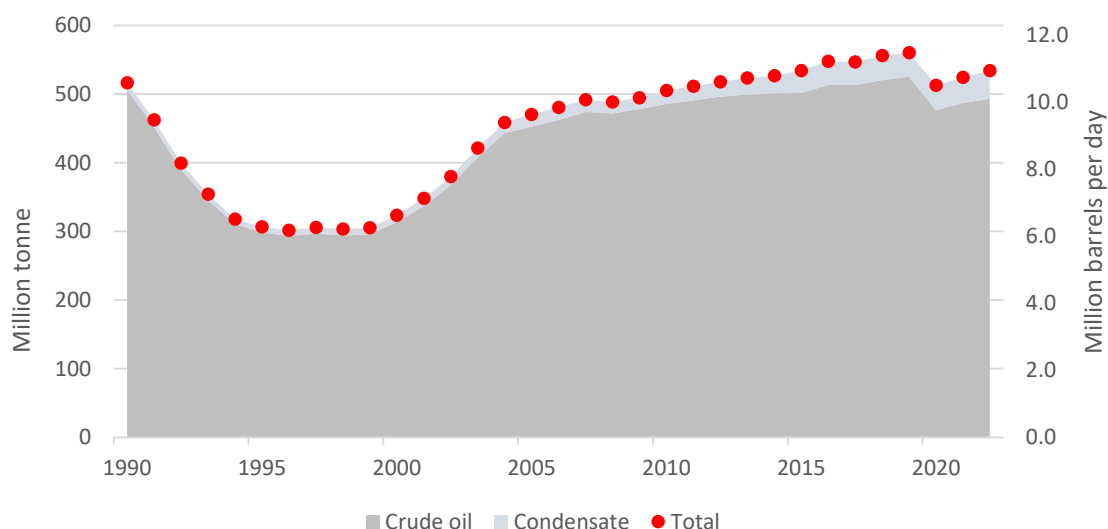


Russian oil output increases in 2022 amid unprecedented Western sanctions: What's next?

Introduction: Finding new markets for Russian oil

In 2022 Russia's liquid hydrocarbons output (crude oil and condensate) increased to 534 million tonnes (about 10.9 million b/d), up 1.8 per cent year-on-year. Russian crude oil exports increased to 242 million tonnes (about 4.9 million b/d), up 7.6 per cent year-on-year. After a sharp production cut in 2020 amid the global oil demand contraction caused by the COVID-19 pandemic, Russia's liquids production demonstrated two consecutive years of robust recovery in 2021 and 2022, partially explained by higher volumes of produced gas condensate in recent years (See Figure 1). Alexander Novak, Russia's Deputy Prime Minister in charge of the energy complex hailed these developments as evidence of the industry's resilience in the face of Western sanctions in his recent article for the "Energy Policy" magazine¹.

Figure 1: Russian liquid hydrocarbons production, 1990–2022

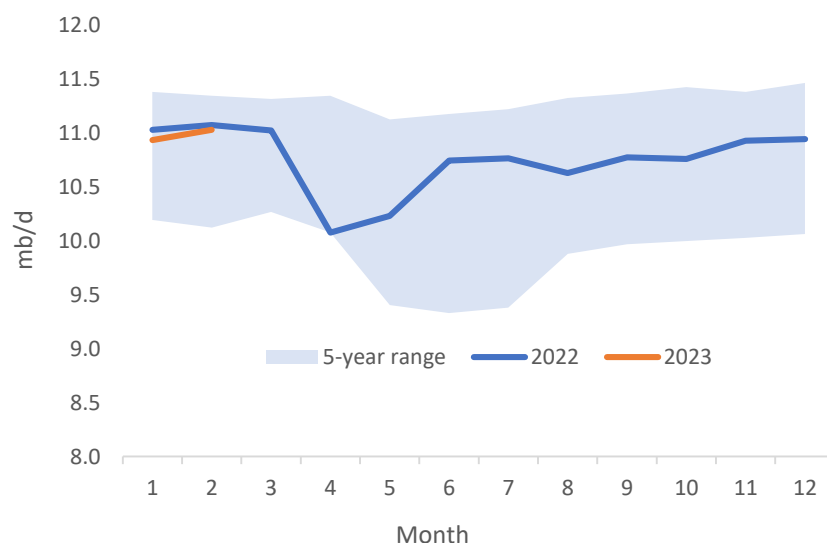


Source: Author, data from Russia's Energy Ministry, Rosstat, CDU

¹ <https://energypolicy.ru/rossijskij-tek-2022-vyzovy-itogi-i-perspektivy/business/2023/12/13/>

Russia's oil industry performance in 2022 and during the first months of 2023 has indeed defied some of the more pessimistic analyst expectations. In January 2023, Rosstat reported the combined crude oil and condensate output of 46 million tonnes, or just shy of 11 million b/d. In February daily production edged up 2 per cent over January, to 11.05 million b/d² (See Figure 2). This information is the latest available from Russian official sources since the Russian government suspended the release of oil and gas statistics starting from March 2023 and Q1 2023 until April 1, 2024³. According to these numbers, crude oil production amounted to 9.8 million b/d and condensate about 1.1 million b/d in the first two months of 2023. Russia announced a 500 thousand b/d (kbd) voluntary output cut for crude oil from March 2023⁴, to be measured against February output, so total crude and condensate production was likely about 10.5 million b/d in March. On March 21st Novak said that the announced reduction of output has been almost achieved and that this voluntary cut would continue through the end of 2023⁵. OPEC estimated Russia's crude oil output in May 2023 at 9,533 million b/d on the basis of secondary sources, the level that was 416 kbd lower than the required level of production of 9.949 million b/d during January-December 2024 under the OPEC+ agreement⁶. On July 3rd Russia announced it would cut oil exports by 500 kbd from August 2023 in concert with the efforts by Saudi Arabia to rebalance the market⁷.

Figure 2: Monthly output of Russian liquid hydrocarbons



Source: Author, data from TEK Rossii magazine

As of the beginning of July 2023, Russia has managed to re-direct flows of its crude oil exports away from the so-called “unfriendly” countries to alternative markets and actually increase exported volumes compared with the end of 2022⁸. This happened with the help of significant discounts that Russian energy commodity exporters had to offer to buyers in Asia (mostly to India and China). To be sure, these discounts have been somewhat exaggerated as the so-called “mirror statistics” from Indian and

² <https://tass.ru/ekonomika/17205695> and <https://tass.ru/ekonomika/17260773>. Note that OPEC revised Russia's February output and used the 9.949 million b/d figure for February 2023 on the basis of secondary sources, apparently accounting for condensate that is excluded from Russia's OPEC+ quota.

³ <https://tass.com/economy/1611395>

⁴ <https://www.reuters.com/business/energy/russia-cut-oil-output-by-500000-bpd-march-2023-02-10/>

⁵ https://www.rbc.ru/business/21/03/2023/6419c07c9a7947949f0386ac?from=from_main_12

⁶ https://www.opec.org/opec_web/en/press_room/7163.htm

⁷ <https://www.reuters.com/markets/commodities/russia-cut-oil-exports-by-500000-bpd-august-novak-says-2023-07-03/>

⁸ <https://www.bloomberg.com/news/articles/2023-05-22/russia-s-oil-flows-stay-high-even-as-moscow-insists-cuts-made>



Chinese customs demonstrate that imported Russian Urals crude was only \$10-15 dollars per barrel cheaper than Brent, not the often reported \$35-40/bbl⁹. Russian ESPO grade sold into Asia on a DES basis showed even lower discounts to Brent, at a discount of \$4/bbl at the beginning of July¹⁰.

It appears that the relative success of Russia's diversification strategy has been facilitated by Russia's tacit acceptance of a reduced tax take, at least temporarily, since a significant portion of the sales price has been retained by exporters and used to build new logistical chains to Asia at the expense of Russia's fiscal take in the first half of 2023¹¹. Compared to former exports to Europe, the netbacks to the exporters on the new trade routes and rents for the Russian state are lower due to longer transportation distances, complicated logistics, and price discounts to new customers. But, on balance, Russia's ability to sustain its niche in the global crude and product markets despite unprecedented trade restrictions could be considered an achievement since it allowed Russia to avoid disrupting its oil output and refining throughput at home.

The longer-term outlook for Russian oil production is however extremely uncertain. The IEA's World Energy Outlook 2022 postulates a 2 million b/d drop for Russian oil production by 2030 in their STEPs scenario. There is no supporting analysis for this assumption in WEO 2022 other than a short paragraph that states:

"Russia has been under sanctions since 2014 but the financial and technology restrictions bite much harder now. As access to technologies, oil field service expertise, equipment and assets is removed, Russia struggles to maintain production in existing fields and to develop large new fields in the Arctic, tight oil, and other offshore areas"¹².

