The future of Russian oil exploration
Beyond 2025
Introduction

Recent deals with international oil and gas majors, involving joint offshore development in the Kara Sea and the Black Sea highlight the importance of exploring for new oil and gas resources to support the long-term development of Russia’s oil and gas sector. We conducted this study to determine how high on the agenda this issue is at the moment. While the need to expand the resource base is still not considered obvious by most industry professionals, who believe that Russian producers’ proven reserves are substantial, the Government is keen to develop new technologies – even those not yet tried and tested on a global scale – and to ensure that they are widely used across Russia. Many industry professionals agree that exploration activities are a crucial element of the oil and gas business, since timely exploration for oil and gas guarantees stable operations and helps in planning future production levels.

At the moment, industry analysis is primarily limited to the search for solutions to mid-term problems that do not go beyond 2020-25. Therefore, we intentionally focused our study on the longer term, to understand the nature and scope of changes needed to support the ongoing development of the oil and gas sector.

Owing to the significant potential of existing fields, there has not, until recently, been a pressing need for Russian oil and gas companies to conduct extensive exploration programs. The reserves of the largest domestic upstream companies, measured in accordance with international standards, have an average life of 20 years. By contrast, major international oil and gas companies have only 13 years of current production left (Figure 1). As is evident from a detailed analysis of the available information, until 2025, producing companies will focus on developing existing deposits and prospects. Beyond that, given the current level of exploration, they are likely to face the challenge of finding new reserves to replace those being produced.

The existing producing fields have mostly hard-to-recover reserves, with the water cut of produced fluids exceeding 80%. This dictates the need to expand exploration into frontier regions, including the Arctic shelf, the shelf of the Black Sea, the Sea of Okhotsk and others. There are still no potential resources available to offset declining production levels in mature producing areas: West Siberia for oil and the Nadym-Pur-Tazovsky region for gas.

Some problems may of course be resolved by the accelerated development of East Siberia and the Caspian shelf – which is likely in the future – and by applying advanced technologies to increase the output of existing oil and gas assets. However, our estimates show that, to maintain the current production levels after 2025, the oil sector alone would need to produce an additional 20 million tons in 2025 and 90 million tons in 2030 from new exploration.

Our report is focused on oil rather than gas exploration, as oil production is much more important for the domestic upstream sector than gas. Since gas producers will concentrate mostly on the natural gas reserves of the Yamal Peninsula and East Siberia, extensive exploration will not be that high on the agenda in the coming five to seven years.

However, the future of Russia’s oil sector, considering its current state and objectives, directly depends on speedy and successful exploration efforts, including those on the country’s continental shelf.
Production levels

According to Russia’s Energy Strategy,1 by 2030, domestic oil and condensate should reach the target production level of 530 million tons. We have interpreted the forecast of the Ministry of Energy in line with the General Plan for the development of the oil sector2 and companies’ longer-term projections. The conclusion is obvious: from 2025 – assuming that Russia intends to maintain its leading position among the oil-producing nations – the potential of existing and allocated onshore fields will not be sufficient to reach the target production level of 500 million tons that was announced by the Russian Government (Figure 2).

Until 2025, there is still a chance to increase output by adopting enhanced oil recovery methods and advanced technologies, but in 2030 – and even more so in 2035 – the anticipated gap can only be bridged by involving new, as yet unexplored fields in commercial production. This data suggests that, with a dwindling potential of undiscovered onshore resources, Russia will have to undertake systematic offshore exploration to maintain a production level of 500 million tons.

1 Russia’s Energy Strategy through 2030, approved by Resolution No. 1715-r of the RF Government, 13 November 2009.

International experience and local realities

Given the high level of risk associated with investments in oil and gas exploration, companies worldwide tend to rely on their own investment strategies and risk-management procedures, rather than on general rules, when investing in exploration projects. Exploration often takes up to 50% of the investment budget of small and medium-sized companies. Depending on the outcome, a company may either significantly boost its market capitalization or find itself on the brink of bankruptcy.

In international practice, there have been cases when companies spent up to 80% of their investment budget on exploration projects, the majority of which proved to be commercially viable and helped to increase market capitalization several times over within 10 years after the initial investment. In subsequent years, however, the investments of these companies were significantly less.

