sector Hit as Kremlin Forced to Increase Tax," Financial Times, May 8, 2023, https://www.ft.com/content/f4b89276-efcf-4731-9ed3-7afea3be4c27.

12 Виктор Георгиевич Мартынов et al., «Нефтегазовое образование в России: вчера, сегодня, завтра,» Высшее образование в России 30, no. 8-9 (2021), https://cyberleninka.ru/article/n/neftegazovoe-obrazovanie-v-rossii-vchera-segodnya-zavtra/viewer.

Moreover, Russian oil companies have tended to keep a substantial part of their expertise in house and use separate service contracts with oil field services companies rather than turnkey arrangements. When two out of the four major services companies, Halliburton and Baker Hughes, left Russia after the beginning of the war, they did so by selling their Russian operations to the local management, which left much of the capacity in the country. In spring 2023, the other two firms, SLB and Weatherford, announced suspension of their investments and of deployments of new technology not already in the country. However, they have continued their operations and even grown their businesses by taking over the contracts of their departing competitors.[13]

Still, Russia is dependent on imports for some critical elements of the technology stack. For example, Russia imports heavy drilling rigs and fracking equipment for long-reach horizontal wells and multistage fracking. Thus far, Chinese suppliers have covered these needs, though Russian oil companies have expressed concerns about getting equipment needed to drill precisely tracked wells and to develop "hard to produce reserves," including rotary steerable drilling systems and accompanying navigational tools for monitoring and logging while drilling.[14]

Russia has made a concerted effort to localize manufacturing of these tools since 2014 and was quite successful. Today, while Russia may be a few years behind the industry's technology frontier, its companies and personnel are sufficiently competent and well-equipped to continue working. The next challenge will be to scale up manufacturing of these systems to fully satisfy domestic demand. Russia's domestically manufactured equipment will most likely be less efficient, more expensive, and less reliable than international equivalents, but it will be available.

Another crucial technology is multistage fracking. In recent years, the US standard has involved up to 40 or even more stages, with 10–15 stages on average. Russian firms would see 20–25 fracking stages as a breakthrough and generally conduct 6–10 stages on average. Some of the tools necessary in high-frac-count wells are not produced in either Russia or China and might have to be smuggled in, violating the existing Western sanctions regime. This constraint might push Russia back technologically by five to seven years and decrease its frac stage count by 30–40%.

Russia's Arctic projects depend even more heavily on technology. In the last decade, Russia has been expanding its oil production in the Arctic by opening areas previously considered inaccessible. Advances in navigation and marine loading technologies for the

13 Liz Hampton, "SLB Wins Russia Business as Oilfield Rivals Exit after Ukraine Invasion," Reuters, January 19, 2023, https://www.reuters.com/markets/commodities/slb-wins-russia-business-oilfield-rivals-exit-after-ukraine-invasion-2023-01-19/.

14 «Роторные управляемые системы. Первые результаты импортозамещения. Испытания отечественных РУС,» Neftegaz.ru, January 5, 2017, https://neftegaz.ru/science/development/331558-rotornye-upravlyaemye-sistemy-pervye-rezultaty-importozameshcheniya-ispytaniya-otechestvennykh-rus/.

Arctic have been particularly important. Though both the loading facilities and icebreakers have been built in Russia according to Russian designs, they rely on some unique imported parts. Russia's icebreaking tankers have been built in Korea. Because Russia lacks some key technologies, its Arctic development projects might slow down or even become impossible.

Gas turbines are also an area of Russian vulnerability. Turbines serve as energy sources in many applications, from pumping stations to processing plants and offshore platforms. Russia has sought to develop home-grown turbine manufacturing capacity based on aviation engine designs and to work through joint ventures and licensing deals with world leaders in these technologies, including Siemens and Baker Hughes. Nevertheless, Russia's two domestic manufacturers, UEC Saturn and Urals Turbine Works, have limited manufacturing capacity and limited product lines. Moreover, their products are considered less reliable than those of their international competitors. Russia's former joint ventures and licensees, Power Machines and REP Holding, never developed complete production lines and depended on foreign suppliers for key components.

Russia's refining segment likewise relies on international equipment, but it is in a more advantageous position than some others. Russia's refining operations are in the final stages of a decade-long modernization program and had received and installed most equipment before the war started and sanctions kicked in. Certain catalysts needed to produce Euro 5 gasoline and diesel are available only from foreign suppliers. The catalytic cracking units and hydrotreatment units in Russian refineries are predominantly based on Western technology, and those vendors require particular catalysts and other expendables as a condition for technical support and warranties. This consideration may no longer be important, however, as war and sanctions have already foreclosed technical support from Western vendors. Rosneft and Gazprom Neft have each been expanding their catalyst manufacturing capacity and may overcome the country's reliance on imported catalysts in a few years.