However, this view ignores factors that have driven Russian oil production to date and an evaluation of how these might change in the future. Two main factors should be taken into consideration: first, that in the past twenty years, Russian oil companies have achieved very good results in managing the decline rates of the so-called "old" oil in Russia, and secondly, that during the past decade most of "new" oil additions to output were not from offshore or from tight oil formations but from onshore fields on the northern and north-eastern periphery of the developed oil provinces in Western Siberia. These projects are logistically more challenging and expensive but otherwise are conventional and do not require state-of-the-art technological solutions (and, in this sense, are not critically dependent on Western technologies and expertise). Russia may be running out of low-cost oil, but it will be many years until it would have to pivot towards high-cost oil. At present, the cost structure for the bulk of Russia's oil output can be described as a combination of low lifting costs (with the ruble devaluation significantly reducing upstream costs), moderate and price-sensitive tax take and relatively high logistical costs, resulting in the overall level of costs that are in the middle of the global cost curve of supply.

So long as general economic conditions, the so-called above-the-ground factors, remain favourable, Russian oil production is likely to continue growing albeit slowly in the medium term, to 2030, as new fields that are ramping up and expected to come onstream more than compensate for the ongoing overall decline from producing fields. The important signpost to watch is the progress of Rosneft's Vostok Oil flagship project, the sheer size of which could ensure future liquids production growth in Russia even if production declines elsewhere increase.

⁹ <https://www.reuters.com/business/energy/india-china-snap-up-russian-oil-april-above-price-cap-2023-04-18/>

¹⁰ <https://www.reuters.com/markets/commodities/prices-russia-espo-crude-china-jump-7-month-high-supplies-tighten-2023-07-05/>

¹¹ That was primarily due to the use of international price benchmarks for Russian crude (the quotations for Urals crude as defined by Argus that lost their relevance in the new conditions) rather than the actual sales prices in the statutory tax formulae determining the tax obligations of Russia's oil producers. Currently, the Russian government is considering different options for modifying the calculation mechanisms in the Russian oil and product taxes that would protect state tax take and introduce a new balance of interests between the state and the hydrocarbon producers.

¹² IEA WEO 2022, p.338

The role of (or rather unavailability of) Western technologies for Russia's oil sector that many market watchers consider to be the crucial factor in determining the future of Russia's oil should be put in proper context. Western service companies have been instrumental in rationalizing field modelling and drilling practices in Russia. But they have always been working in close partnership with Russian oil companies that have developed their own fit-for-purpose solutions and talent. Many Russian majors have been relying on in-house service teams, using the Russian affiliates of the Western service companies only for the most challenging tasks. The overall share of Western service companies in 2022 was under 12 per cent. Some Western service providers decided to leave Russia in 2022, selling its business to Russia-based management teams made up of former employees¹³, but some stayed and expanded their business and revenues¹⁴. Presently, Russia's service industry that has been learning from the best global practices for thirty years is fully capable of continuing to be successful in conventional oil developments and delivering oil production growth from these assets.

Thus, while a sharp decline of Russia's oil output by 2 million b/d cannot be ruled out, an alternative scenario of a managed output reduction by 0.5-0.7 million b/d and stabilization in the near term with subsequent steady growth in the medium term once new giant onshore projects in Russia's northeast take off is entirely plausible. The future is uncertain, but the past is not. In the absence of official Russian oil statistics from the beginning of 2023, and drastically reduced access of Western oil analysts to Russian oil data post 2020, many projections for Russian oil will suffer from the necessity to extrapolate future trends from the "wrong" base year.

To explain, 2020 statistics, in most cases, represent the latest available data set for Russian oil that many Western analysts have been using for extrapolation of future trends, since the data for 2021 was released already after the start of the Russia-Ukraine war when access of Western analysts to Russian data became problematic. But 2020 was a very unusual year, marked with unprecedented production cuts in response to reduced economic activity across the whole world due to the COVID-19 pandemic. It represents a distorted base year for extrapolating future trends since it was a clear outlier. This insight reviews the latest publicly available Russian statistics through 2022 which addresses "the wrong base year" problem and provides a more informed assessment of the near-term oil production dynamics in Russia.

Context: Key available statistics about the Russian oil sector

Oil reserves

Russia is one of the world's "big three" oil producers (along with the US and Saudi Arabia) and has vast oil reserves and resources. According to the 2022 edition of BP Statistical Review Russia's proved reserves as of the end of 2020 amounted to 112 thousand million barrels (representing 6.2 per cent of global reserves) with a reserves-to-production ratio of 28 years.

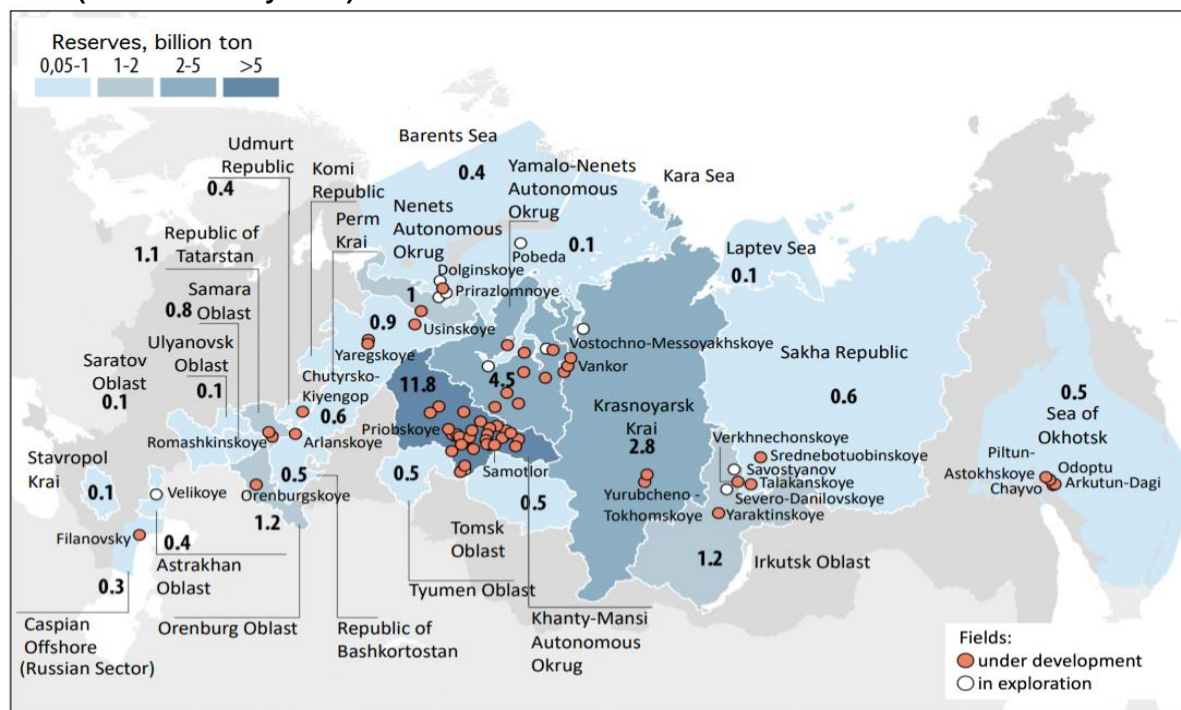
Russia's methodology of reserves calculation differs from the Western system by making a greater emphasis on technical recoverability of reserves rather than the economic efficiency of doing so (under the prevailing market prices at the moment of assessment). According to Russia's Ministry of Natural Resources (MNR), as of January 1, 2021, Russia's oil and condensate reserves under A+B1+C1 categories (which roughly correspond to proven and probable categories in the Western methodology) constituted 19,010.4 million tonnes and 2,242.4 million tonnes, respectively¹⁵.

¹³ https://www.rigzone.com/news/halliburton_wraps_up_exit_from_russian_operation-09-sep-2022-170308-article/

¹⁴ <https://www.reuters.com/markets/commodities/slb-wins-russia-business-oilfield-rivals-exit-after-ukraine-invasion-2023-01-19/>

¹⁵ State Report on the usage of Russia's mineral resources in 2020. Moscow, 2021

Figure 3: Russia's A+B1+C1 hydrocarbon liquids reserves by region and location of main fields (as of 1 January 2021)



Source: Russia's Ministry of Natural Resources

For 2020, MNR assessed a recovery factor for oil under these categories of reserves in Russia at 37.1 per cent. This methodology thus suggests a “cover” of about 35 years for what essentially are fields under development and assessment. The estimates of oil resources for Russia that might underpin new discoveries in the future run as high as 55,800 million tonnes for oil and 13,100 million tonnes for condensate. The bottom line: Russia is not going to run out of oil for more than a hundred years. Furthermore, there is a tremendous potential for additional giant discoveries, albeit most likely in the Arctic offshore.