We focused our analysis on the experience of major international oil and gas industry players, since these are comparable to their Russian peers in terms of key operating parameters and have a similar interest in exploring new regions. In the middle of the last decade, exploration projects accounted for nearly 10% of the investment budget of major international oil and gas companies, but the proportion of such investments is now growing for a number of reasons (Figure 3).

First is the lack of promising development and production projects that meet the predetermined investment criteria. Due to the high level of competition, an asset’s price is not always commensurate to its added value.

A second reason may be unsuccessful experience in acquiring overpriced production assets, although some acquisitions were ultimately a success story for major players who understood the current state of the acquired assets and knew how to capitalize on their potential.

The third reason is “resource nationalism,” a trend prevailing in resource-rich countries that are reluctant to share hydrocarbon reserves with international players. The host governments tend to limit foreign involvement to exploration activities and the development of complex geological structures requiring specific technical expertise. For all other activities, the go-ahead is given mostly to national companies.

When it comes to Russian companies, exploration activities still account for a small share of their spending. This is indicative of a low level of interest in such investments among domestic players.

Among key considerations for investing in an exploration project is the project’s success rate, which is calculated as capitalized drilling costs (total investments in exploration drilling, less the cost of dry holes) divided by total investments in exploration drilling. The success rates of exploration drilling in Russia normally range from 50% to 90%, and this should encourage increased investment in exploration projects by Russian companies (Figure 4).

Owing to the extensive exploration experience of local players and their knowledge of the exploration potential of mature areas, the success rates of exploration projects in Russia are above the world average (40%-70%). However, with the expansion of exploration activities into less well-known regions, Russian companies are likely to face a sharp decline in success rates (down to 20%-30%), even if significant investments are made in preliminary studies (seismic surveys, electrical prospecting, etc.)

Figure 3. Exploration costs/total investments (preceding three-year average, %)

Sources: IHS Herold, company reports, Ernst & Young analysis
The fairly modest results of exploration activities in East Siberia and on the Caspian shelf clearly indicate the level of risk that domestic companies may face in the future.

Another dominant factor is the weight of prospecting costs (to be expensed as incurred in accordance with international accounting standards) in the total exploration budget. In Russia, such costs account for a much larger share of total exploration expenses (which include drilling as well as prospecting costs) than in the rest of the world (Figure 5). This is largely because Russian companies focus most of their exploration efforts onshore. With a maximum well cost of USD15 million per well (except 6km-7km wells drilled in reservoirs with a high H2S content), total drilling costs are comparable to seismic costs. By contrast, the cost to drill an offshore well may be as high as

Figure 4. Exploration drilling success rate
(preceding three-year average, %)

Sources: IHS Herold, company reports, Ernst & Young analysis
USD60 million to USD120 million, thus affecting the cost ratio for offshore exploration: seismic acquisition costs will account for a significantly smaller proportion of the sum of these costs and drilling costs. Consequently, this parameter is expected to decline to the world average against a background of overall growth in the exploration budget.

We compared local and major international oil and gas players in terms of total exploration budget, projected success rates of new exploration projects and the proportion of seismic costs, and we concluded that local players need to almost double their investments in exploration, with drilling costs needing most of the increase. By contrast, the share of seismic and other prospecting costs in the total exploration budget will decrease, as offshore drilling requires a significantly larger investment. Hence, the success rates of exploration activities are set to decline as well.

Figure 5. Prospecting costs/total investments (preceding three-year average, %)

Sources: IHS Herold, company reports, Ernst & Young analysis
Experience suggests that investments in exploration are far too little for immediate results. There is also a need for significant investments in infrastructure and time for appraisal drilling to select the best development scheme that would guarantee maximum added value. It is crucial to understand how much time will elapse between initial exploration and the first oil production.

Industry players have obviously become much more disciplined. While in the 1970s and 1980s, the time lag between discovery and production could be two to three decades, this has now been reduced to eight to nine years (Figure 6). Having managed to reduce the waiting time before the start of commercial production to a record-breaking five to seven years, Russian companies have been ahead of their international peers.

