ROLE OF ARCTIC OIL AND GAS PRODUCTION IN THE DEVELOPMENT OF RUSSIAN REGIONS

Institute of Regional Problems

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CONTENTS

SUMMARY

The importance of the Arctic to the economy of modern Russia, and especially to its future, cannot be overestimated. The long period of practical absence of Russia in the Far North, which began in the 1990s, has now ended. Today, the Russian Federation, represented by its president and the government is clearly expressing its strategic interests in the Arctic – the most severe territory on earth, where about 20% of the Russia's territory is located. The framework of state policy in this region for the period up to 2020 has been approved, and the Development Strategy for the Russian Arctic has been created to ensure national security for the corresponding period. A law is being prepared on the Russian Arctic, which will create the organizational and legal conditions for the implementation of the basic goals and directions of state policy in the Russian Arctic. Our country has finally returned to its most northern territories.

In this context, the announcements of major practical steps being taken in the development of local resources take on a special significance. The recent successful drilling of exploration wells in the Pobeda (Victory) Field has not only confirmed the presence of huge hydrocarbon reserves in the Arctic Shelf, but has also marked the beginning of a qualitatively new period in the history of the Russian and global oil and gas industry.

Along with hydrocarbons, the depths of the Arctic contain a huge number of other useful fossil minerals – platinum group metals, nickel, copper, cobalt, and others – but the main direction of economic development of the northern territories at the present stage of implementation of the abovementioned strategy is the production of energy producing materials.

The development of natural resources in the Russian Arctic entails certain difficulties, chief among them being – the harsh climate, lack of developed infrastructure, low population, and the need to implement highly costly environmental protection measures. Under these conditions, effective economic activities can only be carried out by industrial giants – such as Rosneft and Gazprom – with their strong resource base, allowing them to profitability realize large and super-large projects, primarily on the shelf.

Oil and gas companies, undertaking large-scale work on the development of new onshore and offshore fields in the Russian Arctic, become tools for the economic development of the northern regions, and the entire Russian economy. As a result of offshore projects implemented by just one company – Rosneft –300-400 thousand jobs will be created in various sectors, directly or indirectly related to oil and gas production. The Arctic direction of the oil and gas industry is intended to be not only one of the major financial donors of the Russian economy, but also a powerful engine for development of high-tech industry in our country.

Industrial companies, ensuring Russia's economic leadership in the North, possess sufficient financial, technical, technological and intellectual resources to implement all the principles of environmental safety at their enterprises in the Arctic Zone.

Currently, hydrocarbon production on the shelf is one of the key growth factors of the Russian economy, thanks to which the full-fledged return of our country to the Arctic has been made possible, as well as the further systemic development of this strategically important region.

INTRODUCTION

On August 9, 2014, an exploration-drilling program was launched on the Arctic Shelf. During the solemn ceremony marking the beginning of work, the participants were greeted by Russian President **VLADIMIR PUTIN,** who joined them on the West Alpha Platform in the Kara Sea via teleconference. The results obtained in the course of this drilling, allow us to already speak about the discovery in the Russian Arctic of huge oil and gas reserves of the highest quality. According to preliminary estimates, based on the first opened reservoir trap, the reserves of the Pobeda Field consist of 499,2 billion cubic meters of gas and 130 million tons of oil – categories C1 + C2. Thus, the beginning of the work here – **is the beginning of a new period in the history of not only Russian, but also of world oil production. This industry has entered the Arctic Era.**

This event has received wide attention, including abroad. Characteristically, most commentators focused attention, as usual, on the anti-Russian sanctions and the question of whether the Russians, without Western technology, could continue this work, and even more to develop their Arctic Program. This talk was mostly about ExxonMobil. In October 2014, this American company was forced to curtail its cooperation with OJSC NK Rosneft, leading the work on the Universitetskaya, due to the imposition of US sanctions against Russia.

In reality, however, this problem is not that critical. Deputy Minister of Energy of the Russian Federation K. Molodtsov is convinced that Russia will be able to "go it alone, using the drilling platforms owned by Russian companies, and in 2015, will ensure the necessary work is carried out on the fields in the Kara Sea." Commenting on the withdrawal of ExxonMobil from the project, the head of Rosneft Igor Sechin said, in an interview with Bloomberg, that his company will continue to work and will develop the project on its own. Russia also has its own platforms for offshore drilling in the Arctic, in particular the Arkticheskaya, built just in the last year (operated by the Gasflot Company). All together, Russia has eight of its own platforms. In addition, the country is developing equipment needed for oil production in the Arctic Shelf, and the first steps have already been made here.

