



Does Russian unconventional oil have a future?

Valeriy Kryukov^a, Arild Moe^{b,*}

^a Institute of Economics and Industrial Engineering, Siberian Division, Russian Academy of Sciences, Academician Lavrentyev Avenue, 17, 630090 Novosibirsk, Russia

^b Fridtjof Nansen Institute, P.O. Box 326, 1326 Lysaker, Norway



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Bazhenov

ABSTRACT

Russia is estimated to hold the world's largest technically recoverable shale-oil resources. The conventional oil resource base is still very large, but there are doubts about how much is economically recoverable. Increasing attention is given to unconventional oil. The purpose of the article is to assess whether fundamental conditions for sustainable, profitable production of unconventional oil are in place. Compared to the successful development of unconventional oil in the USA, Russia has several disadvantages. The Russian oil sector is dominated by big companies without the flexibility in methods and decision-making required in very heterogeneous unconventional projects. Infrastructure is less accessible in Russia than in most American projects. On a more fundamental level the relatively poor condition of geological data collections is a serious cost increasing factor, and the system for development and dispersion of new technologies has critical shortcomings. Russia lacks appreciation of risk taking and a corresponding regulatory framework, as well as relevant financial mechanisms. Nevertheless, government documents almost exclusively focus on technology as such as well as on taxation and tax benefits as preconditions for successful development. Without addressing the fundamental institutional problems, the potential for exploiting the resources base will be limited.

1. Introduction

The production of shale gas started in the USA in the 1990s on an experimental basis. From 2005–2014 its share of USA's output grew from almost zero to 40% (Pumphrey, 2015), and by 2009 the USA had become the world's largest producer of gas (BP, 2017). Just a few years after shale gas emerged on the scene, a similar development got underway with oil. From 2010 to 2014, American oil production soared, reaching 519.9 million tons¹ – an increase of 60%, made up almost exclusively of tight (including shale) oil, which is oil held in rock formations – in this article jointly referred to as shale-oil. By 2015 the USA had the same output as Saudi Arabia, the world's top oil producer. There has been some discussion of whether such high output levels are sustainable (Hughes, 2013), but little disagreement that 'the shale revolution' in oil and gas production is here to stay (Morse, 2014).

The re-emergence of the USA as the leading energy producer, with the addition of so much new production capacity, has rattled world energy markets – and constitutes a major challenge for many traditional petroleum producers (Auping et al., 2016). This 'revolution' has been taking place in the USA, but the natural conditions for unconventional

production are in place also in many other countries (see Table 1). Exploiting these resources is no straightforward matter, however, and there is disagreement over how much of the potential will ultimately be commercially, regulatory and politically exploitable (Lozano Maya, 2013). A case in point is Russia, which, according to USA Energy Information Administration estimates, holds the world's largest technically recoverable resources of shale oil, as well as considerable reserves of unconventional gas (EIA, 2013).

Russia was until recently the world's top producer of hydrocarbons, but there has been growing concern about its ability to uphold oil production because its conventional resource base is being depleted and new fields are smaller, more complicated and remotely located – thus more expensive to develop (Kryukov and Moe, 2013a). With Russian gas, however, there are still ample, accessible conventional resources.

The search for regions that can replace production from the large fields now on the decline has been a major issue in Russia. Much has been expected of Eastern Siberia and, more recently, the Arctic offshore. In both cases, an important argument has been that opening new regions would permit the Russian oil industry to continue using well-known methods and to run large-scale projects, although offshore

* Corresponding author.

E-mail addresses: kryukov@ieie.nsc.ru (V. Kryukov), amoe@fni.no (A. Moe).

¹ Throughout this article volumes are reported in tons to preserve the original data from Russian sources where metric tons is the standard measurement, except where original data are in barrels. Conversion factors are not unequivocal. For instance, BP and Gazprom uses a factor where one metric ton of oil equals 7.33 barrels, whereas Rosneft uses 7.46. The factor will vary according to the type of crude oil.

Table 1
Top 10 countries with technically recoverable shale-oil resources (billion barrels).

Source: EIA (2013).

1	Russia	75
2	USA	58
3	China	32
4	Argentina	27
5	Libya	26
6	Australia	18
7	Venezuela	13
8	Mexico	13
9	Pakistan	9
10	Canada	9
	World total	345

would require heavy contributions from foreign companies. The presence of shale-oil resources has been known for some time, but without attracting much interest – probably because of the country's ample conventional resources, and because exploiting unconventional resources would differ radically from the traditional approach of the Russian oil industry. Some projects are now underway, with interest spurred by attention from foreign companies, as well as by developments in the USA. Therefore, we ask: how promising is the outlook for developing untraditional oil in Russia?

