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On top-priority measures to improve the investment attractiveness of oil prospecting in energy transition

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Abstract. The country needs new, profitable "here and now" reserves that can slow the rate of oil production decline. In this regard, the subsoil manager urgently needs to take fundamental measures to raise investment in oil prospecting and to speed up the process. All hopes rest upon independent investors who have potential to accelerate and increase prospecting activity. In order to stimulate oil prospecting, the subsoil manager needs to take several steps towards independent investors.

Keywords: oil prospecting, exploration, independent investors, energy transition, profitable reserves, investments, oil production, classification of oil and combustible gas reserves and resources

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Strengthening decarbonization measures in many countries and the associated active development of alternative types of energy sources may lead to the displacement and complete replacement of the share of oil from the total energy balance of many countries by 2040. In this regard, the timing of the implementation of domestic oil exploration projects, possibly even before the end of the exploration process, will fall into the zone of economic inaccessibility. Considering that the duration of prospecting and exploration for oil and gas fields takes 10 years or more, in the next twenty years, geological exploration, which is at the beginning of the entire process of preparation for oil production, will be the most vulnerable from the point of view of investment depreciation.

In this regard, the timing of the implementation of domestic ambitious and costly oil exploration projects, for the execution of which trillions of budget rubles and endless tax exemptions are requested, may even before the end of the exploration process fall into the zone of economic inaccessibility.

It should be admitted that the incentive measures proposed by the budget manager to increase the volume of exploration and improve the quality of discovered oil reserves have not yielded the desired result. In addition, there remained on paper the unrealized volumes of investments necessary for the development of the resource base and, accordingly, the amount of tax revenues to the budget. Information on the example of the Khanty-Mansi Autonomous Area–Yugra speaks very eloquently about this (Table 1).

Meanwhile, the situation in domestic oil production testifies to the inexorable approach of the long-term trend of production decline. There are many predictions in this regard, but all the authors of these calculations are unanimous that without new fields the rate of production decline will be even more significant. As an illustration, Figure 1 shows one of the forecasts of the Ministry of Energy.

Today, the Bazhenov project, the Arctic shelf and the Arctic coast of the Kara Sea have been announced as the official mainstreams, where the state is waiting for an increase in fresh oil reserves that can, as is expected, anticipate the downward trend in production. For these areas, multibillion-dollar budget subsidies and tax preferences have already been issued and

Search area Khanty-Mansi Autonomous Area	Expected investment required to develop the resources, billion rubles	Expected tax revenues to the budget as a result of resource development, billion rubles
Koltogor	7.09	115.6
Kazym	37.46	656.89
Octyabr	7.29	142.52
Alexandrov	3.87	72.61
Yugansk	6.86	141.26
Total	62.57	1128.88

Tab. 1. Expectations of investments in oil exploration and tax revenues to the budget (based on the materials of the Shpilman Research and Analytical Centre for the rational use of subsoil, 2018)

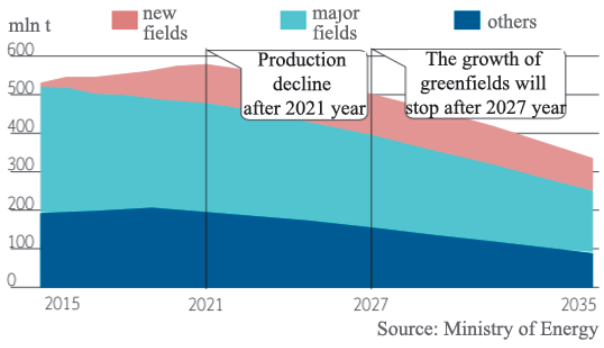

Fig. 1. Forecast of production levels in the Russian Federation (based on the materials of the Ministry of Energy, 2015)

promised, centers of competence and national projects have been created. Meanwhile, on the Bazhenov project, field experiments are still ongoing, and the announced forecasts are only awaiting confirmation. Thus, the involvement of the Bazhenov formation in active development remains far beyond the horizon of long-term planning, and the contribution to the nearest production will be negligible.