However, local companies are mostly focused on onshore production, and offshore projects may take much longer to develop. Note that statistics give only an average picture, and it would be too optimistic to believe that offshore projects in Russia will take less than nine years to develop. Offshore projects that are currently being developed or planned cannot be taken out of the equation either: preparing a project for commercial production has proved to take longer than expected – due less to technological problems than to economic, tax and political factors.

Considering the above circumstances and a number of other factors, it would be logical to assume that commercial production on the Russian shelf will start only after 2024.

**Figure 6. Time between discovery and first oil**

Sources: IHS Herold; Ernst & Young analysis
Exploring new frontiers

Russia is washed by 13 inland and open seas, with the area of the shelf and continental slope totaling 6.2 million square kilometers. Twenty major oil and gas provinces and basins have been discovered on the Russian shelf, 10 of which have proved oil and gas reserves (the largest Arctic sedimentary basins are the East Barents, South Kara, Laptev, East Siberian and Chukchi basins).

The initial recoverable resources of the Russian shelf are reported to reach 100 billion tons of oil equivalent, including 13 billion tons of oil and 87 trillion cubic meters of gas, accounting for 22%-27% of the World Ocean’s total offshore hydrocarbon resources. It is noteworthy that around 75% of Russia’s total offshore resources are located in Arctic regions with severe weather conditions and poorly developed infrastructure. In 2008, the U.S. Geological Survey (USGS) completed an assessment of undiscovered conventional oil and gas resources in all areas north of the Arctic Circle. According to this study, these are predominantly natural gas resources (over 75%).

Another study, by Wood Mackenzie and Fugro-Robertson, dedicated to the assessment of the Arctic’s hydrocarbon potential (Future of the Arctic, 2009) found that gas resources predominate over oil in much of the Arctic basin. Gas accounts for 85% of the Arctic's discovered resources and 74% of its exploration potential. Consequently, estimates regarding future oil-production levels may be based on the assumption that Russia’s Arctic regions contain recoverable oil reserves of 2 billion-4 billion tons.

Map showing prospective oil areas north of the Arctic Circle

Source: USGS

Russia’s major companies seek to form joint ventures to explore and develop the country’s unevenly explored Arctic shelf. The majority of localized resources (around 94% of the total) have been found in the western part, while the hydrocarbon potential of the eastern part, along the slope and in the deep Arctic basin, is mostly regarded as inferred or contingent.

The following fields were discovered as a result of exploration drilling and prepared for development: Shtokman and Murmanskoye (the Barents Sea); Prirazlomnoye, Medynskoye-more and Dolginskoye (the Pechora Sea); Kamennomysskoye and North Kamennomysskoye (the Kara Sea, Ob-Tazov Bay).4

The petroleum potential of the Black Sea and Azov Sea should not be underestimated either. Agreements for joint offshore development signed in 2010 clearly demonstrate that both domestic and international companies are interested in cooperating in this area. According to estimates by RosNIPitermneft, the Azov Sea’s hydrocarbon resources amount to 200 million tons of oil equivalent, while the undiscovered resources of the Tuapse Trough in the Russian Black Sea basin, according to various estimates, may range from 3 billion to 11.5 billion tons of oil equivalent.5

5 http://www.yuga.ru/articles/economy/3780.html
When planning for the future, companies must clearly understand whether their own resources and abilities are sufficient to meet the sector’s long-term development goals. To that end, it is crucial to understand what parameters should be used as a baseline.

In projecting future oil output from new projects, we proceeded from the following assumptions:

- Operations will be conducted by Gazprom and Rosneft — companies that meet the criteria for offshore operations stipulated in the Law on Subsurface Resources (more than 50% state ownership and over five years of offshore experience).
- Exploration investments in such projects have historically been around USD500 million per year.
- The time lag between oil discovery and initial production is nine years.
- A minimum of two exploration wells should be drilled to discover a new field.
- It is assumed that giant fields will be found first.

In this scenario, the first oil flows can be expected only after 2026, with projected production in 2035 totaling around 55 million tons (Figure 7). This is far from enough to offset a steep decline in production from the existing fields.