Experience gained with unconventional hydrocarbons in the USA offers a natural point of departure for discussing the prospects in Russia. Obviously, there are major differences in the industry between the USA and Russia – but are they of a character and magnitude that could seriously limit the potential for developing unconventional oil in Russia? It is also relevant to examine the characteristics of unconventional resources as such. What distinguishes unconventional from conventional resources? How do unconventional resources fit in with the general development of the Russian hydrocarbon resource base? Does Russia have its own approach to developing unconventional resources? Are policies evolving that reflect the specific features of unconventional resources?

In Section 2 Russia's overall conventional oil reserve situation is assessed and in Section 3 the Russian definition of unconventional oil and the most promising production regions are presented. Section 4 discusses the challenges in accessing unconventional oil, comparing Russian conditions with the experience from the USA. Section 5 highlights Russian efforts to overcome some of the institutional problems and reviews recent policy proposals, before conclusions are drawn in Section 6.

2. Russia's conventional resource base – still a potential?

The reserve classification system in use in Russia operates with the categories A, B, C1 for explored reserves. Category A represents reserves already under production, B reserves are proven and developed, but not in production, whereas C1 are discovered and delineated but not yet developed. Altogether these three categories are often translated into “proven reserves,” the term used in most Western countries. Categories C2, C3, D1 and D2 represent unproven resources. Category C2 refers to resources in the immediate vicinity of producing fields, whereas categories C3, D1 and D2 represent resources with high/very high degrees of uncertainty.

According to the Ministry of Natural Resources (MPR), Russia had 18.4 billion tons of explored reserves (Russian category A + B + C1) as of 1 January 2016, but it is uncertain if all this is commercially recoverable (see Fig. 1). The ministry also reports that an assessment conducted in accordance with the principles of the Society of Petroleum Engineers (SPE), and which includes economic parameters, arrived at only 11 bill. tons (MPR, 2016).

A striking feature of Russia's reserve base is that almost all of it has

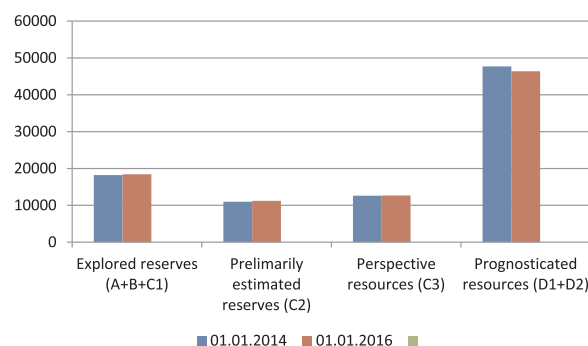


Fig. 1. Russian oil resource base, 2014–2016 (mill. tons). Source: MPR (2014, 2016).

been licensed to companies: some 95.7% of the explored reserves and 88.8% of the preliminarily estimated reserves (MPR, 2015a). This situation, a major weakness of Russian resource management policy, represents the continuation of decisions made at the end of the Soviet period, when huge swaths of oil territory which had been controlled by Soviet oil industry organizations were transformed to licenses and granted to oil companies based on the former state production associations (Kryukov and Moe, 1994). With very few new fields now available for licensing, the authorities have limited room for manoeuvre if they want to encourage companies to start or increase production. According to the All-Russian Petroleum Scientific-Research Geological Exploration Institute (VNIGNI), less than 1 billion tons of poorly explored oil reserves remain unlicensed (Mescherin, 2013). The volume of prognosticated resources is very high, however – almost 70 billion in the D1 + D2 categories, according to one authoritative source (Varlamov, 2016).

Increasing recovery rates could offer a potentially important source of oil-production growth. According to the Ministry of Energy, improving the average recovery rate from 37% to 42% would correspond to an additional 4 bill. tons of oil reserves. However, rates have been falling since 1995, stabilizing only in recent years. In new fields, the expected rate is often set at 32% – the same as in 1948.

According to Rosnedra, the federal subsoil resources management agency under the Ministry of Natural Resources, another unused potential lies in developing already explored but not producing fields. Holding some 3 bill. tons of reserves, these could yield up to 50 mill. tons annually. An additional 40 million tons could come from non-producing layers in fields already in production (Mescherin, 2013).

According to the Minister of Natural Resources, a major problem is the depletion of the ‘exploration reserve’ – areas with the potential for new discoveries. For many years now, additions to reserves have exceeded production, but about 80% of additions come not from new discoveries but from new exploration of fields already in production, where production equipment and infrastructure are already in place (Donskoy, 2014; Kryukov and Moe, 2007). (See Table 2).

In Russian energy-strategy documents, as well as in statements from officials in the Ministry of Energy, the emphasis has been on exploration and development of new traditional reserves in increasingly remote locations. This is reflected in the latest official version of the Russian Energy Strategy, the key overall strategy document for the energy

Table 2
Production and addition to reserves, oil and condensate (mill. tons).
Source: Rosnedra, Neftegazovaya Vertikal’ (2015).

	2009	2010	2011	2012	2013	2014
Total additions	630	783	745	742	700	750
Re-evaluations	5	174	123	110	99	100
New exploration	621	609	622	632	601	650
Production	491	501	507	514	523	527

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