Regarding the geographical distribution of Russia's oil reserves, there are several oil basins, including the “older” oil provinces in the North Caucasus and in the South, very mature production in the Volga region that has been under development since the 1930-40s, the most prolific and mature Western Siberia, under development since the 1960-70s, and “newer” Timan-Pechora in the northwest of the country, as well as Eastern Siberia and the Far East oil provinces, where large-scale oil production mostly started in the 1990s-early 2000s.

Western Siberia is the core region, containing most of the country's oil reserves and accounting for the lion's share of Russia's liquids output. Khanty-Mansiysk autonomous okrug or KhMAO is home to Russia's largest oil fields, whereas Yamal-Nenets autonomous okrug or YaNAO – to Russia's super-giant gas fields, and, consequently, to the largest condensate reserves in the country.

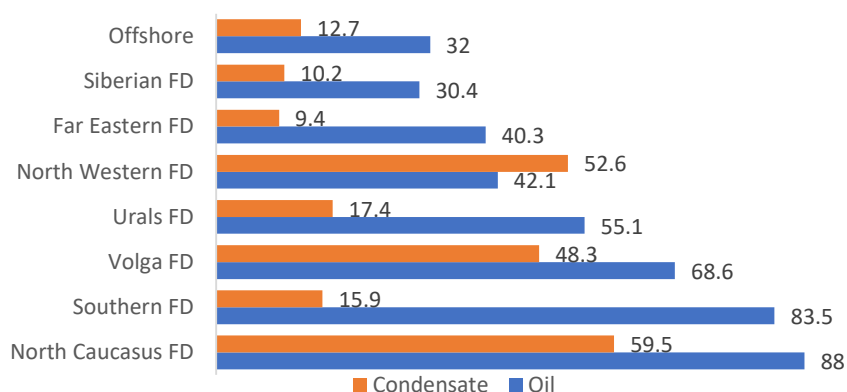
The overall conclusion is that the remaining reserves will allow Western Siberia (located within the administrative borders of the Urals Federal District) to hold its position as the core of the Russian oil industry for decades to come, especially if modern production techniques are used, while the older oil provinces would be able to maintain production at lower levels for many years, and new contributions to growth are likely to come primarily from the current periphery of the Western Siberian oil province in the Krasnoyarsk region and from Eastern Siberia, from the fields that are logistically challenging but are conventional from the upstream development perspective. Russia does not need to develop new high cost oil from tight formations or from the Arctic offshore for the next twenty years unless the future market would justify the needs for Russia to grow its total oil output robustly. Given the predominance



of peak oil demand theories and the policies of moving away from fossil fuels as part of the global energy transition agenda, this is unlikely to be the case.

The available Russian statistics on the rates of depletion of the oil reserves by region is organized by the federal district, not by oil basin, which complicates the analysis (See Figure 4).

Figure 4: Degree of depletion of A+B1+C1 reserves by Russia's federal districts, per cent (as of January 1, 2021)



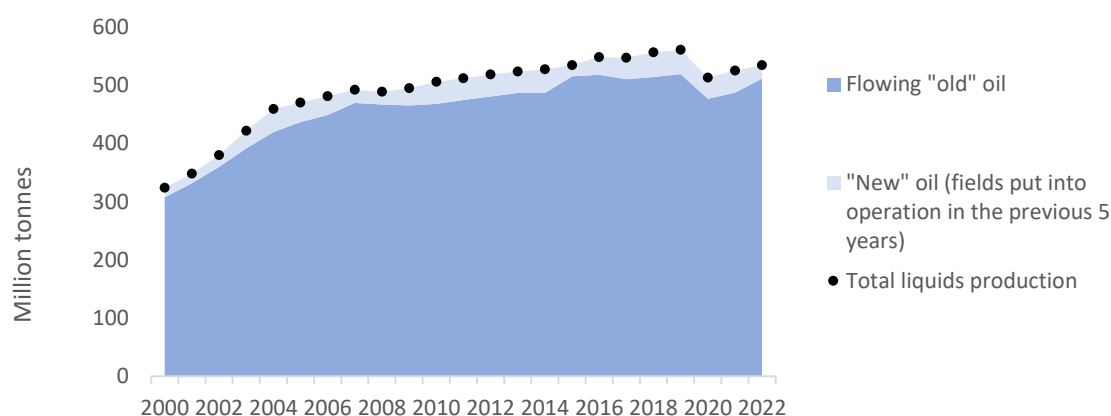
Source: State Report on the usage of Russia's mineral resources in 2020

Main upstream activity indicators

Russia's oil industry is relatively mature. One indicator of this maturity is that most liquids production comes from "older" fields. For example, fields that have been in production for more than five years accounted for 95.7 per cent of Russia's total liquids production in 2022. Many of these fields passed their peak production phase some time ago and have been in a natural production decline for many years.

It is noteworthy that in the Russian statistics "new" fields are defined as those put in operation fewer than five years earlier; the field composition changes with each passing year. The fluctuations in the category of "new" oil are often due to the departure of major fields from this category, as was the case in 2015 when the Vankor's field production passed the five-year threshold and the output by other new fields was insufficient to compensate for the fallout. At the same time, the series since 2000 suggest that Russia has been able to develop and add to its overall portfolio of new fields very consistently, suggesting that investments in new productive capacity is sustainable (see Figure 5).

Figure 5: "New" and "Old" oil in Russia's output



Source: Author, data from TEK Rossii magazine

The bulk of activity, however, happens at mature fields. As the end of 2022 there were 158.8 thousand producing wells in Russia. After idling lots of wells in 2020 as part of the cuts agreed with OPEC, Russia brought most of them back into production and also drilled new ones at high rates in 2021 and 2022 (See Table 1).

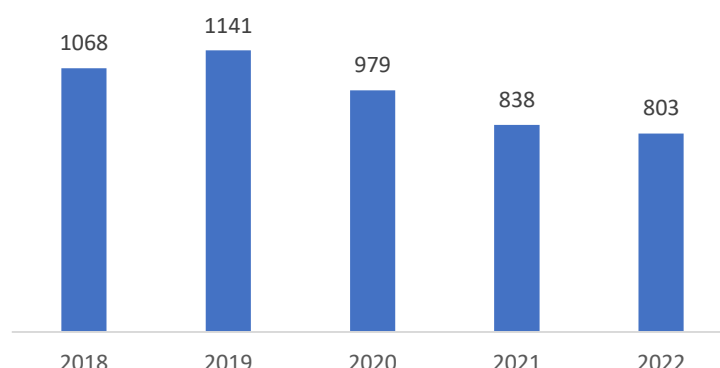
Table 1: Main indicators of productive capacity and drilling

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
<i>(thousand meters)</i>										
Total drilling volumes	21,656	20,772	22,883	25,594	28,636	28,702	28,497	27,984	26,974	29,189
Development wells	20,839	19,778	22,065	24,680	27,648	27,634	27,356	27,005	26,136	28,386
Exploration wells	817	994	818	914	988	1,068	1,141	979	838	803
<i>(units)</i>										
Total well stock at end of year	165,423	168,315	170,163	173,073	175,335	177,459	180,449	178,712	183,168	186,443
Producing	143,835	146,282	148,658	151,470	150,770	155,046	154,965	136,492	155,590	158,785
Idle	21,588	22,033	21,505	21,603	24,565	22,413	25,484	42,220	27,378	27,658
New	6,454	6,065	6,261	7,141	6,251	7,946	7,861	6,957	7,365	7,866

Source: Author, data from TEK Rossii magazine

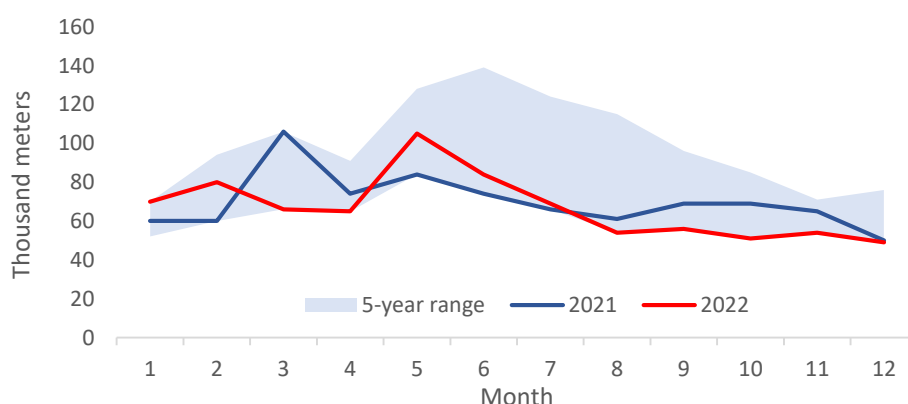
It is universally accepted that drilling volumes represent one of the most reliable among the readily available indicators of the near-term future production. Russia's CDU has been providing statistical series for exploratory drilling and development (production) drilling for many years. In 2021 and 2022 exploratory drilling in Russia declined considerably probably indicating a shift to shorter-term priorities among the Russian companies (see Figures 6 and 7).

