

The potential in Russia's new energy frontiers



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Russia is believed to be one of the richest countries in the world with its vast oil and gas resources. According to the recent data, its reserve base amounts to 96 billion tons of oil equivalent (btoe) which is nearly 700 billion barrels of oil equivalent. The offshore part of the reserves, defined as what is recoverable under current economic and technical conditions, is less than 10 per cent. Russia's total resource base is several times larger and is estimated to be 259 btoe (1,890 bboe), and of this amount the offshore part is 96 btoe, or 37 per cent. This gives a total estimate of 355 btoe for so-called conventional hydrocarbons and as shown below.

The Russian Arctic is believed to be the area with the highest unexplored potential for oil and gas as well as for unconventional resources such as natural gas hydrates. Despite a common view that the Arctic has plentiful hydrocarbon resources, there are ongoing debates regarding the potential of this region as a future energy supply base, raising issues of geopolitics and environmental concern as well as assessment and delineation of Arctic resources and the technology and market demand for developing them. However, scarce information and geological data create uncertainty about the Arctic as main base of Russia's energy supply in the second half of this century. A further uncertainty is the pace at which production from northern areas including the Arctic, will be brought onstream – either because of national policy, infrastructure development or investment by the state and the oil companies. These areas embrace those where

development has already been started (offshore Sakhalin, northern Timan Pechora) and those awaiting future development such as the Barents and Pechora seas, East Siberia, Yamal, Kara Sea and Kamchatka.

The following sections will briefly describe the status and future prospects in the exploration and development of these areas and challenges associated with them.

The Northwest of the Russian Arctic

There is a common view that shelves of the Barents, Kara and Pechora seas are considered as the most prospective areas for offshore oil and gas field development.

Barents and Pechora seas

With almost 31 btoe of oil and gas resources, the Barents and Pechora seas represent one of the most attractive areas of the petroleum resources development.

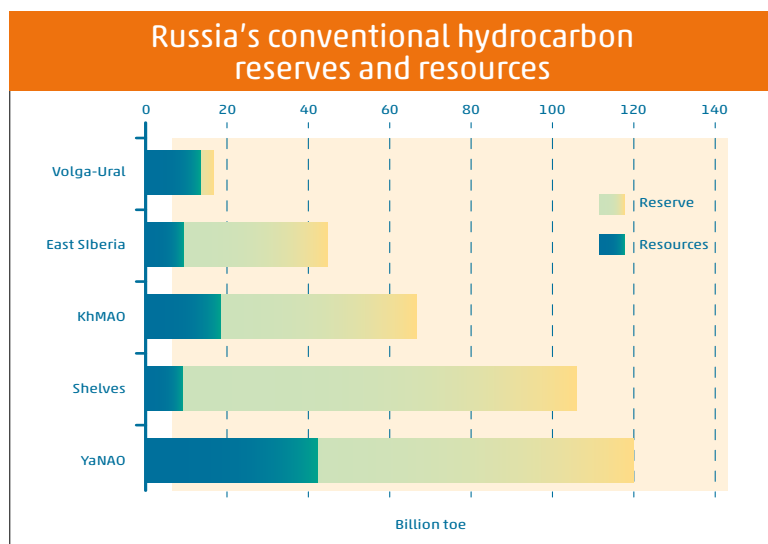
So far two gas-condensate fields – Shtokmanskoye and Ledovoye, and three gas fields – Ludlovskoye, Murmanskoye and North-Kildinskoye have been discovered in the Barents Sea. Potentially interesting structures have been detected in the Fersman-Demidov shoulder, Shatsky and Vernadsky swells, and also in the area of Medvezhy and Admiralteisky swells.

The former "Grey zone", which was disputed between Norway and Russia, has a high potential in the area of Fedynsky Swell and East-Barents foredeep where quite a number of structures are very prospective for both gas and oil.

Up to the present time oil has not been discovered in Arctic seas except the Pechora Sea, therefore these locations, including Admiralteisky swell, are of particular interest.