Thus, today Russia can continue working in the Arctic, in part with the help of companies, not falling under the sanctions, and in part – using its own resources. In the strategic perspective, the country has already initiated the start of a new sector of its economy. Now Rosneft is actively working on creating a unique production base for marine equipment. The Far Eastern Center of Shipbuilding and Ship Repair OJSC is creating an industrial and shipbuilding cluster, the core of which will be the Zvyezda (Star) Complex in the town of Bolshoy Kamen. In addition, near Murmansk, there are plans to build a coastal support base to provide assistance to offshore projects in the Western Arctic, including plants for the production of underwater fittings, concrete blocks, and a heliport for several dozen aircraft.

Thus, the pressure of sanctions can be overcome, and besides, these are not the main problem Russia faces during its development of the Arctic Shelf and the Arctic territories as a whole.

First of all, the move to extract oil in the Arctic has been influenced by the fact that traditional stocks are being exhausted. With that, in terms of the technologies being used in the working environment of the Arctic Shelf, these are comparable to space exploration, or to the "nuclear revolution". This fact in itself changes the role of this sector in the Russian economy and, more broadly, in the life of Russian society. This sector may well serve as the lead customer and developer of industrial and technological innovations. As a matter of fact, **the Arctic oil and gas area is intended not only to become one of the major financial donors of the Russian economy, but also a locomotive for the development of high-tech industry in the country.**

Second, the actual drilling and production of oil – is only one part of the oil industry. Oil, if it is not delivered to the consumer, is useless. Infrastructure and logistics are a must – oil pipelines, storage facilities, tankers, and a system of complexes for their maintenance. People are needed who will be engaged in ensuring the operations of all the above-mentioned. The creation of infrastructure and training of people to service it – involves a great deal more work that the actual production itself. This is true for all areas of oil production, and the Arctic, of course, is no exception. Production of oil is planned in areas where the infrastructure and often people are simply not available. Oil companies acting on their interests are breathing life into these regions. **As a result of oil and gas production, taking place is an integrated development of the Arctic and adjacent territories, which account for about 20% of the Russian Federation.**

Thanks to the plans for the development of the shelf, life is being invigorated in all regions of the Russian North. Being created (or will be created in the foreseeable future) are new, well-paid and stable jobs in the high-tech sphere. This, in turn, will create effective demand, which will lead to the development of social structures in these areas, including retail, services, healthcare, education and culture. A multiplier effect is created: the oil industry serves as the engine of development in other areas of life, which create the conditions for the development of the oil industry. Thus, **oil production in the Arctic – is not only a locomotive for innovation in industry, but also a locomotive of social and economic development in the Arctic regions of Russia.** These include seven constituent entities of the Russian Federation, four of which are fully part of the Russian Arctic (Murmansk Oblast, Nenets, Yamal-Nenets and Chukotka Autonomous Okrugs) and three partly (six districts of Arkhangelsk Oblast, two districts of Krasnoyarsk Krai and the five settlements of the Republic of Sakha [Yakutia]); and included in the Arctic territories is also the urban district of Vorkuta.

By starting work on the development of northern territories program, Russia has truly returned to the Arctic.

Of course, this returning process is now only at its beginning. However, it is so complex, and its significance is so great, that even today, in the early stages, it must be subject to a thorough analysis, examination and evaluation of the prospects.

In this regard, the Institute of Regional Problems, in cooperation with a pool of regional experts, began researching the observed and projected effects of the activities of oil and gas companies in the Arctic, in terms of the socio-economic situation in the Northern (Arctic) regions of Russia. Since environmental issues constantly lead to increases in tension, the research also included some important aspects of the impact of Arctic oil production on the ecology of the region.

The first results of our research, we present to you in the format of a report.

CHAPTER ONE

Russian Arctic: problems and opportunities

Arctic – this is the northern area of our Earth, including the deep basin of the Arctic Ocean, shallow peripheral seas with islands and coastal parts of the continents of Europe, Asia and North America. Among Arctic states are Denmark, Iceland, Canada, Norway, Russia, Finland, Sweden and the United States. The Arctic Zone of the Russian Federation (Russian Arctic) accounts for about one third of the entire area of the Arctic, which is one fifth of the territory of Russia.