Figure 6: Annual exploration drilling in Russia, thousand meters



Source: Author, data from TEK Rossii magazine

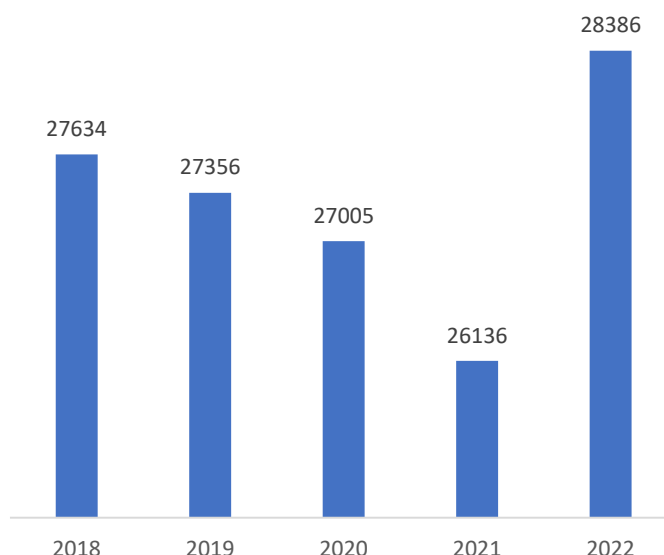
Figure 7: Exploration drilling in Russia in 2022 by month, thousand meters



Source: Author, data from TEK Rossii magazine

It is noteworthy that since the beginning of the second half of 2022 monthly exploratory drilling volumes have been the lowest for the past five years. At the same time, development drilling after the hiatus of 2020-2021 grew robustly in 2022, to the top of the range for the past five years. This, in fact, provides the straightforward explanation for the growth of Russian oil and condensate output in 2022, in spite of sanctions and a major change in the target export markets (See Figures 8 and 9).

Figure 8: Annual development drilling in Russia, thousand meters



Source: Author, data from TEK Rossii magazine

Figure 9: Development drilling in Russia in 2022 by month, thousand meters



Source: Author, data from TEK Rossii magazine

The data on the composition of producing wells by method of extraction in Russia in 2021 (the latest year for which this statistic is available) demonstrates that most of them can be considered conventional developments (see Table 3).

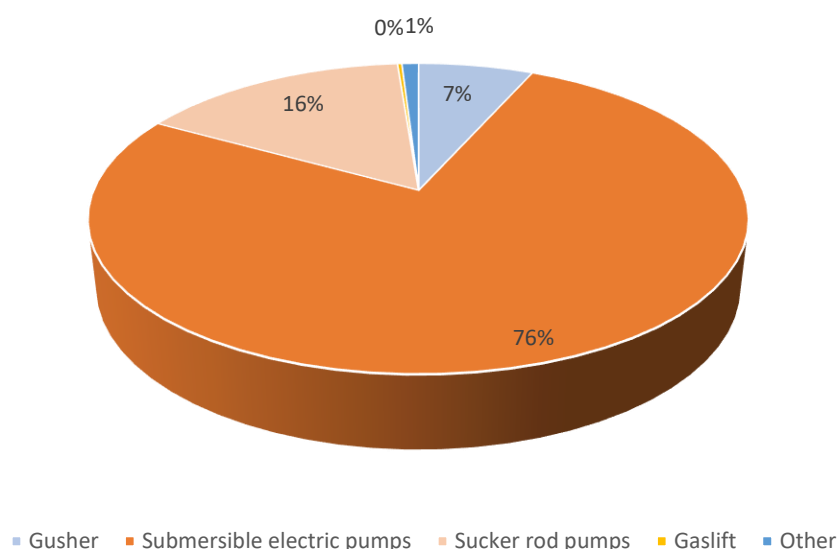
Table 2: Composition of the producing oil wells of main Russian companies by method of extraction in 2021

	<u>Gusher</u>	<u>Submersible electric pumps</u>	<u>Sucker rod pumps</u>	<u>Gaslift</u>	<u>Other</u>	<u>Total</u>
Rosneft	1704	30706	2729	152	384	35675
Bashneft	9	3454	8732	0	5	12200
Lukoil	286	20329	6872	2	1393	28882
Surgutneftegas	434	23046	981	0	64	24525
Gazprom-neft	283	7356		443		8082
Tatneft	8	4469	15013			19490
Slavneft	45	3133				3178
Rusneft	61	1570	190		4	1825
NNK	139	5886	535		49	6609
Total main companies	2969	99949	35052	597	1899	140466
<i>Percent of total</i>	<i>2.1%</i>	<i>71.2%</i>	<i>25.0%</i>	<i>0.4%</i>	<i>1.4%</i>	<i>100%</i>
Total Russia						155590

Source: Author, data from TEK Rossii magazine

The statistic for main companies covers 90 per cent of the total stock of producing wells and thus is representative of the national split as well. The bulk of extraction is done with the use of submersible electric centrifugal pumps that are used at 71.2 per cent of oil wells; sucker rod pumps account for 25 per cent of wells, with other methods of extraction represented at less than 5 per cent of wells. For 2022 similar composition is available for new wells only (see Figure 10).

Figure 10: Composition of new producing oil wells launched in 2022 in Russia by method of extraction



Source: Author, data from CDU

The 2022 data for new wells confirms the main message: three quarters of Russian oil is produced with the help of submersible electric centrifugal pumps. It also comes as no surprise that the proportion of gushers for new wells is higher than for all wells.

The oil production swing in 2019–2022

The past few years have been dramatic and challenging for Russia's oil producers. First, the global economic slowdown as a result of the COVID-19 pandemic caused an unprecedented drop in global oil demand in 2020. For the first time since Russia joined OPEC+, it had to introduce drastic production cuts to help stabilize and re-balance the global oil market¹⁶. Russia has never been a swing producer, but the unprecedented crisis called for unprecedented responses and Russia committed to reduce its crude oil output by almost 2 million b/d in the spring of 2020.

Implementing an abrupt production cut at this scale and within a very short timeframe represented a tremendous technical challenge for the Russian oil companies as they were confronted with a task of delivering 10-20 per cent cuts for their upstream portfolios while having to solve a complex problem of optimizing output and trading it off against the risks of permanent loss of production¹⁷. The fact that Russian oil companies managed to implement the cut and then to resume increasing production in 2021 and 2022 suggests that very little if any productive capacity has been permanently lost after the wells were shut down and consequently re-started. The sectoral statistics for the “swing period” of 2019-2022 is extremely important for understanding how the Russian oil industry managed to cope with the challenge.

Russia's oil production by company

In recent years the state-owned companies have expanded their footprint in Russia. This is especially the case of Rosneft that in the past decade gobbled up Yukos, TNK-BP, and, most recently, Bashneft. Another state-owned company, Gazprom-neft, has taken over the Sibneft assets and is developing the portfolio of the liquids assets for its parent company Gazprom. The production data by company reported by Russia's Ministry of Energy, however, has kept the notions of the previous era, providing separate output data for Bashneft and Slavneft (the latter is jointly managed by Gazpromneft and Rosneft), and also showing oil production by production sharing agreement (PSA) projects (Kharyaga, Sakhalin-1 and Sakhalin-2) as a separate category.

Gazprom's and Novatek's core business is gas production but both companies produce significant amounts of gas condensate. It is expected that this trend will be even more pronounced in the future as the share of projects that produced “wet” gas from deeper layers increases. The “other” category consists of about a hundred of independents with some companies (for example Tomskneft) and joint ventures (such as Arktikgaz, Salym Petroleum Development) producing very substantial output. (See Table 3).

First thing to note, there is a slight discrepancy in the data reported by the Ministry of Energy for 2022, as the sum of the company contributions to output (535.2 million tonnes) exceeds the reported national total (534 million tonnes). The most likely explanation is that the 2022 production data by company was preliminary, and the final national production number has taken account of losses. This means that the reported production numbers by company might be corrected in the future, but the correction is going to be minor and not material.