It is anticipated that development of the Barents Sea will start from the Shtokman field, which later will be accompanied by the satellite fields of Ledovoye, Ludlovskoye and Terskoye and later by the fields of the Fersman and Demidov swells. This concept will enable utilisation of available infrastructure so as to reduce investment costs.

The 2010 Norwegian-Russian agreement on delimitation of the Barents Sea can spur a new round of active cooperation between two countries on the development of Arctic resources. The new agreement opens new opportunities for active cooperation in developing this strategically important





region. Possible large accumulations of petroleum resources in the delineated zone are located closer to the shoreline than the Shtokman field, and this may facilitate a new concept of the whole Barents region development.

The shelf of the Pechora Sea is the only one among all the Arctic shelves where the oil has been discovered. The main fields of this region are the Prirazlomnoye, Dolginskoye, Medyn-more, Varandey-more and Kolokomorskoye oil fields, the Severo-Gulyaevskoye oil-gas-condensate field and the Pomorskoye gas-condensate field. Besides these fields there are several large and prospective structures located in the south eastern part of Pechora Sea: Yuzhno-Russkaya, Pakhanchevskaya, Sakhaninskaya and Papaninskaya. According to the estimates, total resources of the Medyn-Varandey and Kolokomorsky structures amount to 410 million tons of oil with a recoverable volume of 80 million tons. It is planned that the Prirazlomnoye field will start the oil production in the Pechora Sea followed by development of other fields.

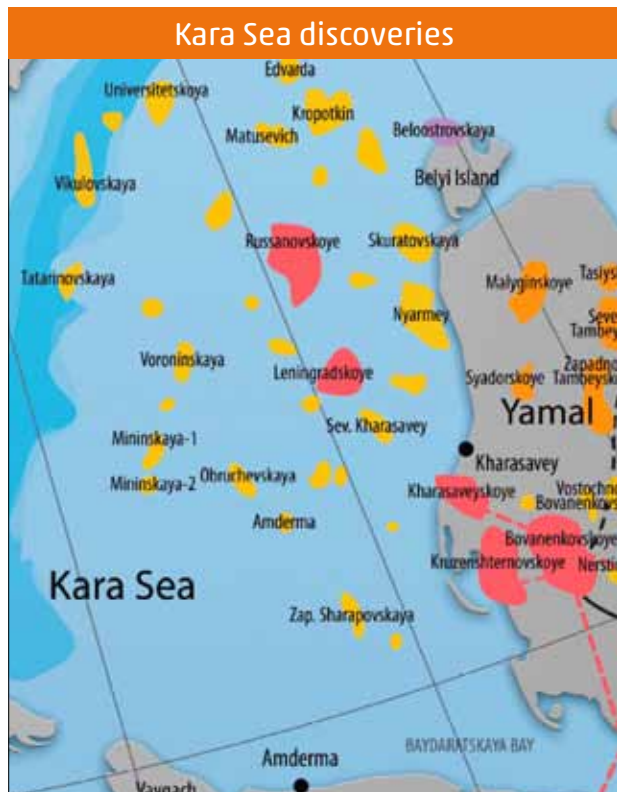
Kara Sea

The Kara Sea with its 37.4 btoe reserves, of which around 75 per cent is gas, is believed to be a sea with the largest petroleum resources. In the Kara Sea, shelf prospective locations are the Yamal shelf with its Leningradskoye and Rusanovskoye fields as well as offshore extension of the Kharasaveyskoye and Kruzenshternskoye fields. Another attractive location is Ob (Severo-Kamennomysskoye, Kamennomysskoye-more and Obskoye fields, aquatorial extension of Yurkharovskoye, Salekhaptskoye, Yuzhno-Tambeyskoye, Utrennee and Tasiiskoye fields) and Tazov (Chugoriakhinskoye field and aquatic extension of Semakovskoye, Antipayutinskoye and Tota-Yakhinskoye fields) bays.