The Arctic shelf with all its environmental and technological limitations, if it ever produces industrial oil, in the foreseeable future will be able to produce no more than 10–12 million tons of production, which is clearly not enough. Discovered offshore oil fields – Pobeda (Kara Sea, 2014) and Tsentralno-Olginskoe (Laptev Sea, 2017), in all likelihood, will never be put into development.

Raised to the rank of a state idea, the annual loading of the Northern Sea Route up to 80 million tons of cargo turnover entirely depends on the size of transportation of produced oil from the Payakha cluster of fields along the coast of the Kara Sea and, possibly, from other Arctic shelf projects. Despite the fact that 1.2 billion recoverable reserves were put on the state balance sheet in 2019, they still need to be turned into proven ones. And this will take a decade and huge physical volumes of deep drilling. And what will be the coefficient of confirmation of reserves, it remains to be seen.

In light of the above, it is obvious that the country needs fresh, profitable reserves "here and now" that can compensate or at least somehow slow down the rate of decline in oil production. In this regard, the subsoil manager urgently needs to take drastic measures aimed at attracting investments in oil exploration and accelerating this process.

It should be said that the participation of the state in large-scale financing of oil exploration works in the near and medium term seems impossible and inexpedient, for different reasons. Since 2003, when the tax on the reproduction of the mineral resource base was abolished, the state has been present in geological exploration only symbolically, limiting itself to regional work, and even then, in an inadequate amount. One should not expect an increase in the volume of high-risk oil exploration works on the part of oil companies as well as the prospecting potential of their license areas is practically exhausted. As the experience of past years shows, for the most part, the size of discoveries, their reserves, are becoming more and more marginal. As a result, many fields are already unprofitable upon discovery, and their commissioning is delayed for many decades.

So, from the materials of the National Reserves Committee of the Federal Subsoil Management Agency (GKZ) it follows that in the period from 2000 to 2016, 850 oil and gas fields were discovered in the Russian Federation, of which 18% of discovered fields were put into development within 5 years; 7% – within 10 years and 1% – within 15 years. 54% of discovered fields have not been put into development, and there is no data on the time of putting into development on the remaining 20% of discovered fields in the state balance sheet (Fig. 2).

Statistics show that oil companies provide the overwhelming volume of growth in hydrocarbon reserves at their developed fields.

Thus, in fact, all hopes for the restoration of the mineral resource base are associated only with the third group of players in the subsoil use market – independent investors. However, life shows – even the most unshakable optimists leave this market segment. Why is this happening?

Firstly, the current financing of prospecting works within the framework of a license for geological exploration of subsoil began to occur, as a rule, at the expense of the capital of the main owners, since the possibility of attracting investments has almost completely disappeared in the country for various reasons.

Regular meetings with the subsoil manager about the need to develop junior exploration companies, attracting market mechanisms such as stock exchanges and financial institutions, creating information and trading platforms, etc. so far they are just talk and plans on paper.

Secondly, by issuing a certificate of the discovery of a deposit under a license for geological exploration of subsoil, the state recognizes that surplus value has been created for a specific subsoil site at the expense of an independent investor. However, this does not affect the

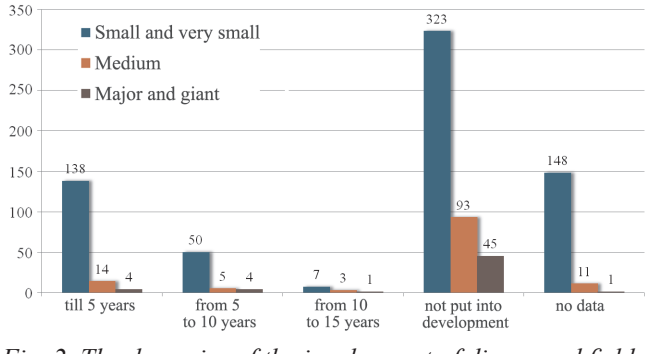

Fig. 2. The dynamics of the involvement of discovered fields in development from 2000 to 2016 (based on materials of the GKZ, 2017)

capitalization of the investor's company in any way, since any commercial activity is prohibited under the five-year license for geological exploration. As a result, during the entire period of oil exploration, the cost of oil exploration companies has "garbage" values.

