

Russia: promoting innovation, investment and cooperation

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Technology is the main factor in the development of the oil industry. Historically, the industry has been and still is, one of the key providers of scientific and technological achievements; it is a powerful driver of scientific and technological progress, stimulating research that is necessary to solve the considerable challenges of hydrocarbon exploration, production and refining. This research is ever more essential due to the finite nature of oil and gas resources and the depletion of very large fields and easy-to-produce reserves.

The principal issue presently is the depletion of mature oil and gas basins and the shifting of production to poorly developed regions and the continental shelf. Potentially, there is enough oil in the world as cumulative production makes up only one-third of conventional oil resources; non-conventional oil resources, such as shale, heavy oil and bitumen (see Figures 1 and 2) account for approximately as much again. The production of these potential resources is conditional on the development of the relevant technology to extract them, and the peak of global oil production could now be put off for several decades due to improving oil recovery and developing resources, the requisite expertise for which was previously not available. In addition, energy-saving technologies and the efficient use of resources are significant factors in reducing energy consumption.

Russia: the new leader in the development of oil and gas technologies

Being one of the richest countries in energy resources (see Figure 3), the current and future development of the Russian oil and gas complex is dependent upon the advancement and modernisation of its technologies.

Oil production in Russia (see Figure 4) is mainly based on the reserves prepared for production during the Soviet period and on a favourable global oil market. The successful development of the Russian oil industry has helped stabilise the Russian economy and ensure its growth.

Russia's scientists were innovators in the field of world petroleum science and were responsible for many technological breakthroughs in oil production and refining. Unfortunately, since the 1980s, Russia has lost its leading role

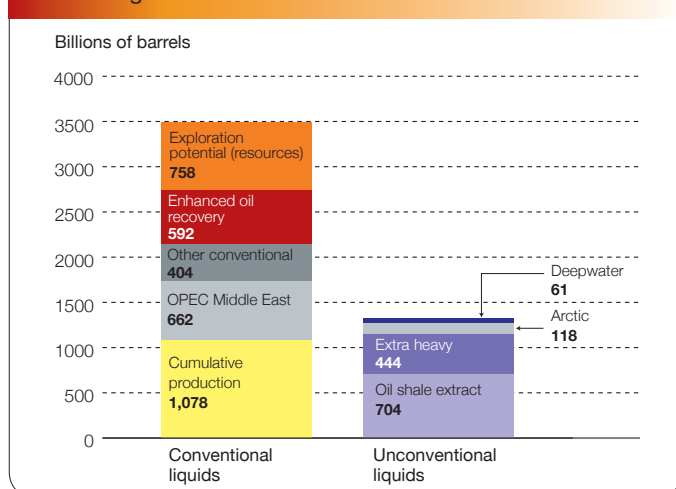
At the same time, the government has managed to significantly increase the revenues of the Federal Budget in the form of tax payments and by establishing a stabilisation fund, a 'safety cushion', for the country that played an important role during the crisis (see Figure 5). In Russia, the oil industry is the main taxpayer, providing 20 per cent of GDP and over 43 per cent of the revenue for the Federal Budget, and is one of the maximum investment multipliers. Growing investments in the oil sector result in orders that are placed with such industries as civil engineering, metallurgy, pipe manufacturing, machine building, transport, power generation and services, among others.

In the post-crisis period, the oil industry must play a key role in the transition to an innovative economy, guaranteeing budget revenues and stimulating the development of science-intensive production and research, without which the Russian oil industry may face stagnation.

Oil production volumes achieved in Russia may also be similarly maintained with large-scale projects in new regions such as Eastern Siberia, the Far East and the Arctic shelf, where operations have already started. In particular, Rosneft is currently implementing the Sakhalin 1, 3 and 5 offshore projects in the Sea of Okhotsk, and is developing the Vankor and Urubchen-Tokhoma fields in Eastern Siberia.

The Vankor project is a good illustration of the role of the oil industry in the innovative development of the economy. The construction of field facilities on Vankor is one of the most recent and largest projects undertaken by the industry. In Russia alone, more than 60 design institutes, 150 equipment suppliers, 65 manufacturing plants and more than 450 contractors were employed. Field facilities construction on such a large scale was designed in partnership with leading Russian and international engineering companies. Up-to-date technology has meant that from designing field facilities to commencing commercial production on this project has taken just three years. Further use of modern technology will ensure

Figure 1. Global Oil Reserves and Resources





the safe development of this field in the Far North, a region that hosts a particularly hostile environment.