According to expert estimates, the population in this part of the world is 4.6 million people, including 2.5 million in the Russian Arctic, with the other Arctic countries having 2.1 million people. We should stress that this figure is, to some extent, arbitrary, and varies depending on where one draws the southern border of the Arctic Zone. In international practice, there are different versions when it comes to defining the border, but in any case – the North contains the least settled and developed territories of all Arctic states. Meanwhile, the importance of the Arctic in their lives cannot be overestimated.

Russia in the Arctic

The water area of the Arctic seas and coast are historically a part of the sphere of influence and interests of Russia. The continuous process of research and development by Russians of the coasts of the Arctic Ocean originated in the time of the Novgorod Republic. The dominance of Novgorod in the north led to the development of shipbuilding and polar navigation, as well as the economic development of the coast up to the mouth of the Ob River. The current Perm Krai was settled by Russians from north to south – from the coast of the ocean to deep into the mainland. In the later period, our compatriots combined fishing activities with exploration and development of the Arctic Zone. Rising to national and international fame were Russian sailors and explorers such as – E.V. Toll, G.Ya. Sedov, S.I. Dezhnev, Kh.P. Laptev and D.Ya. Laptev, V.I. Bering, F.P. Wrangel and many others.

During the Soviet era, the ambitious project of the Northern Sea Route (NSR) was realized – the shortest sea route linking the European part of Russia and the Far East. Russian legislation has defined the NSR as the "historical national unified transport communications link in the Russian Arctic". Using the NSR, the distance from St. Petersburg to Vladivostok is over 14,000 km (Via the Suez Canal – it is more than 23,000 km). The first steps in the development of the NSR was perceived at home and abroad as a great feat, and explorers returning from their expedition were surrounded by a heroic halo, same as the first astronauts were a few decades later.

Relying on the Northern Sea Route, the USSR was able to not only ensure smooth sea links between its western and eastern regions, but also created a logistical support line, that made possible the development

of natural resources of the extreme northern regions of the country. Starting from the second half of the 1960s, Surgut oil and Yamal gas became the core of the Soviet economy.

The Arctic was not only the pantry but also shield of the USSR. The Arctic Ocean was the shortest path to the shores of its main geopolitical rival. Therefore, the Arctic region was always the home to a powerful military group and the most powerful Soviet naval force – the Northern Fleet. After the collapse of the Soviet Union, military presence had dramatically dropped there. The leaders of Russia in the 1990s did not want to spend money on defense, as maintaining such an infrastructure in the Arctic requires huge expenditures.

At the same time, the economic importance of the Arctic regions in the post-Soviet period has increased dramatically. Today, these regions produce more than 90% of Russian nickel and cobalt, 60% copper, and 96% of the platinum metals group. In addition, about 80% of the country's gas and 60% of its oil are extracted from these regions. Moreover, the forecasted potential reserves of the abovementioned raw materials in the Arctic regions surpass by 70-90% those in the rest of Russia. The shelf of the Arctic Ocean, without a doubt, can be considered as a strategic reserve, which strengthens the mineral resource security of the country. About 1.7% of the population of the Russian Federation – this is the percentage of people living in the Arctic Zone – produces almost 12% of the gross domestic product (GDP). The contribution of the Russian Arctic to national exports is about 25%.

In the 1990s, the Far North was de facto deprived of state support and placed at the mercy of market forces. Today the situation is beginning to change. **The state has started more actively working on the problems related to the Arctic territories, realizing that Russia's future is inextricably linked with the fate of the country's Polar Regions. Their development should be a national priority.**

However, the industrial exploitation of resources in the Arctic – although an important task, is not the only one. The mainland of the Russian Arctic, as the most extensive and economically most developed, compared with similar areas of other Arctic countries, serves as a major platform for fundamental and applied research in various fields of knowledge, the conversion of this knowledge into new technologies, needed for further development of resources of the macro-region.

The Russian Arctic plays an exceptionally large and important military-strategic role for the country. In the 21st century, the state has returned to the task of maintaining a military presence in the Arctic. An Armed Forces Group of the Russian Federation is now active in the Arctic Zone.