Third, the "final blow" to motivate independent investors to finance oil exploration is the need to pay a one-time payment upon the discovery of a field under a geological exploration license. If the new deposit turns out to be large enough in terms of reserves, the amount of the payment will be commensurate and sometimes even exceed the cost of prospecting. This payment is required if the company wants to retain the subsoil use right for a discovered field. But already in a different status – an oil producing organization. If the one-time payment is not paid, then this is qualified as a violation of the essential license conditions, and, accordingly, the license will be revoked ahead of schedule.

And finally, fourthly, it should be admitted that at present there is an absolute devaluation of estimates of the resource potential. So, in particular, the state balance of the Russian Federation (as of 01.01.2018) contains 13 billion tons of promising resources (D0) and 45 billion tons of forecast resources (D1 + D2). How many are profitable? Does it make sense to explore them by drilling at any cost? There are no answers.

In this regard, the statistics for the Khanty-Mansi Autonomous Area–Yugra (KhMAO–Yugra) is indicative. Out of 1727 hydrocarbon traps 94% have resources of less than 3 million tons, half of which are located in deposits of the Lower and Middle Jurassic, very complex in their geological structure. So it is clear from the outset that the validity of these estimates will be extremely low. In fact, practically the entire fund of local traps in KhMAO–Yugra is below the threshold of profitability under the current tax environment. This confusion in resource estimates is used by unscrupulous players who have penetrated the geological exploration market. As a result, almost half of the composition of independent subsoil users is updated every five years (Table 2). New companies come to the prospecting sites that have neither licenses nor experience in the territory of KhMAO–Yugra.

Nevertheless, despite the above problems, the author's many years of experience in practical geological exploration allows us to assert that it is venture capital companies that do not plan to become oil producing companies that have the greatest potential for accelerating and increasing exploration activity. And they limit their business only to oil exploration.

Year	2009	2010	2011	2012	2013	2014	2015	Total
Issued	13	14	8	20	25	7	28	115
Withdrawn	12	5	5	14	10	3	4	53

Tab. 2. Turnover of prospecting licenses of the NP type in the KhMAO–Yugra (based on the materials of the Shpilman Research and Analytical Centre for the rational use of subsoil, 2016)

And in order to attract independent entrepreneurs into subsoil use and stimulate prospecting work in the unallocated subsoil fund, it is necessary to create conditions for increasing the investment attractiveness of this business.

To do this, the subsoil manager needs to take four steps towards independent investors.

Step One: Abolish the need to pay a one-time payment for the discovery within the framework of a geological exploration license for those subsoil users who, in the event of a field discovery, refuse to renew their exploration and production license in advance. In this case, the exclusive right to sell open stocks should be left to the state.

For this, it is necessary to introduce into everyday life the concept of "Independent Geological Exploration Company" (IGEC). This status should be assigned to a legal entity that has received a license for geological exploration of subsoil, in accordance with the Order of the Ministry of Natural Resources of Russia dated 03.15.2005 N 61 (as amended on 01.27.2014).

The distribution of funds received from the sale of the field at the auction will be carried out between the IGEC and the state according to a pre-grounded formula.

In the proposed scenario, the state, acting as a guarantor and an intermediary, gets the opportunity to receive income from the auction, comparable to the size of one-time payments. In turn, independent companies, in the event of the discovery and sale of profitable reserves, will not only compensate for the costs incurred, but also receive substantial profits. There is also a basis for the capitalization of independent exploration companies already in the process of a five-year cycle of oil exploration.

In addition, there are a number of additional positive indirect effects. So, in particular, due to the expected size of discovered reserves and their profitability, there is a basis for increasing the capitalization of independent exploration companies already in the process of a five-year exploration cycle.

An increase in the number of venture capital companies represented by IGEC will lead to an increase in orders for seismic exploration and deep drilling, since their owners should objectively be interested in improving the production culture and scientific and technical support of exploration.