Vankor may be classified as an integration project for Eastern Siberia and the Far East, as Vankor oil will be the main product to be transported via the first stage of the Eastern Siberia-Pacific Ocean pipeline system. In fact, the Vankor field represents a breakthrough in the Russian oil sector and technologies that are currently being applied there will establish a benchmark for the efficient development of the whole of Eastern Siberia in the future.

After 2016, hydrocarbon resources which cannot be developed with available technologies and equipment now will become the main oil resource base. These difficult-to-produce oil and gas reserves include high-viscous, low-permeable and under-gas-cap deposits with a maximum 15-25 per cent oil recovery factor. It is anticipated that with further technological development, the oil recovery factor may reach 55 per cent.

Development of these reserves will require a completely new approach, one which will require the highest standards in technology and equipment. Even now, Russian companies and research institutes are required to prepare for the fulfilment of future orders from the oil industry.

Russia also has huge hydrocarbon reserves on the Arctic shelf, estimated at 90-100 billion tonnes of oil equivalent, slightly less than a quarter of the world's total hydrocarbon reserves. The development of offshore hydrocarbon resources is one of the key factors for the future development of Russia and its position in the global energy market.

Due to a poor knowledge of the region, the probability of Arctic offshore reserves is 3.5-5 times lower than in Eastern Siberia. Offshore development technologies available in

Russia and worldwide are not sufficient to develop these offshore reserves. For extensive development of the Russian Arctic shelf, technological breakthroughs in every segment of the industry are needed, from the development of monitoring systems to the construction of sub-sea production facilities.

Exploration costs in these remote and climatically harsh regions are higher than in conventional oil producing regions in Russia: US\$400-500 per tonne of incremental proven reserves compared with US\$30-50 per tonne in Eastern Siberia. The capital expenditure required to start the production of these offshore reserves is also extremely high.

According to estimates, more than 30 ice-class stationary platforms and about 10 semi-submersible and floating drilling rigs, as well as about 90 ice-class vessels with a dead weight of 70,000-120,000 tonnes will be required for Arctic offshore projects. In terms of complexity these projects are comparable to space projects. It is clear therefore that without the research and development of scientifically-intensive production techniques, Arctic offshore resources cannot be developed.

The national task: to ensure an inflow of investments

The potential development of the industry is constrained by an acute shortage of investment resources. A shortage of projects that are attractive to investors under the current fiscal regime limits investment in the oil industry. Long-term investment cycles require highly profitable projects that are resistant to market trends. The government is actively amending the tax legislation and this will mean altering the taxation system in general, and allowing tax exemptions within the current system. Prompt transition to the new taxation system will ensure an inflow of investments and