03

Outlook

Russian policy toward the oil sector—and specifically the Russian government's ability and willingness to support developing new resources—will be one of the most important domestic factors shaping the sector's development in the coming years. The grand design of the 2021 General Scheme for the Development of the Oil Industry was to maintain production at a plateau of 10.5–11 million barrels per day (mbd) through the end of the decade. Meeting this goal would require developing new reserves, which Moscow planned to achieve by targeting previously uneconomic reserves in existing production regions and by developing new oil provinces. In producing regions, this meant developing low-permeability, highly compartmentalized, thin-layer reservoirs. The new provinces were to be Gydan (a peninsula east of Yamal, on Russia's northern coast) and Taimyr (in Russia's most distant northeast territory). Both prongs of this strategy would require cutting-edge technologies, including advanced drilling for the existing oil-producing regions and the Arctic suite of technologies for the new provinces, which are in the extreme northern regions of continental Russia. As these two prongs both depend on imports, efforts to develop them will necessarily be slower and more modest than they would have been absent Russia's invasion of Ukraine and Western sanctions.

Developing new oil reserves in Gydan and Taimyr would also require very substantial upfront investments, on the order of tens of billions of dollars, for new infrastructure, including surface and port facilities and logistical hubs. A looming capital crunch might make these investment decisions difficult. If Russia's leaders proceed anyway, financial constraints could yield partial or arrested development if a lack of capital forces mothballing of half-completed projects. Developing the hard-to-recover reserves in existing production regions could be done incrementally and would thus likely be more attractive to the state planners. That said, most of this incremental production would be more capital-intensive than existing projects, with a higher unit cost. As a result, it would be uneconomic under the basic tax treatment. New development along these lines is unlikely without state support and tax breaks, which would in turn provide the state with a lever to direct the projects.

04

Declining production?

If limited to its existing production base with incremental additions, Russia might face a 3–5% annual decline in production until the end of the decade. However, market conditions might be even more restrictive and could force a deeper and more abrupt production cut. If this occurs, Russia would probably follow a strategy like the one it followed during the COVID-19 pandemic, when it implemented a 20% production cut. In that case, producers shut down their least profitable wells, slowed electric submersible pumps on the rest of their well stock, slowed their drilling programs, and restored idled capacity to alleviate natural production decline rather than drilling additional wells. A similar approach could be taken to respond to sanctions pressure. Russia's 2021 experience demonstrated that its producers were able to bring back much of their idled capacity without major problems.

Russia's large refining capacity also requires consideration. Domestically Russia consumed 3.4 mbd of oil products in 2021, while its refining run was 5.7 mbd, according to BP's *Statistical Review of World Energy*.[15] Russian firms exported the 2.3 mbd difference, which made Russia one of the largest exporters of refined oil products. In the first months of Europe's oil products ban, Russia has not curtailed either its refining run or its products exports. Because the world does have substantial spare refining capacity but limited global spare crude production capacity, sanctions pressure could limit Russian oil products exports more than its crude oil exports. This result would reduce Russia's refining run.

Moreover, domestic demand for oil products was stagnating even before 2022. With lower car sales and slower economic growth, domestic demand might even decline through 2030. In such an environment, the spatial distribution of Russia's refineries (an outcome of Soviet-era planning) would keep most of the refineries running at a lower load as opposed to forcing closure of less efficient plants. The only real competition among refineries is in the Middle Volga region; this could lead to some closures in the Samara and Ufa refining clusters (both owned by Rosneft).

Within a year, Russia has left its principal traditional export market, Europe, almost completely. So far, Russian firms have managed to maintain their production volumes and refining runs, but the trade pattern has changed radically. India and China now absorb more than 90% of Russian crude exports.[16] Indian purchase volumes went from minuscule to 1.5 mbd, a quantity that replaced imports from the Persian Gulf, which in turn shifted to Europe. Russian oil products likewise found new markets, in this case in non-European

15 BP, Statistical Review of World Energy, https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html.

16 Shweta Sharma, "Russian Oil Exports Back above Pre-Ukraine War Levels as India and China Buy 90% of Moscow's Crude," Independent, April 14, 2023, https://www.independent.co.uk/news/world/europe/russia-ukraine-oil-export-india-china-b2319123.html.

Mediterranean countries and even as far as Brazil.[17] As a consequence of the war and sanctions, the world oil market is organizing into segments that accept and do not accept Russian production.

In 2022, despite high oil prices, little new supply emerged to replace Russian oil. Though it was the major source of supply growth in the 2010s, US shale oil production grew at a much lower rate during the COVID-era trough in comparison with growth at the same price levels before the pandemic. Concerns that OPEC spare production capacity might be insufficient to replace any substantial cut in Russian exports have become widespread. This environment is probably a result of underinvestment during the period of low oil prices after the 2014 oil price crash, as well as later expectations of imminent demand reduction due to the energy transition.

If Russian oil production declines, OPEC production will be the only viable alternative in the 2020s. In that case, policymakers around the world will need to achieve a complex and delicate balance: on the one hand promoting energy security, which would encourage investment in fossil fuel production, and on the other seeking to contain climate change, which would deter that investment by increasing investor concerns about potentially stranded assets in the fossil fuel industry in the next decade. If this balance discourages new Western investment in production while Russia's production erodes, Russia's hand may strengthen, despite the country's many challenges.

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17 MRC, "Russia Boosts Diesel Exports to Latin America Since EU Embargo," April 11, 2023, https://www.mrchub.com/news/407118-russia-boosts-diesel-exports-to-latin-america-since-eu-embargo.