According to the estimates, gas production from the Kara Sea shelf area may reach up to 200 billion cubic metres (bcm) annually, which could compensate for the decline in production from fields in Yamal peninsula and enable utilisation of available infrastructure.

Ob and Tazov bay areas

The Ob and Tazov bays, now being actively explored, have emerged as another very attractive area of future petroleum production with a lot of already discovered fields and potential structures. According to the estimates, gas fields of the Ob and Tazov bay areas could produce gas with the annual rate of 75 bcm.



Source: Sherpa Konsult, 2010

Offshore Sakhalin and Caspian Sea areas

According to Russia's energy strategy, offshore fields should annually produce around 220-230 million tons of oil equivalent, and by 2030 up to almost 300 mtoe. It is anticipated that nearly half of that amount will come from the Sakhalin and Caspian offshore regions alone.

Recoverable petroleum resources of the Sea of Okhotsk including offshore Sakhalin area amount to 8.9 billion tons of oil equivalent. Caspian recoverable resources comprise nearly 3.5 btoe. Active exploration programmes with dynamic production growth in both areas maintained by experienced and internationally recognised companies gives confidence that this target will be reached.

Potential of West and East Siberia

Is there an alternative to the development of oil and gas fields located in the untapped Arctic offshore areas? The development of Arctic resources is inevitable although there is no time pressure in doing that right away. Russia has abundant petroleum resources onshore with technology for safe and efficient development available now. There →



→ are two regions, namely, Nadym-Tazov and Krasnoyarsk regions that could easily maintain production at required level on a mid-term and even on a long-term basis and thus, postpone development of the Arctic resources of the Yamal peninsula and the northern seas.

The Nadym-Tazov region is a new hub of hydrocarbon accumulations in West Siberia. Recent estimates showed that this region has potential gas resources up to 20 trillion cubic metres (tcm). Its proximity to the Yamburg gas condensate field with developed infrastructure and with gas pipeline exporting gas to Europe, makes development of this region very attractive both technologically and commercially. According to estimates made by VNIIGAZ (Gazprom's R&D institute) a high level of production (up to 15 bcm per year) can be reached already in the third year of development.

The second potentially large centre of petroleum production is associated with the Baikal region of hydrocarbons accumulation, which is accessible for industrial development. According to resource evaluation reported in 2003, recoverable reserves of oil and gas in this region amount to 35-45 btoe (approximately 30 per cent of which are liquid hydrocarbons). The largest field of this region – the Kovyktinskoye gas condensate field with estimated in-place volume of two tcm (with an upside potential of up to 10 tcm) could serve as a starting point for such a development.

Although East Siberia is characterised by the highest reserve replacement ratio, capital investments in the area need to be almost twice as big as in traditional oil-producing regions, due to the lack of infrastructure and the distance to the market. For example, one of the key East Siberian projects, Vankor (developed by Rosneft) is located 1,500 km from Krasnoyarsk, the main transportation hub in this region. Severe climatic conditions limit construction to around 100 days per year.

One can conclude that these large scale projects in new oil and gas regions, like West and East Siberia, the Far East and Arctic offshore will provide the reserves to sustain Russian output. According to future planning by 2020 Russia should annually produce 1,300-1,350 mtoe, and by 2030 1,415-1,475 mtoe. The offshore share of Russian production will grow from around 17 per cent in 2020 to more than 20 per cent by 2030. It is anticipated that nearly half of that amount will come from the Sakhalin and Caspian offshore regions, while the other 50 per cent will be delivered by the Russian northern seas.

However, lack of infrastructure limits the attractiveness for companies. Development of resources of the northern seas is additionally complicated by the lack of technology and qualified personnel, operational and environmental problems and higher cost. In order to meet this challenge a state-coordinated exploration programme is required, with the close cooperation and participation of the international community.

A stable, transparent and predictable legal framework will be needed for the massive investments required in exploration and production, and for the active involvement of foreign companies, bringing with them indispensable competence, experience, technology and health, safety and environment principles. But Russia's resources will be important to sustain oil and gas supplies to western Europe and the Asia-Pacific region. ■