¹⁶ See also Yermakov V. *Changing Landscapes: New Strategies for the Big Three Oil Producers*. Journal of International Affairs, April 2021. <https://jia.sipa.columbia.edu/online-articles/changing-landscapes-new-strategies-big-three-oil-producers>

¹⁷ See Yermakov V. and Henderson J. *The New Deal for Oil Markets: implications for Russia's short-term tactics and long-term strategy*. OIES Insight, Oxford, 2020 <https://www.oxfordenergy.org/publications/the-new-deal-for-oil-markets-implications-for-russias-short-term-tactics-and-long-term-strategy/>

Table 3: Russian oil and condensate production by company (million tonnes)

									<u>2020/19,</u> <u>percent</u>	<u>2022/21,</u> <u>percent</u>	<u>2022/19,</u> <u>percent</u>
	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>change</u>	<u>change</u>	<u>change</u>
LUKoil	85.7	83.0	81.7	82.1	82.1	73.4	75.7	80.0	-10.6%	5.6%	-2.6%
Rosneft	188.8	189.7	188.2	194.2	195.1	180.0	168.9	163.7	-7.8%	-3.1%	-16.1%
Gazprom-neft	34.3	37.8	39.5	39.5	39.2	38.9	38.6	40.2	-0.6%	4.2%	2.6%
Surgutneftegaz	61.6	61.8	60.9	60.9	60.8	54.8	55.5	59.6	-9.9%	7.4%	-1.9%
Tatneft	27.2	28.7	28.9	29.5	29.8	26.0	27.8	29.1	-12.7%	4.6%	-2.3%
Bashneft	19.9	21.4	20.6	18.9	18.7	12.9	13.8	18.1	-30.7%	31.2%	-3.3%
Slavneft	15.5	15.0	14.3	13.8	14.0	9.7	9.8	12.0	-30.5%	22.0%	-14.0%
Rusneft	7.4	7.0	7.0	7.1	7.1	6.4	6.7	6.9	-10.1%	3.4%	-2.9%
NNK	2.3	2.3	2.1	2.0	2.1	2.0	16.0	17.1	-2.7%	6.6%	730.9%
Total VICs	442.7	446.7	443.4	448.1	448.8	404.1	412.8	426.6	-9.9%	3.3%	-4.9%
Gazprom	17.1	17.4	17.4	17.4	18.3	18.9	20.6	24.3	3.3%	17.6%	32.4%
Novatek	4.7	8.0	7.7	8.3	8.4	8.1	8.1	7.7	-4.3%	-4.1%	-8.4%
Other	54.6	59.4	61.7	63.5	66.2	63.1	66.1	66.8	-4.7%	1.0%	0.8%
PSAs	15.0	16.0	16.5	18.7	19.4	18.6	16.9	9.8	-4.3%	-41.8%	-49.4%
Total Russia	534.1	547.5	546.7	555.9	561.1	512.8	524.5	535.2	-8.6%	2.0%	-4.6%

Source: Author, data from TEK Rossii magazine

Another observation is that the 2022 national output was negatively affected by lower production by PSA operators, which declined 42 per cent or by 7.1 million tonnes year-on-year. The main reason for the drop was the withdrawal of ExxonMobil that was a project operator from Sakhalin-1 in March 2022 causing a halt of oil production for many months. In October 2022 the Russian government established a Russian company, managed by Rosneft subsidiary Sakhalinmorneftegaz-shelf, that will own investors' rights in Sakhalin-118. The new operator started to restore output and managed to bring it back to about 70 per cent of capacity in the beginning of January 2023. It was reported that the oil output at Sakhalin-1 might be fully restored by the end of February 2023¹⁹. As a result of Exxon's departure from Russia, Sakhalin-1 oil output in 2022 was only 4.6 million tonnes, 59.2 per cent lower year-on-year. Assuming a normal operation of the project, Russia's national output could have been higher by about 5 million tonnes in 2022 suggesting an even stronger bounce back. Rosneft's report regarding the operating results in 2022 noted that company's total hydrocarbons output in that year was 5.1 million b/d, but stood at 5.5 million b/d at year end, most of the difference due to the recovery of the output at Sakhalin-1. The return to normality at Sakhalin-1 in 2023 means that the 2023 national production is going to receive a boost from the reinvigorated Sakhalin-1 output.

Robust growth in Gazprom's liquids production confirms the continuation of the recent trend in rising gas condensate output. Novatek's liquids output declined, year-on-year, and even more so compared to 2019.

As mentioned earlier, probably the most interesting question to address is what the available statistics tells us about how Russian companies managed to perform the "swing" in production during 2019-2022. The liquids output by vertically integrated Russian oil companies as a group (VICs) was up 3.3 per cent year-on-year in 2022 and 4.9 per cent below the level of 2019, the year when Russia's oil production hit an all-time record of 560 million tonnes. This is a surprisingly good result for the industry because when Russian oil companies were utilizing full productive capacities, from 5 to 7 per cent of the production was represented by economically marginal wells. The reasons for keeping these wells operational were license obligations and employment issues rather than economic rationale. To the

¹⁸ <https://www.reuters.com/world/europe/russias-putin-signs-decree-setting-up-new-operator-sakhalin-1-tass-2022-10-07/>

¹⁹ <https://www.reuters.com/business/energy/russias-sakhalin-1-near-full-oil-output-after-exxon-exit-source-2023-01-09/>

extent the companies were able to rationalize their portfolios during the crisis by retiring the most marginal assets, the fact that oil production in 2022 was 5 per cent less than in 2019 might be interpreted as a sign of a “leaner” and better positioned industry that has bounced back to the optimum and sustainable level of output.

Another important insight from the dataset in Table 3 is that at first sight the production cut in 2020 was not on a pro rata basis among the Russian VICs. The year-on-year reduction in output in 2020 for VICs as a group was 9.9 per cent. Surgutneftegaz was the only company among the Russian VICs that exactly matched its reduction in output with that number. Lukoil, Tatneft, and Rusneft reduced their output slightly more than average; Bashneft and Slavneft – much more than average, by over 30 per cent; Rosneft – by 7.8 per cent, and Gazprom-neft – by only 0.6 per cent. However, if we use the wider definition of Rosneft that recognizes its ownership of Bashneft and 50 per cent interest in Slavneft, the production cut for the company in 2020 was 10.4 per cent. Gazprom-neft was a special case indeed, apparently due to higher share of condensate in its liquids output (the agreement among OPEC+ explicitly excluded condensate from the production cut).

One should also use caution interpreting the apparent deterioration of Rosneft output on the basis of Table 3 data. In 2021 Rosneft’s output did not stabilize as was the case with other VICs but continued to fall. At the same time, we see a tremendous increase in production by NNK. The explanation is simple: that year Rosneft sold a collection of its assets (mostly mature and with marginal economics) in the south of Russia, in the Volga region, in Timan-Pechora and in Western Siberia with a combined output of about 12 million tonnes to NNK as part of portfolio optimization. The effort apparently paid off since the average well flow rates for Rosneft improved and were the highest among the VICs in 2021 (See Table 4).

Table 4: Well productivity by company (crude oil), thousand tonnes per day

	<u>2019</u>	<u>2020</u>	<u>2021</u>
LUKoil	8.2	8.6	8.2
Rosneft	12.6	12.5	13.5
Gazprom-neft	14.3	14.5	13.1
Surgutneftegaz	7.3	6.3	7.6
Tatneft	4.5	5.0	4.1
Bashneft	3.9	3.8	4.5
Slavneft	10.3	12.8	12.2
Rusneft	9.9	10.7	10.8
NNK	7.8	7.5	6.6

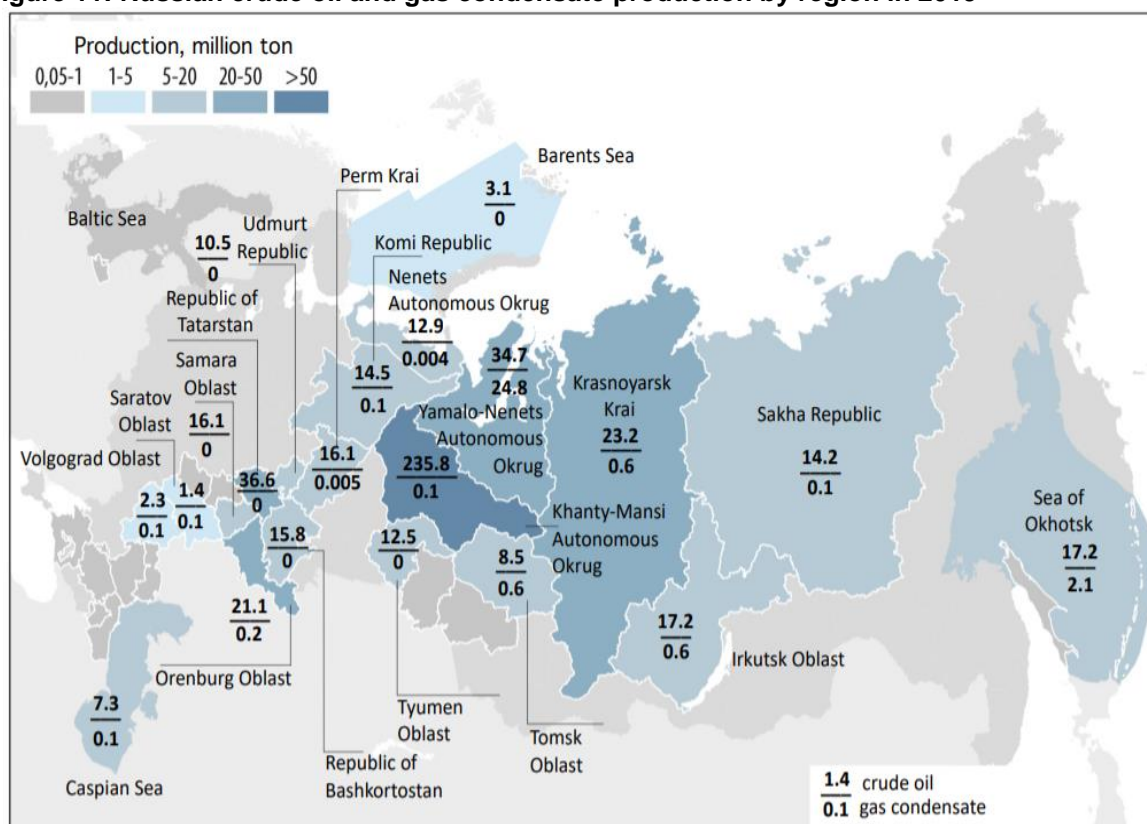
Source: Author, data from TEK Rossii magazine