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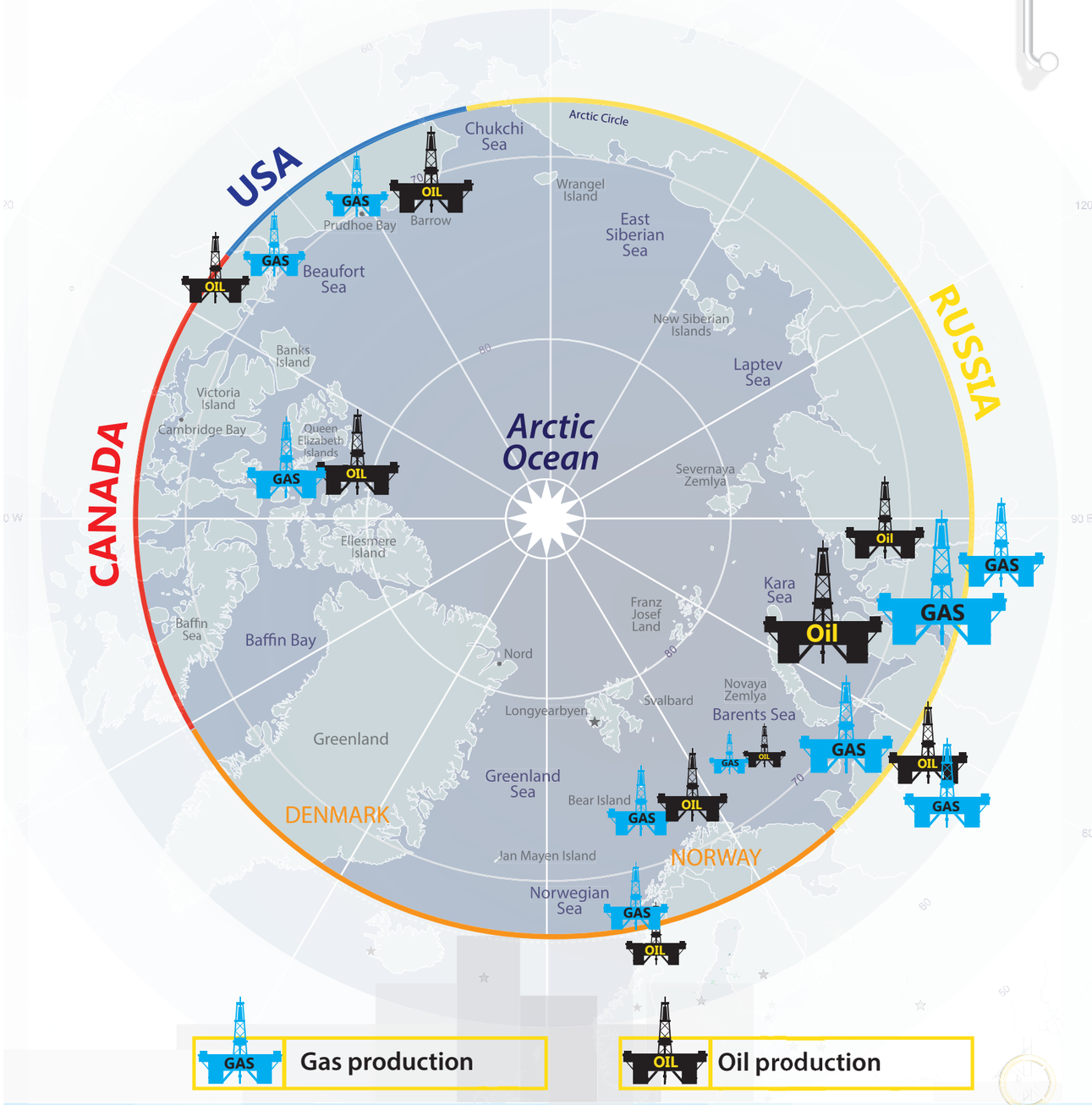
DATA ON THE EXPLOITATION OF FIELDS IN THE ARCTIC



Problems

The development of the Arctic, as in Soviet times – is a very important condition for the development of Russia. However, the development of this region is connected with objective difficulties. In addition, many problems have accumulated in the Arctic during the Soviet period, and in the 1990s.

Climate

The special characteristics of the Arctic climate are influenced by its proximity to the North Pole. The soils here consist of permafrost, and the climate is very harsh. For example, in Yakutia, the maximum amplitude of the average temperature in the coldest month January, and the warmest month July is 70-75 °C. In terms of the absolute value of the lowest temperature (according to various sources this is -67.8 °C or -77.8 °C), the republic has no analogues in the Northern Hemisphere.