Consequently, Russian state-owned companies will hardly be able to meet the target production level of 500 million tons beyond 2030 if they rely only on their own resources.

**Figure 7. Oil output from new exploration (projections, million tons)**

Source: Ernst & Young analysis

---


7 IHS Herold, Ernst & Young analysis.
Are foreign investments necessary?

The question now arises: do Russian companies have sufficient resources for extensive offshore exploration? In order to maintain the production level at 500 million tons in 2035, the output of new exploration projects must be at least 160 million tons a year. We estimate that investments in exploration should effectively triple to achieve this (see Figure 8). But as we mentioned above, exploration is a high-risk investment, affording only limited opportunities to use the project financing model. This important argument in favor of foreign investments also means that national enterprises should generally retain a 30%-40% share in each project (depending on the company's actual ability to finance the project), while giving the rest to an international consortium. Foreign investments should be roughly USD1 billion to USD1.5 billion a year.

It would seem reasonable to bring in two or three partners, since even if exploration is successful, subsequent development will require diverting significant financial resources. One can also expect longer periods from the start of exploration to first production. As a result, exploration will have to begin at the same time in as many projects as possible, meaning that Russian companies will have a smaller share. This will undoubtedly come into conflict with the principle that national companies must retain a controlling interest (over 50%).

Importantly, there is great potential for an approach where initial costs are carried by a foreign investor and subsequently compensated for from the positive cash flow. Russia's largest companies follow this strategy in their deals with international oil and gas majors.

This is a very common approach worldwide, as it helps national oil companies (NOCs) with large portfolios of new projects to reduce risk – that is, to obtain a higher-return project, provided that exploration is successful, because the NOC will begin to finance negative cash flows only after four to six years. (With the cost of capital at 10%, the net present value of the project increases by 30%-35%.) However, there is a risk that returns may be insufficient if an

---

**Figure 8. Oil output from new exploration**

(projections, million tons)

Source: Ernst & Young analysis
extremely attractive oilfield is discovered, dampening the project’s ultimate economic performance for the NOC due to its smaller share. Furthermore, in such a scenario, the NOC will receive no front-end participation fee from the foreign partner, whose risks increase many-fold and require compensation.

However, this approach is subject to a number of conditions. Currently, it is common practice for the size of the premium per unit of discovered reserves payable upon the final investment decision to be stipulated in advance. But it is very difficult to set such a premium, as reserve estimates may significantly differ even after exploration and appraisal drilling. In order to avoid disagreements, independent advisors should be engaged who can propose alternatives for effective deal structuring. In the event of a negative (or positive) outcome, such solutions must ensure that the company has no reason for returning to the table to revise the initial terms of cooperation. Such an approach may be asking too much, because it is almost impossible to provide for every scenario, but it is also obvious that a lack of clear rules of the game retards development.

Investments in exploration must triple so that the level of oil production can be maintained at 500 million tons after 2030. Based on our estimate of the aggregate exploration budget of Russian oil producers, we conclude that the sector cannot do this without foreign investments. Exploration-phase financing deals have enormous potential, although they may limit profitability in the longer term.
Other factors

In 1995, James MacKay8 derived a formula for calculating the optimal interest in an exploration project. The formula is based both on research to assess numerous companies’ risk appetites and on utility theory. The strength of the formula lies in fairly direct calculations, making it possible to quickly and very reliably define the right size of interest in any project.

The formula’s results have been repeatedly proven and are highly regarded by professionals, who recommend this approach for further use. Based on the formula, even for Russian companies willing to accept risk, optimal shares in exploration projects vary in the range of 20%-30%, which is even more at variance with the control retention principle. Of course, shifting the cost burden to the investor can completely change a company’s risk profile and solve the control issue, which might also be discussed in terms of structuring the shareholder agreement between project participants. But it appears to us that full-fledged participation in exploration projects involving the acceptance of risk can help significantly increase a company’s value.

The staffing issue is equally important for offshore exploration. Offshore projects typically require experience that differs from what is currently the norm in Russian companies. We believe the following matters are of the greatest concern: geology (lack of comparative information on similar regional projects), project management (numerous foreign contractors, design work) and knowledge of foreign languages. A reliable management team is essential to complex offshore operations in a harsh natural environment far from infrastructure. A track record of similar high-cost projects is a key condition for success. All of the above factors, coupled with the drive for new technology, show that Russian oil producers have an interest in strategic alliances with global industry leaders.