After adjusting for the non-organic factors, Rosneft’s remaining portfolio was not faring too badly. However, Rosneft without Bashneft and 50 per cent of Slavneft registered a production decline in 2022 year-on-year while most of Russian producers were demonstrating growth. Adding back production from Bashneft and from the interest in Slavneft to the core Rosneft production, however, is just enough to move the gross Rosneft output into the positive growth territory in 2022 with 0.1 per cent year-on-year increase.

Russia’s oil production by region

Unfortunately, the latest available aggregate national statistics on the split between crude oil and condensate output by region from the Ministry of Natural Resources is available only for 2019. On the other hand, the dated statistics might, in fact, be very useful since it was the year of the highest liquids production in Russia to date. Clearly, the lion’s share of Russian condensate is produced in YaNAO, which is home to Russia’s super-giant gas fields (See Figure 11).

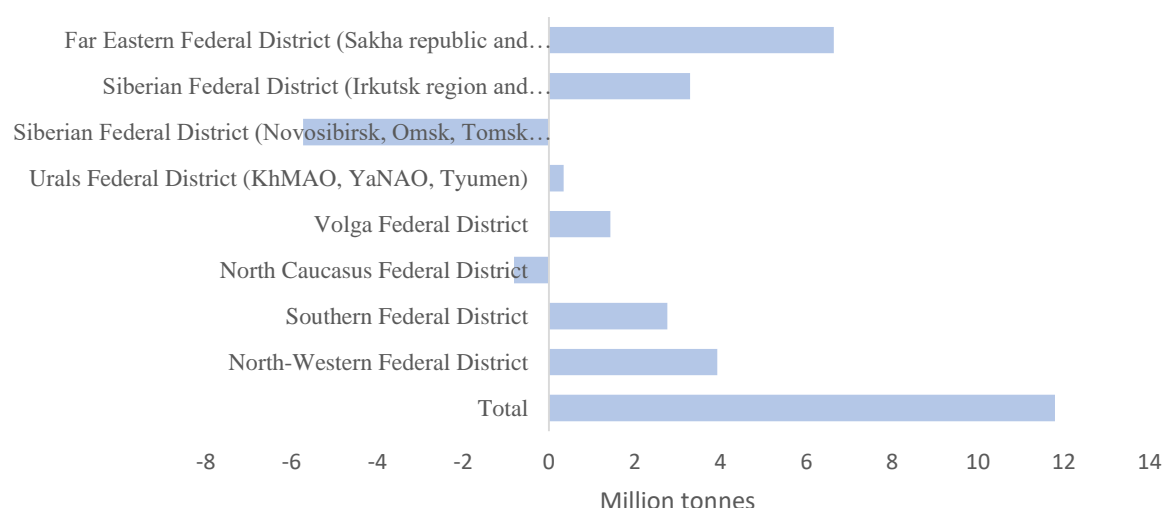
Figure 11: Russian crude oil and gas condensate production by region in 2019



Source: Russia's Ministry of Natural Resources

The combined regional data series for the liquids production is currently available through 2022. Figure 12 demonstrates an incremental change in Russia's oil and condensate output by region over the decade ending in 2022.

Figure 12: Incremental change in reported Russia's regional oil and condensate production, 2022 over 2013 (million tonnes)



Source: Author, data from TEK Rossii magazine

It appears that in the past decade, Russian oil companies achieved very good results in managing the decline rates of the so-called “old” oil in Russia, specifically in the Volga region and in Western Siberia, and secondly, that during the past decade, most of the “new” oil additions to output were not from (presumably extremely high-cost) offshore or from tight oil formations but from onshore fields on the northern and north-eastern periphery of the developed oil provinces in Western Siberia. These projects are logistically more challenging and more expensive but otherwise are conventional and do not require state-of-the-art Western technological solutions. Clearly, the modest national production increase from 2013 to 2022 was happening against the backdrop of declining output in Novosibirsk, Omsk and Tomsk regions, stable production in Western Siberia and growing output in Krasnoyarskiy krai and Russia’s Far East. Finally, Table 6 provides an illustration to the “swing” period of 2019-2022 with regards to the regional production dimension.

Table 5: Russian liquids output by region

	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>% change</u>
Total	561.1	512.8	524.5	535.1	2.0%
European Russia	165.7	148.3	153.6	160.3	4.4%
<i>North-Western Federal District</i>	31.2	27.6	28.9	31.968	10.6%
Nenets Autonomous Okrug	16.0	14.1	15.1	17.3	14.4%
Komi Republic	14.6	13.0	13.3	14.3	7.7%
Other	0.6	0.5	0.5	0.4	-25.6%
<i>Southern Federal District</i>	14.6	13.6	12.6	12.4	-2.0%
<i>North Caucasus Federal District</i>	1.0	0.9	0.9	0.8	-16.2%
<i>Volga Federal District</i>	118.9	106.2	111.2	115.2	3.6%
Bashkortostan	16.1	11.1	11.9	14.3	20.4%
Orenburg region	21.7	20.7	21.3	20.739	-2.6%
Perm region	16.1	15.1	15.6	16.594	6.4%
Samara region	16.1	15.5	15.9	15.55	-2.2%
Tatarstan	36.7	32.7	34.5	35.923	4.1%
Udmurtiya	10.5	9.5	9.8	10.08	2.9%
Other	1.7	1.6	2.2	2.0	-7.8%
Western Siberia	319.6	292.4	300.4	310.3	3.3%
<i>Urals Federal District</i>	310.1	285.3	293.0	303.2	3.5%
KhMAO	236.1	210.8	215.8	223.1	3.4%
YaNAO	61.5	63.3	66.6	70.611	6.0%
Tuymen region	12.5	11.2	10.7	9.539	-10.9%
<i>Siberian Federal District</i>	9.5	7.1	7.4	7.1	-4.4%
Tomsk region	9.1	6.9	7.2	6.946	-3.5%
Other	0.4	0.2	0.2	0.1	-34.0%
Eastern Siberia and Far East	76.0	72.1	70.5	64.5	-8.5%
<i>Siberian Federal District</i>	41.8	37.5	36.9	36.3	-1.5%
Irkutsk region	17.9	17.3	17.2	17.0	-1.3%
Krasnoyarskiy krai	23.9	20.2	19.8	19.4	-2.2%
<i>Far Eastern Federal District</i>	34.1	34.5	33.5	28.2	-15.9%
Sakha republic	14.4	16.2	17.5	19.124	9.3%
Sakhalin	19.7	18.3	16	9.049	-43.4%

Source: Author, data from TEK Rossii magazine

Vostok Oil: Russia's new flagship oil project

Rosneft's Vostok Oil project is based on the production potential of 13 oil and gas fields on the Taimyr peninsula and in the northern part of Krasnoyarsk kray, some of them already producing like the fields in the Vankor cluster, and some being new developments in the Payakha cluster (See Figure 13).

Figure 13: Vostok Oil project



Source: Rosneft

Vostok Oil project represents a massive undertaking that is going to lead to significant job creation (the total number of people involved in the work on the project is estimated at 400,000, including 130,000 Rosneft personnel and contractors) and significant increase in Russia's GDP as a result of both direct and indirect economic effects. This is a flagship project for Rosneft with confirmed oil reserves of 6 billion tons and expected combined hydrocarbons annual production from the project at 50 million tons by mid-2020s during phase one based on Vankor and Payakha clusters and at up to 100 million tons during phase two, based on East-Taymyr fields development which is planned by the early 2030s²⁰.

