Is a shale revolution possible in Russia?

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Considering the explosive growth of production in the US, we are justified in speaking of the "shale revolution". But is this term correct? It is an illusion to view the transformation of the US oil and gas industry as a one-time breakthrough. The companies had been improving their field development techniques for years and had invested billions of dollars before they achieved such great success. The shale revolution was preceded by decades of increased R&D spending, the creation of a sustainable innovation system based on fundamental science, venture business and tax incentives.

For the time being, the "shale success" cannot be replicated, since only the US and Canada have experienced such a fortuitous combination of circumstances, including geology, liberal regulations, private ownership of mineral resources, available credit funds and oil transportation infrastructure. Compared to North America, we can say that shale production in Europe has pretty much failed, due to difficulties such as environmental legislation and such factors as population density in the producing regions. Some countries are breaking fresh ground in shale: China is systematically developing expensive technologies to start its own industrial production, while Japan performed shale extraction for the first time in its history in 2013.

Of course it is impossible to accurately forecast these projects; shale production has its own peculiarities, advantages and disadvantages. However, production of hard-to-recover reserves may in the long run turn into a strategic argument in the global market for the countries seeking to achieve energy self-sufficiency. In this context the issue of shale production in Russia is becoming ever more important.

Let us compare the situation in Russia to the US along basic parameters. According to the calculations made by the US Energy Information Administration, Russia is the world's leader in terms of oil shale reserves, while the US holds second position. At the same time, the US produces around 8 million barrels of oil per day and oil shale accounts for nearly one third of cumulative production; while Russia produces around 600,000 tons (4.5 million barrels) of shale oil per year.

The importance given to shale oil in Russia is quite different from that in the US. Unlike the Americans, who use this feedstock for domestic consumption, the Russian government seeks to prevent a reduction in the export proceeds to the state budget with the aid of shale oil (according to the pessimistic scenario of Russia's Ministry of Energy, oil production may drop from 500 to 370 million tons per year over the next decade or two).

Structural political and economic conditions still prevent Russia from stepping up its shale oil production. While acknowledging the need to pay taxes the companies are at the same time facing an investment deficit. The country is in great need of new breakthrough technologies. While new wells are constantly being drilled, the issue of expedient feedstock transportation is appearing on the agenda.

LUKOIL's Varandey offshore oil terminal in the Barents Sea

In the end, the profitability of shale oil production and export is quite doubtful.

Unlike a great number of small and medium-sized independent companies operating in the US, only major players are engaged in shale projects in Russia, while the rest of the companies simply cannot afford it. Many market analysts believe that Russia regards shale oil production as an "image issue", a so-called sport for the oil elite. To what extent are they right?

The current situation with the resource base is as follows: nearly all Russian shale oil reserves are located in the Bazhenov formation, a rock horizon in West Siberia at a depth of more than 2 km. The area of occurrence exceeds one million square metres, and the oil-bearing formation is 20-30 metres thick. According to different estimates, the oil reserves in the formation vary from 140 to 170 billion tonnes, out of which between 20 and 50 billion tonnes are comparable to Brent oil quality.

State-owned Rosneft and Gazpromneft (in partnership with ExxonMobil and Shell, respectively) are developing the Bazhenov formation along with the private companies LUKOIL and Surgutneftegaz, which run their projects separately. Major oil servicing organisations, including Weatherford, Schlumberger, Baker Hughes and Halliburton, act as contractors.

LUKOIL has been conducting pilot operations in two sections of the Bazhenov formation for several years. We believe that in the foreseeable future we will be able to select the best available drilling techniques and start commercial production. While applying conventional horizontal drilling and fracturing techniques, we stake our claim on the thermal gas formation stimulation technique and in-situ combustion maintenance.

The formation has huge potential; according to many foreign analysts, under favourable conditions it may be capable of producing 100-120 million tonnes of oil per year by 2020. In fact, during the last 20-year period cumulative production in the Bazhenov formation slightly exceeded 5 million tonnes. That said, the average current unit costs associated with this type of production are more than double the costs associated with conventional projects. Irrespective of individual achievements, in general the projects implemented by the companies and through joint ventures are at the initial stage of research and the introduction and testing of approaches and techniques.