Executives in many companies believe that competent contractors alone can help resolve many issues. The example of cooperation between NOCs and international players who have decided or plan to create research and technology centers to pursue their primary objectives of work safety and effective exploration casts the problem in a somewhat different light. In an increasingly competitive industry where all the NOCs have stated international ambitions, expecting the IOCs to share the information that forms the basis of their competitive advantage is unlikely.

Russian companies often start work independently and gain experience through trial and error at the expense of soaring costs. Foreign organizations generally ignore such local experience as well as cheaper solutions. This often prevents them from achieving the required level of efficiency. So it is a top priority for such projects to pool foreign and Russian experience and knowledge in one team with common goals. Russia needs to learn not only to adopt technologies in cooperation with international partners, but also to build a foundation for future independent projects.

The existing tax regime in Russia’s oil sector and the de facto disuse of Production Sharing Agreement (PSA) lead us to conclude that the investment appeal of offshore projects is close to zero, making it difficult to bring in foreign investors, even though potential reserves are enormous. Current proposals to change the tax burden of oil companies do not do enough to make offshore projects more attractive, as their primary focus is new onshore projects. In this context, one cannot hope for fast offshore oil development. Another argument is that offshore projects typically require a stable tax regime, which cannot be guaranteed in current conditions.

We believe that the criticism of existing PSAs is well grounded and understandable, but this does not mean that future agreements can’t include provisions to help cut unreasonable spending and make license holders more committed to rapid development. Another reasonable change would be to limit fees so that the Government could earn additional income when hydrocarbon prices go up.

Russian players create another barrier by not giving foreign investors access to exploration and production licenses. The Shtokman project clearly demonstrates that service contracts are currently the preferred format of cooperation. But Russian civil law permits customers to terminate contracts at any time at their sole discretion. As a result, Western companies often require additional guarantees. This creates difficulties, as it is not common for Russian companies to reserve resources for a long time.

Oil producers obviously hope to discover major strategic reserves when they explore new areas. Under Russian law, where a license is limited to exploration, the investor is compensated for costs with a small premium and may subsequently be offered entirely new terms of participation in development. Not all risks associated with exploration can be offset in such arrangements, making them unacceptable for companies that explore for and produce oil.

A number of regulatory changes are thus required to successfully bring in foreign companies (only the start of commercial production can be regarded as success). Current legislation makes exploration less appealing to investors and may prevent them from participating in projects in which they are expected to finance fully the highest-risk phases of new oilfield development.
Russia is facing a pressing need for more aggressive and extensive exploration, including on the continental shelf. Our estimates suggest that, to maintain the current level of oil production after 2030, exploration costs should be more than three times their current level. However, there are a number of legislative, political and tax constraints impeding the influx of foreign capital.

We believe that commercial oil production, along with major capital investments, should be viewed as the primary determinant of success.

Our estimates and supporting arguments indicate that domestic players, acting on their own, will hardly manage to maintain steady oil production in the next thirty years. The most compelling argument in support of this view is the need to invest billions of dollars in projects with a high level of risk. It is only by investing in a large number of such high-risk projects that a company can maintain a neutral risk profile.

Such an approach may, however, significantly raise the limits of exploration costs and disturb the existing balance of development, exploration and acquisition costs.

One possibility, though fraught with difficulties, would be to find foreign co-investors who are willing to bear the costs throughout the exploration phase. Yet such cooperation could considerably limit the future value growth of domestic companies and will hardly be in the national interest. Besides, foreign partners tend to take full control over a project when they bear all project costs. This means that the Russian party would not benefit from knowledge and technology transfer, since all fundamental work would be done abroad.

Executives in local oil-producing companies realize the importance of this problem. The insights gained from offshore projects in the Black Sea, recently announced alliances between NOCs and international oil and gas majors, and the experience acquired in the Yamal LNG and Shtokman projects are crucial for both local businesses and the state in determining their long-term policy, but we believe that policy should focus on R&D centers established as part of such projects. These centers will promote the development of highly qualified staff and the sharing of leading practices that will improve the use of present-day technologies and ensure that Russian companies will be able to handle complex projects on their own in the future.