Crude from Vostok Oil fields has a uniquely low sulphur content of 0.01-0.04 per cent, making it more valuable and more environmentally friendly due to lower SOx emissions²¹. To protect this unique crude quality that would command a price premium²², Rosneft intends to build a dedicated 770-km pipeline from Vankor to a new seaport in Bay Sever (North) near the existing port of Dixon. Rosneft has pledged to deliver up to 30 million tons of oil to the Northern Sea Route by 2024, and much more in the longer term²³. Vostok Oil project indeed may become a game-changer for NSR, ensuring extremely high levels of shipments in the 2030s and beyond.

²⁰ https://www.rosneft.ru/upload/site1/document_publication/Rosneft_Gazeta2020_RUS.pdf

²¹ <https://www.rosneft.com/press/today/item/206597/>

²² https://www.rosneft.com/upload/site2/attach/0/14/02/SPIEF_slides_2021_EN.pdf

²³ Minutes of the meeting of Russia's President Vladimir Putin with Rosneft's CEO Igor Sechin on 25 November 2020 <http://kremlin.ru/events/president/news/64493>



The project also involves construction of new ships on a grand scale. In total, 50 vessels of different types, including oil tankers, LNG carriers as well as various support ships are expected to be commissioned under the project. Orders for 10 Arc-7 ice-class tankers have been placed at the Zvezda shipyard.

Russian fiscal policies and the oil sector: upstream incentives at last

The most important above-the-ground factor for the future of Russia's oil output is taxation. Since the early 2000s, the Russian government has been using the fiscal instruments that relied on taxing gross revenues of the Russian oil producers – the so-called Mineral Extraction Resource Tax (MRET) and the export duty (export tax). From the Russia's state perspective, the administrative simplicity of these levies represented a clear advantage. The potential downside was that these levies did not take the costs into account and thus could be detrimental for high-cost projects.

To account for oil price cyclicity and to tax windfall price revenues, the sliding scale formulae for both MRET and export tax were introduced, linked to the price of Urals crude in the international markets. When oil prices were high, state tax take would go up, up to about 90 per cent, and when oil prices were low, it would decline to shield producers and secure their minimum operating margins. So long as the legacy of the Soviet era investments could be run down, this was a second-best but reasonably rational trade off that the Russian planners had chosen, and indeed the tax system has worked reasonably well and survived the oil price crashes in 2009, 2015 and 2020.

Whereas mineral royalties are usually site specific, the philosophy of the Russian MRET when it was introduced in the early 2000s was of a "one-size-fits-all" tax. Over time the Russian tax administrators had to accept the reality: an oil production tax should reflect the differences in project economics that are a function of site-specific mineral rents. The flip side of relying on gross revenue taxation for Russian oil has been its negative impact on the economics of many Russian brownfields and also on new big-ticket projects. From a project development perspective, the tax burden was all front-end loaded, and the distribution of risks favoured the state over the producers.

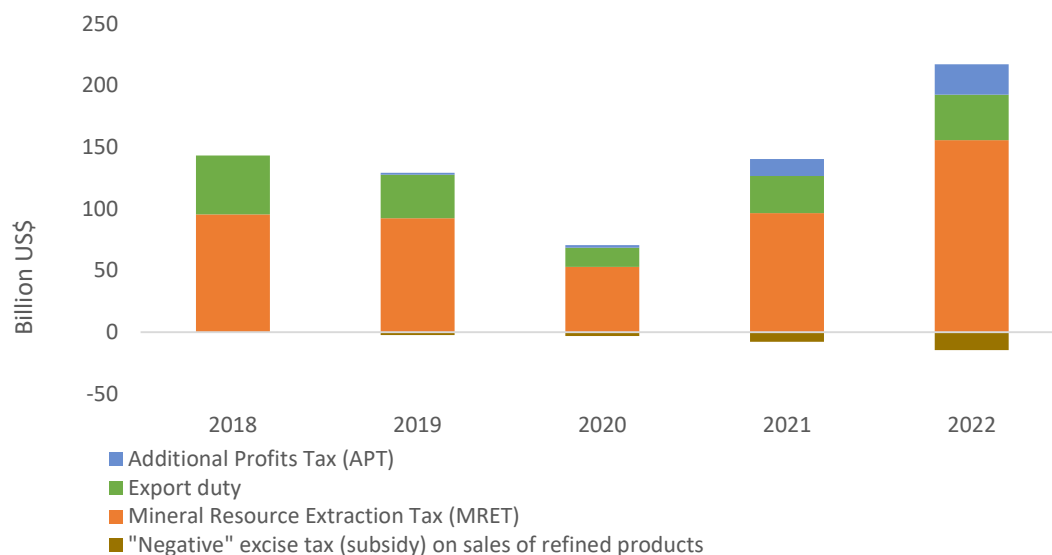
Russia's fiscal authorities had been reluctant to embrace the idea of a full-scale transition to oil taxes that would be sensitive to costs or profits (few early production sharing agreements (PSAs) are the exceptions that prove the general rule) for a fear of tax base manipulation by oil companies. At the same time, ad hoc state interventions to address the problems of non-performing oil fields were increasing and numerous exemptions and rate reductions to MRET had flourished in Russia during the 2010s. These were primarily addressing the situations of depleted fields, and also the new fields in the regions that were lacking developed infrastructure. As Russia's production base was deteriorating and more new fields were brought into production, the share of assets that had different MRET exemptions reached almost 60 per cent by 2020. Moreover, Russia's Ministry of Finance was concerned that by 2035 the output with reduced rates of MRET would reach 90 per cent of the total.

The so-called Additional Profits Tax (APT), a cash flow-based alternative to MRET for certain fields was introduced in Russia on January 1, 2019, initially with limited application by few pilot projects. In 2021 it was finally moved from the pilot stage to more general application. The income tax rate was set at 50 per cent after deducting production and transportation costs which should significantly reduce tax terms for mature fields, while taxes for new fields would be slightly improved as well²⁴. In 2021 the collected APT reached \$13.7 billion accounting for 11 per cent of all collected oil and gas federal taxes, and in 2022 - \$24.7 billion and 15 per cent, correspondingly (See Figure 14).

²⁴ <https://www.nalog.gov.ru/rn77/taxation/taxes/ndd>



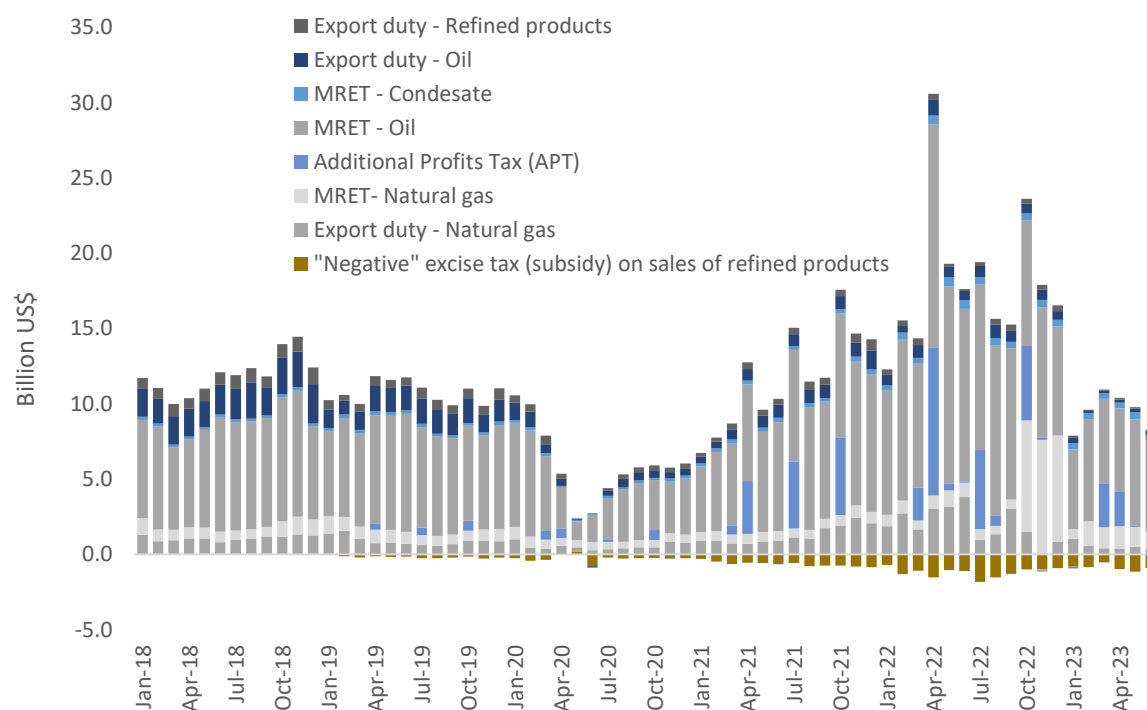
Figure 14: The changing composition of Russia's oil and gas tax take



Source: Author, data from Russia's Ministry of Finance

The monthly data on the overall level and composition of oil and gas revenues in Russia's federal budget through April 2023 is presented on Figure 15.