Figure 2. Global Oil Production Capacities, million barrels/day

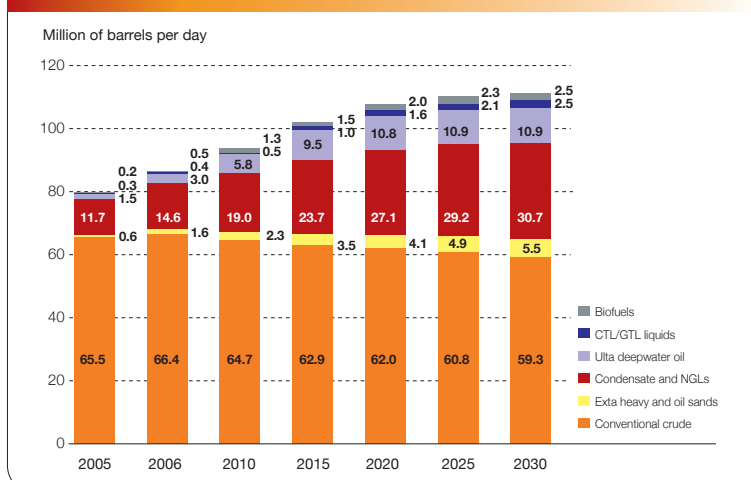


Figure 3. Russia in Global Oil and Gas Production

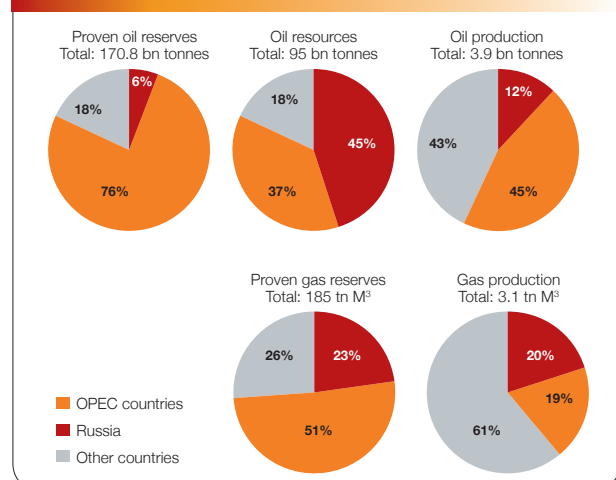
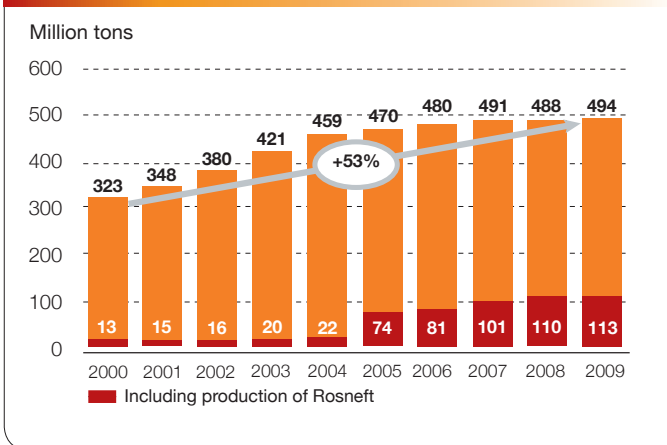




Figure 4. Dynamics of Oil Production in Russia



give a boost to oil production. Correspondingly, government must take measures to invest in research, development and establishment of science-intensive programmes.

Russia undoubtedly has great potential for meeting the tough challenges facing the oil industry. Its scientists were innovators in the field of world petroleum science and were responsible for many technological breakthroughs in oil production and refining. Unfortunately, since the 1980s, Russia has lost its leading role.

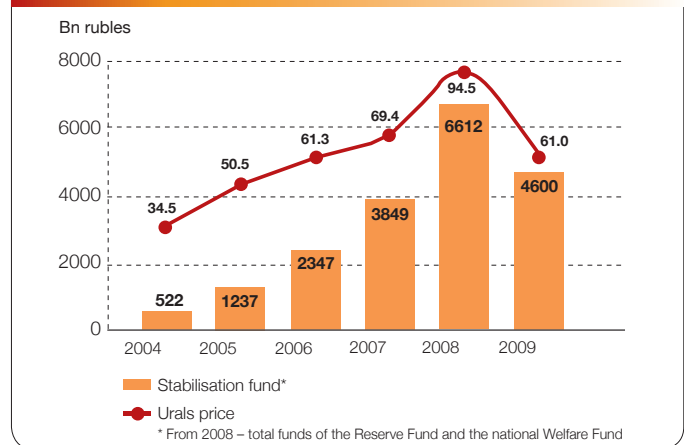
Now, it is time for fundamental and industry research institutes, engineering centres and service companies to become key components of a pioneering development of the oil industry. A 'Technologies Market' is to be built in Russia, with initiatives being coordinated by the leading oil companies, particularly, Rosneft.

Government support for this innovative development of the fuel and energy complex would mean, in the first instance, establishing the conditions for innovative development, including the preparation of government research programmes, government financing of venture funds and research centres and the establishment of technology clusters and tax exemptions.

However, for this new development of the oil industry to succeed, accelerated innovative development of related industries is required, particularly in machine building, metallurgy and chemistry, to meet the needs of oil and gas producers, oil refiners and petrochemical companies.

Fulfilment of these top-priority measures along with the development of an integrated programme for the innovative development and modernisation of Russian industry would improve the competitiveness of Russian companies and provide additional incentives for Russian economic growth generally.

Figure 5. Wealth of Oil and Gas Funds of Russia



Investment in innovation: the key factor in an oil company's competitiveness

Oil companies participate directly in establishing, developing and introducing technologies to meet their operational targets.

The systematic technological development of Rosneft was a key factor in ensuring its leading position as a company in Russia and worldwide. Today, Rosneft is the largest company in the Russian oil industry, competing with international majors in key production indicators (Table 1).