However, recently the government has started to reform the fiscal system to boost hard-to-recover reserves production. A law on tax incentives came into effect in 2013, according to which a zero mineral extraction tax (MET) rate for a one-year period was granted to the fields located in four shale suites with a 3 per cent reserves depletion rate. The issue of promoting tax incentives is currently under discussion. In addition, there is a plan to establish a Coordination Centre for Geologic Exploration and Non-conventional Hydrocarbon Production under the auspices of the Rosgeologiya state holding. Thus, progress in the area of the hard-to-recover reserves production is certainly underway.

LUKOIL's Korchagin oil field in the north Caspian Sea

Need for energy tax reform

Meanwhile, those measures are not enough to considerably change the status quo. It is necessary to dramatically reform the fiscal system in the fuel and energy complex and create more favourable conditions for the introduction of new techniques. As for the companies, the above reform also means changes in their investment patterns. Instead of drilling a well producing oil and generating income during a guaranteed period of time, they will have to make regular investments, change conditions and ensure the tactical mobility of production.

Historically, shale deposits could have played a great role in the diversification of the Russian oil and gas industry. Their production started in the mid-19th century; the establishment of the shale industry goes back to the first years of the Soviet Union.

Oil shale was predicted in 1962 by the famous Siberian geologist Fabian Gurari, while another legendary oilman Farman Salmanov for the first time succeeded in getting shale oil inflow in the Bazhenov formation in the early 1970s. Incidentally, the fracturing and horizontal drilling techniques were developed in the Soviet Union in the early 1960s, and in 1971 specialised R&D institutes recommended thermal and gas formation stimulation technique.

However, the hard-to-recover reserves could not then compete with the huge resources of Siberian oil discovered in the mid-20th century. For many years, huge resources of conventional hydrocarbons satisfied the demand of the country for energy and guaranteed budget income, thus making extraction of "difficult" oil somewhat optional. It is a paradox, but the abundant resources available actually resulted in a lag in terms of developing new technology.

Today, conventional fields are being depleted while new ones occur in structures with complicated geology and at great depths. The reliance on offshore fields is not so unambiguous to many experts and market players, either. In their opinion, development of the Arctic Region is a strenuous task and calls for immense investments, while in the mid-term the future belongs to other hard-to-recover reserves, namely, oil shale, bitumen, and coal-based methane. On the other hand, other analysts believe that Russia should focus on conventional reserves, since they are far from depletion. Russia should promote geologic exploration and discover new fields of conventional oil and take measures to enhance their oil recovery.

I believe that it would be a mistake to identify a single priority, for the oil industry should utilise both approaches. The accumulated experience in the area of conventional oil production does not negate the need to develop hard-to-recover reserves. In the future Russia must not find itself hungry sitting on a bag full of food but unable to eat any of it. There is no conflict between the different approaches used by our companies to implement production projects. Development of our own techniques and acquisition of foreign solutions produces a mutually beneficial effect upon the industry and enhances its competitiveness. Some think that Russia should wait until foreign developments become cheaper. Do we have enough time for that? It is possible to catch up with the US within the next 5-10 years, but the leader will go far ahead during this period. For this reason, today the Russian oil industry is making investments and an effort to promote non-conventional resource production.

Thus, the world's leaders in terms of shale oil reserves, namely, Russia and the US, find themselves in stark contrast in terms of the starting conditions to discuss and compare their outlooks. However, the benchmark analysis of the whole range of structural conditions will enable us to gain a better understanding of what we are waiting for and what shale oil can give us. In my opinion, considering all our economic and industrial peculiarities, Russia can experience shale evolution rather than shale revolution – in other words, evolution of the oil strategy.

Development of shale and hard-to-recover oil in the country should boost industrial development. As for the country, it will form the basis for the establishment of qualitatively new relations with the business community. Implementation of the new strategy will require great flexibility, as well as a quick and accurate choice between tactical alternatives. The technological progress in the area of shale oil production should produce a multiplier effect upon the various branches of science and the nation's production potential. I agree that the future belongs to hard-to-recover hydrocarbons. It is for oilmen and the government to decide what this future will look like. ■