In the northern districts of Krasnoyarsk Krai, the average January temperature is -36 °C, while in July it is +10 °C. In the Arctic part of the Yamal-Nenets Autonomous Okrug, for most of the winter the temperatures remain very low (about -35 °C), with the absolute minimum reaching -63 °C. A relatively milder climate exists in the Murmansk Oblast, although here in the winter, the thermometer can also drop to -45 °C.

Such climatic conditions determine the forms of economic activity in the region. In the industrial age, any economic project implemented here requires additional expenditures, as to the implementation of the economic activity, and providing for the livelihood of the people.

Demographics

Non-indigenous population of the Russian Arctic, as a rule, has always been "tied" to major economic projects, mainly related to the mining and manufacturing industries, transport facilities and pipeline infrastructure, and this attachment was due, not in the least, to be higher wages paid here than on the "mainland".

In the 1990s, when economic activity fell in the North, and Northern bonuses lost their significance, there was a massive exodus of people. According to an expert preparing this report, V. Selin, over the past twenty years, the northern regions of Russia (including the Russian Arctic) have been abandoned by almost 20% of the total population that lived here in 1990. The population continues to decline in Norilsk – one of the world's largest polar settlements. In Yakutia today, there are fewer inhabitants than in 1989, although in comparison with 2002, there has been a clear increase. According to V. Selin, a small, but steady decline in population is occurring in the Murmansk Oblast. The only exception is the Yamal-Nenets Autonomous Okrug, where there is a tendency towards continuous population growth. Nevertheless, this fact should be considered as an exception, which only proves the rule. In Yamal, the number of residents is increasing with the growth in economic activities, which has continued here consistently for many years.

Transport, infrastructure and logistics

Russia's Arctic Zone is huge, with the centers of economic activity are often thousands of kilometers from each other. Any activity in the Arctic requires the careful creation of logistics networks, and the development of transport and social infrastructure. However, under local conditions, this does not arise spontaneously, but is always tied to economic projects, and requires clear planning, as well as significant investments of capital and labor. The construction and maintenance of infrastructure is simply too expensive for the implementation of projects for which there is no guaranteed loading. The only exception is the Northern Sea Route – which is a strategic infrastructure project supported at the national level, regardless of situational fluctuations.

The poorly developed transport network in the north of the country hinders the development of the entire macro-region. The river fleet is used to move freight, but the main form of transport is still aviation. Thus, Krasnoyarsk Krai has 26 airports and Yakutia – 23 (for comparison: on average in Russia, each region has only one airport). This type of transport is not cheap, but often there is no alternative. Thus, **a vicious circle is formed, which needs to be broken: the development of infrastructure requires economic projects that could load it and provide the moneys to support it, but the propagation of such projects is hampered by the poor infrastructure.**

Ecology

According to well-established and widely replicated mass media reports on the opinions of experts, the ecological system of the Arctic is very fragile and vulnerable. And this is true: because of climatic conditions, the processes of the self-cleaning ecosystem are considerably slowed down, compared to the more southerly natural zones. Meanwhile, after the withdrawal of Soviet military infrastructure, a great deal of man-made "garbage" was left in the Arctic, in particular, a huge amount is found on Novaya Zemlya, Franz Josef Land, and other places. To clean up the islands, 1.5 billion rubles have been allocated from the federal budget.

In 2010, the special envoy of the Russian President for International Cooperation in the Arctic and Antarctic Artur Chilingarov initiated the project "Cleaning of the Arctic", which is being implemented by the Russian Geographical Society. In 2012, the entire territory of the Alexandra Land Island, part of the Franz Josef Land Archipelago was cleaned up. During the cleanup works, they collected, cleaned and compressed 47,500 steel drums, with a total mass of almost 2,000 tons. Amalgamated and moved to the temporary storage were more than 1,700 tons of fuel and lubricants, collected and processed were about 4,000 tons of scrap metal and 4,700 tons of other solid wastes. In 2013, the works on eliminating contamination were carried out on the islands Rudolf, Hayes, Hofmann and Graham Bell. In the near future, experts plan to clean up Wrangel Island, the territories of Russian presence on the Spitsbergen Archipelago and the New Siberian Islands. Comprehensive evaluations of the ecology in seven major regions of the Arctic Zone will be carried out.