The targets of Rosneft's innovative approach are determined by the strategic tasks of the company and correspond to Key Performance Indicators (KPI). Large-scale investments are required to achieve these goals. According to preliminary estimates, Rosneft's investments in ongoing modernisation programmes will amount to 530 billion rubles by 2014. Together with other operational development programmes, the overall volume of investments will amount to 2.1 trillion rubles.

The sources of Rosneft's innovative development include its own technologies and developments engineered in cooperation with leading Russian and foreign research and development centres (about 38 per cent), as well as technologies obtained through Russian and foreign service companies (about 62 per cent).

The company cooperates with 28 Russian research centres and academic institutes and 12 foreign research centres in the form of long-term research and development programmes that are of practical importance to Rosneft. The company reconstructs connections between the fundamental science and industry research and actual operations.

Rosneft establishes research and development clusters in every major region on the basis of its own corporate



research centres, research institutes of the Russian Academy of Sciences, regional academic universities and company subsidiaries. This allows the company to introduce ground-breaking technology and ensure integrated education and training of oil and gas experts, which makes working for the company attractive to post-graduates.

Cooperation: an effective form of attracting investments and best practices

In recent decades, various forms of cooperation have become far-reaching; firstly, the implementation of large-scale oil and gas projects and secondly, the development and introduction of new production technology and the production of new fuels. Cooperation provides better opportunities for raising finance, attracting necessary experience and technologies and sharing risks between all participants.

In Russia, international cooperation is becoming more and more applicable for the implementation of large and sophisticated projects. In particular, Rosneft has joint projects with a number of foreign partners – including ExxonMobil, BP, ConocoPhillips, CNPC, Sinopec, ONGC and Sonatrach, among others – in exploration, production and refining, both in Russia and abroad.

According to Ministry of Energy estimates made together with oil companies, about 8 trillion rubles will be required for the development of the oil industry in the next five years. These funds can be partially raised in the form of foreign capital, providing that terms and conditions are met. An

international partner should arrange project finance, transfer the experience of managing large-scale projects, and ensure the creation of service infrastructure in Russia, as well as quality engineering with the transfer of knowledge and experience to Russian contractors.

It is very important to make sure that imported technology is used as a lever for the accelerated development of Russian technologies and equipment, putting an end to technological dependence on imports. Of course, international fora, particularly, the World Petroleum Council (WPC) constitute one of the most important forms of international scientific and technical cooperation. The Russian National Committee of the World Petroleum Council (RNC WPC) was specially formed for this purpose and has been functioning for over 50 years.

RNC WPC unites production, service and research and development companies, organisations in academic institutes and institutes of the Russian Academy of Sciences, ensuring a full representation of the Russian oil and gas complex. Well-known experts and scientists work in public sections of the Committee.

Recently, RNC WPC has been developing direct bilateral relations with other national committees of the World Petroleum Council. Russian-Chinese oil and gas cooperation fora established by the Russian and Chinese national committees are a good example of such relations. The first such forum was held in 2007 in Beijing, the second one took place in 2010 in Moscow. These events proved to be a very effective way of exchanging information and we, together

with our Chinese partners, have decided to continue this practice in the future.

In conclusion, I would like to emphasise that the stimulation of innovations, investment and cooperation is essential for the Russian oil industry if it is to achieve a new operational level; from the exploration and development of new hydrocarbon reserves to refining, engineering and producing new fuels.

The development of the oil industry gives, in turn, a substantial boost to the Russian economy and will facilitate a shift towards a more innovative development model. □

Table 1: Basic indicators	2005	2009	Rating of Rosneft in 2009	
			In the world*	Among Russian oil companies
Proven reserves of oil, million tonnes	2.047	2.483	1	1
Hydrocarbons proven reserves replacement ratio %	131.6	296.2	1	1
Crude production, million tonnes	74.6	112.8	4	1
Oil refining, million tonnes	22.2	49.8	11	1
Earnings before amortisation (EBITDA), \$ bn	7.0	13.6	12	2
EBITDA profitability, %	40.6	40.1	1	1
Free cash flow, \$ bn	1.0	3.4	5	2
Net profit, \$ bn	4.2	6.5	11	2
Specific operational costs for oil and gas production, \$/BPE	2.2	2.3	1	1
Market capitalisation, \$ bn	-	82.5	10	1