Step Two: Acknowledgment of the fact of a field discovery onshore without running the production string.

For decades, all domestic classifications of reserves (including the current one: Classification of oil ..., 2013) consider the reserves to be proven and recognize the fact of the discovery of a field only after the industrial

oil production rate is obtained during the testing of the productive formation in the production casing. And it was right. However, the development of technologies of reservoir testing with the tools deployed on wireline cable made it possible to assess the industrial potential of the object with the same degree of reliability, as well as in the column. This speeds up and reduces the cost of the subsoil exploration process. It is no coincidence that the reserves of the latest oil discoveries on the shelf of the Kara, Laptev, Sakhalin seas were taken based on the results of testing the layers on the cable. The meaning of the innovation is clear – in conditions of short navigation, difficult ice conditions, there is no longer time to run the string in a prospecting well loaded with a large program of research work (coring, logging).

According to the deep conviction of the author of this publication, there is an urgent need to extend this opportunity to prospecting wells drilled on land. In conditions of great remoteness, high geological load, limited time of operation of winter roads for mobilization-demobilization of a drilling rig, such a solution will significantly reduce the cost of prospecting drilling.

To implement this proposal, it is only necessary to change and supplement some points of the regulatory documents, namely:

In the Classification of reserves (Classification of oil ..., 2013):

Remove from clause 15 the phrase: "*... in the waters of the seas, including on the continental shelves of the seas of the Russian Federation in the territorial waters, in the internal sea waters, as well as in the Caspian and Azov seas ...*",

and read clause 15: "*For discovered fields, reserves of category C1 include the reservoir / part of the reservoir, penetrated by the first exploration well, in which high-quality results of hydrodynamic logging (HDL) were obtained, which allows assessing the nature of the reservoir saturation*".

In the guidelines for the application of the new Classification (Classification of oil ..., 2013):

Remove from clause 36 h) the phrase: "*... in the seas, including the continental shelf of the Russian Federation, in the territorial waters, in the internal sea waters, as well as in the Caspian and Azov seas ...*"

and read: "*For discovered fields in the first prospecting wells, it is allowed to study by formation testers on a cable*".

Remove from clause 48 the phrase: "*... (the exceptions are deposits in the seas, including on the continental shelf of the Russian Federation, in territorial waters, in internal sea waters, as well as in the Caspian and Azov seas) ...*".

Step Three: Remove the ban on drilling below the allotment to explore deep horizons.

This prohibition dramatically slows down the process of prospecting for oil in deep horizons at long-term developed fields. This now requires a separate search license. It is difficult to imagine, given the practice of subsoil use, that some outside investor would want to search for oil in a field being developed by another company.

However, now the process of obtaining a separate exploration license and the associated creation and approval of individual design solutions significantly slows down and interferes with the study of subsoil.

Step four: develop methodological solutions for the economic efficiency of discovered and explored reserves.

At the moment, the state balance of reserves in B2 + C2 categories is 12.1 billion tons of recoverable (excluding Payakha and Zapadno-Irkinskoye fields). Will they be able to become suppliers of fresh stocks in the short term? Unfortunately, today there are no methodological solutions for the economic assessment of discovered and explored reserves recognized by the subsoil manager, which ultimately makes it impossible to understand the further economically justified development of such reserves.

In the proposals described above, there are no requests for additional budgetary funding or special benefits. All that is needed is the actions of the subsoil manager to create conditions for the introduction of real market mechanisms.

The implementation of the proposed steps will contribute to solving the main tasks – accelerating prospecting work and increasing the growth of oil reserves due to the discovery of new fields. The increase in the number of IGEC will lead to an increase in orders for seismic exploration and deep drilling. The owners of the IGEC will be extremely interested in improving the production culture and scientific and technical support of the work, since the market value of the IGEC in the course of the five-year exploration period may already become significant, which will help to attract investments. This, in turn, will increase the motivation for conducting oil exploration works and will contribute to the formation of a new business environment that will stimulate the emergence and development of creatively thinking professional teams with an impeccable reputation and capable of managing the exploration process.

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