Considering the specifics of the discovered oilfields, it can hardly be expected that all the development efforts will be successful. Nevertheless, tapping into foreign resources will not only help local companies avoid business shocks from new projects, but will allow them to focus on even more ambitious goals for the future.

Terms used in this study:

NPV – net present value
PSA – production sharing agreement
How can Ernst & Young help?

Our oil and gas professionals are organized within four service lines: assurance, tax, transactions, and advisory. They bring both broad and deep oil and gas industry experience to the table, and extensive experience with the major industry players. Our experience and service offerings particularly relevant to the oil and gas sector and industry include:

- Statutory accounting and compliance services, including external audit and other assurance-related services such as HS&E, climate change and sustainability reporting services; accounting advisory services; and fraud investigation and dispute services
- Tax planning, advisory and compliance services, including in-bound tax compliance services; transaction tax services; and tax-efficient supply chain advisory services
- Transaction advisory services, including partnership planning and optimization; portfolio planning and evaluation services; strategic financing assessments; transaction due diligence; asset valuation and business modeling; and transaction integration services
- Performance improvement and risk management advisory services, including internal audit services and internal controls design and evaluation; planning, budgeting and forecasting optimization; business process innovation, transformation and governance; project life cycle management services and Project Management Office (PMO) implementation and operation; as well as strategic risk assessment, management and remediation

For more information about our service lines and our principal oil and gas-focused service offerings, please contact the below-referenced individuals, or your local Ernst & Young office.
Contacts

Dale Nijoka
Global Oil & Gas Leader
Tel.: +1 713 750 1551
dale.nijoka@ey.com

Alexey Loza
CIS Oil & Gas Leader
Tel.: +7 (495) 641 2945
alexey.loza@ru.ey.com

Victor Borodin
CIS Oil & Gas Tax Leader
Tel.: +7 (495) 755 9760
victor.borodin@ru.ey.com

Alexander Barinov
CIS Oil & Gas Advisory Leader
Tel.: +7 (495) 705 9731
alexander.barinov@ru.ey.com

Alexey Kondrashov
Global Oil & Gas Tax Leader
Tel.: +7 (495) 662-9394
alexey.kondrashov@ru.ey.com

Hakob Sarkissian
CIS Transactions Leader
Tel.: +7 (495) 705 9722
hakob.sarkissian@ru.ey.com

Andrey Kobzev
Director, Moscow Oil & Gas Center
Tel.: +7 (495) 660 4867
andrey.kobzev@ru.ey.com
Ernst & Young

Assurance | Tax | Transactions | Advisory

About Ernst & Young
Ernst & Young is a global leader in assurance, tax, transaction and advisory services. Worldwide, our 141,000 people are united by our shared values and an unwavering commitment to quality. We make a difference by helping our people, our clients and our wider communities achieve their potential.

Ernst & Young refers to the global organization of member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit www.ey.com

How Ernst & Young's Global Oil & Gas Center can help your business
The oil and gas industry is constantly changing. Increasingly uncertain energy policies, geopolitical complexities, cost management and climate change all present significant challenges. Ernst & Young’s Global Oil & Gas Center supports a global practice of over 8,000 oil and gas professionals with technical experience in providing assurance, tax, transaction and advisory services across the upstream, midstream, downstream and oilfield service sub-sectors. The Center works to anticipate market trends, execute the mobility of our global resources and articulate points of view on relevant key industry issues. With our deep industry focus, we can help your organization drive down costs and compete more effectively to achieve its potential.

© 2011 EYGM Limited. All Rights Reserved.

EYG no : DW0097

This publication contains information in summary form and is therefore intended for general guidance only. It is not intended to be a substitute for detailed research or the exercise of professional judgment. Neither EYGM Limited nor any other member of the global Ernst & Young organization can accept any responsibility for loss occasioned to any person acting or refraining from action as a result of any material in this publication. On any specific matter, reference should be made to the appropriate advisor.

www.ey.com/oilandgas