Figure 15: Russia's federal budget monthly revenues from the oil and gas sectors

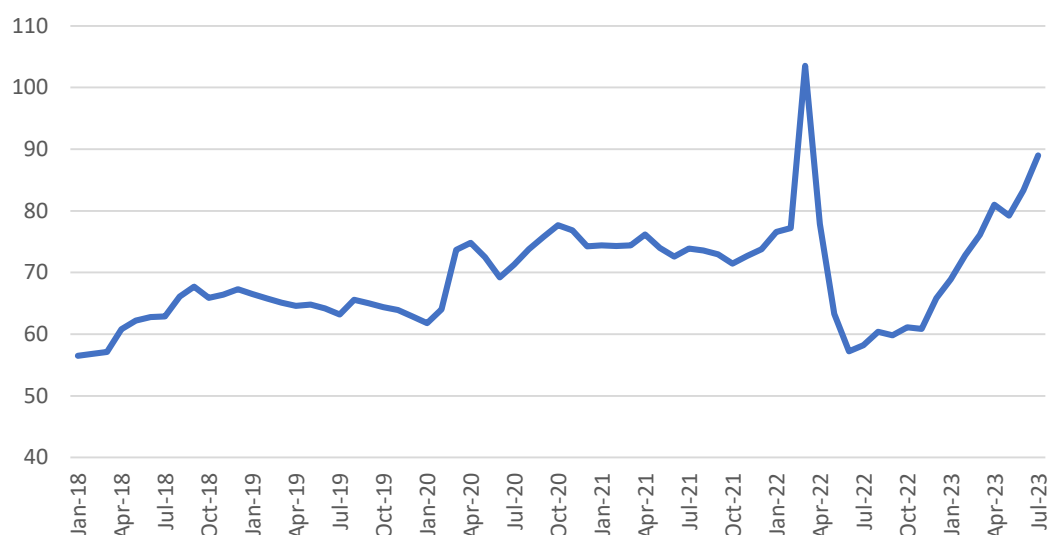


Source: Author, data from Russia's Ministry of Finance



Clearly, Russia's federal budget revenues from oil and gas declined drastically in 2023 year-on-year. In the first six months of 2023, they were 48 per cent lower than in the corresponding period of 2022. However, 2022 was an exceptional year, with extremely high prices for natural gas and robust prices for oil. Looking at the longer-term history demonstrates that Russia's federal budget revenues in 2023 have been comparable with those from 2018 and 2019 and, in fact, were 12 per cent higher in 6 months of 2023 than in the 6 months of 2020. To address the budgetary shortfall, Russian decision-makers allowed the ruble to depreciate in the past 12 months. Weakening the ruble and thus boosting the proceeds from exports has been Russia's default solution for addressing the emerging federal budget deficit (See Figure 16).

Figure 16: Russian ruble to US dollar exchange rate



Source: Author, data from Russia's Central Bank

Western sanctions and technological dependency of the Russian oil sector

The role of Western technologies for Russia's oil sector must be put in proper context. Western service companies have been instrumental in rationalizing field modelling and drilling practices in Russia. But they have always been working in close partnership with the Russian oil companies that have developed their own fit-for-purpose solutions and talent²⁵. Many Russian majors have been relying on in-house service teams, using the Russian affiliates of the Western service companies only for the most challenging tasks²⁶.

Western Siberian oil fields in the early 2000s is a case in point. The collapse of the Soviet Union and its command economy had a corollary in dwindling oil output at the Russian oil fields in the first half of the 1990s, followed by a stabilization at circa 60 per cent of the 1990 level in the second half of the decade. Lack of investment during this period resulted in high natural decline rates at the fields claiming their toll and not being offset by enhanced recovery measures or new field development. By the end of the 1990s Western Siberia seemed to be written off as a future growth prospect.

But instead, what happened in Western Siberia during the five years since 1999 was nothing short of a miracle, as national output increased from 6.2 million b/d in 1999 to 9.2 million b/d in 2004, up 50 per cent for the period. Thane Gustafson, the famous scholar and historian of the Soviet and Russian oil and gas industries, attributes "the miracle in the oil fields" to a set of innovative practices introduced by

²⁵ <https://www.rogtecmagazine.com/wp-content/uploads/2022/04/01-REnergyCO-Russian-OFS-in-the-Global-Context.pdf>

²⁶ <https://www.fortunebusinessinsights.com/russia-oilfield-services-market-106163>



two Russian oil companies, Yukos and Sibneft, in the early 2000s, which were consequently adopted and widely applied by the rest of the Russian oil industry. These included a creative merger of sophisticated Western reservoir modelling with low-cost Russian logging data, which allowed to correct the water flooding patterns and well spacing design for Western Siberian fields to greatly increase well productivity while keeping lifting costs at very low levels; much wider use of hydrofracturing (Yukos) and horizontal drilling (Sibneft) to raise well flow rates; and the “re-discovery” of prospective zones between principal reservoirs and horizons left unexplored as a result of distorted incentives during the Soviet time. The main result was the realization that the size of the remaining opportunity in West Siberia had been grossly underestimated because of the Soviet legacy²⁷.

The much publicized “exodus” of the Western service companies from Russia in 2022 and its assumed negative impact on Russia’s oil industry performance appears to be an exaggeration. The overall share of the so-called “big four” Western service companies in 2022 was about 20 per cent, with Shlumberger accounting for 8 per cent, Baker Hughes for 4 per cent, and Halliburton for 2 per cent²⁸. Most of the service work in Russia has been performed by the in-house service organizations within the Russian majors and Russian service companies. Halliburton and Baker Hughes, two of the “big four” Western service providers, decided to leave Russia in 2022, selling its business to Russia-based management teams made of their former employees²⁹. The largest player, Shlumberger (re-branded SLB and re-registered in Russia), stayed and expanded their business and revenues according to Reuters³⁰. A Russian subsidiary of Weatherford, Swiss oil service company, also continues to work on its existing contracts and has been planning to sign new ones, according to Kommersant³¹.

Presently, Russia’s service industry that has been learning from the best global practices for thirty years is capable of continuing to be successful in conventional oil developments and delivering oil production growth from these assets. A comprehensive review of the situation with Russian oil services performed by Bloomberg recently concluded that the sector has been largely immune to the Western sanctions³².

Conclusion

It is generally a consensus view that oil output in Western Siberia will decline, sooner or later, imposing pressure on Russia to prevent an overall decline in the national oil output. But the timing for the onset of the decline matters a great deal. If a higher and longer production plateau relative to the currently assumed numbers can be maintained, the total production profile for Russia needs to be re-evaluated.

Another easy assumption that many analysts seem to be making is that Western service companies have been indispensable for the Russian oil industry and that their exodus in 2022 is going to result in drastic drop of output. While some equipment and some exclusive software might not be available to the Russian service providers in the near term, there are substitutes, probably less efficient but nevertheless capable of delivering decent results.

It seems to be an exaggeration to think that the decline of legacy fields in Russia would force the Russian companies to undertake extremely expensive operations (e.g. in the Arctic offshore) to compensate the missing volumes. There are brownfield opportunities onshore with higher but generally moderate costs that could be used as part of the bridge strategy.

The Vostok Oil project is mistaken for a principally next level project with regards to its complexity and difficulty. In fact, the challenge for this project is that it requires the creation of substantial new

²⁷ See Gustafson T. *Wheel of Fortune: The Battle for Oil and Power in Russia*. Cambridge, MA 2012

²⁸ <https://yakov.partners/publications/russian-oilfield-service-industry>

²⁹ https://www.rigzone.com/news/halliburton_wraps_up_exit_from_russian_operation-09-sep-2022-170308-article/ and <https://www.vedomosti.ru/business/characters/2023/05/11/974472-nash-fokus-nahoditsya-na-lokalizatsii-tehnologii>

³⁰ <https://www.reuters.com/markets/commodities/slb-wins-russia-business-oilfield-rivals-exit-after-ukraine-invasion-2023-01-19/>

³¹ <https://www.kommersant.ru/doc/5999182>

³² <https://www.bloomberg.com/news/articles/2023-02-14/russia-did-most-oil-drilling-in-a-decade-even-as-sanctions-hit>



infrastructure in what is essentially a periphery region to Russia's current upstream activities. In terms of below ground risks, it is not a project that requires next generation technologies.

Most of negative outlooks for future Russia's oil production make a reservation that the output decline is likely to occur in the absence of accommodating fiscal policies by Russian regulators. There is always a conflict between the industry and tax collectors. At the same time, the Russian government has demonstrated time and again that while it hates to leave potential tax revenue on the table, it is at the same time ready to extend a helping hand to the sector at the time of trouble. The solutions (tax exemptions) have been ad hoc for most of the time; recently, with the expansion of APT regime to the wider collection of assets, they finally seem to be becoming more systemic.