The high costs of projects: delayed innovative development as a problem

Arctic conditions require an innovative approach to address emerging issues. Often, an operation, which on the mainland is quite routine, in the Arctic requires the development and application of special technologies. Innovative development is always very expensive, and in the Arctic conditions, it becomes a super-expensive. Young Russian business initially sought to master the less expensive and more profitable sectors based on traditional approaches and solutions, which did not involve exclusive and expensive implementation schemes for their realization. The slow process of innovation in the Arctic, despite the fact that its development is impossible without innovation – is another problem faced by the macro-region, and is no less acute than the demographic or logistics problems.

Solving problems

The solutions to the above-mentioned problems, of course, lie in the development of profitable economic activities in that region. **The construction of infrastructure, changes in demographic trends, development and implementation of innovations, and the solving of environmental problems, all require profitable economic projects.** Only they will provide demand for new infrastructure and the influx of labor, and furnish funds for innovative development. It is these kinds of projects that will be able to create a resource base for making changes in the principles of existence of the Arctic macro-region, replacing the logic of survival with the logic of sustainable development. However, the extreme conditions, as described above, do not allow us to suppose that such a base can be created by conventional projects, developed by not just the small and medium businesses, but even the "ordinary" big companies. **To be considered as elementarily cost-effective, such base projects should be super-profitable and affordable for implementation by either the state or large corporations.**

As a result, a paradox appears: to solve the problems of the Arctic, large-scale economic projects are needed based on innovation, but the problems, specific to this region, make these projects so complex and expensive that only a few operators dare to take up their implementation. There is only one way out: super large-scale innovative projects should be implemented in the Arctic. These projects can initiate a multiplier effect, and only they can become the driving force behind the development of various industries as well as the territories. The most striking example of such a project – is the production of hydrocarbons from the Arctic Shelf.

In view of the foregoing, it seems possible to answer the key question: What is Russia going to do in the Arctic: only work on exploiting the natural resources of the region, or to carry out large complex projects that can create the conditions necessary for human life? It is hoped that the second path is selected. As **I. LEBEDEV** noted, the key (direction of the development of the Russian Arctic) is not exploitation, but

settlement, creating conditions, in general, for the normal functioning of this zone, the capacities and needs of which are very diverse."

Below we will consider the views of those already mentioned and other experts on the impact of such projects on the lives of the Arctic regions of Russia.

CHAPTER TWO

The production of hydrocarbons as an engine of development of the Russian Arctic

The state program of the Russian Federation "Socio-economic development of the Arctic Zone of the Russian Federation for the period up to 2020" provides a frame-cluster approach, based on the advanced development of transport, energy and social framework of the territory and the concentration of resources in priority areas, development of support zones, and exploitation. To implement these plans requires a fundamentally different quality of transport and energy infrastructure, as well as the social sphere. In addition, according to the conclusions reached in the first chapter, the foundation for such a framework should be the implementation of economic projects that require modernization of all the listed directions. But what are these projects?

The Arctic can only develop through super large-scale and super profitable projects. Only these will be able to act as a locomotive for the development of the Arctic regions, and the profits from these will compensate for the unavoidable additional expenses caused by severe climatic conditions, and will allow for the integrated development of the regions, while maintaining the profitability of the projects themselves. These should not be just projects, profitable in the Arctic conditions, but projects that must be undertaken especially in the Arctic. What projects can be specifically considered as Arctic? First of all, they must be based on the competitive advantages offered by the Polar Region. In the course of this research, they were formulated by **V. SELIN:** "In general, the Arctic economy obviously offers two key competitive advantages – these are the rich resources and transport communications, which look relatively favorable for the next 20 years." Therefore, for now, these projects can be only of two types – logistics (transport) and raw materials.

Currently, there is only one independent transport project – the Northern Sea Route (NSR) and the development of the Murmansk transport hub. Nevertheless, for all its importance, it is unlikely in today's environment, to be able to play the role of a locomotive of development for the Arctic. First of all, for its operation, a large-scale modernization of the northern regions is not necessary, it is sufficient to support the infrastructure of Artic ports created during the Soviet era, and if need be, to slightly modernize it. This will not lead to significant changes in the lives of the northern regions of the country. Secondly, the volume of traffic does not guarantee the receipt of sufficient funds for the integrated development of Arctic territories. In other words, for the NSR, it is neither possible nor necessary to become that locomotive. Other logistical projects (such as the Northern Latitudinal Railway) generally are not independent. As was already mentioned in the first chapter, they can be cost-effective only if there is guaranteed loading for them. Thus, logistics projects are not the locomotive, but only one of the conditions for the development of the Russian Arctic, albeit extremely important projects.

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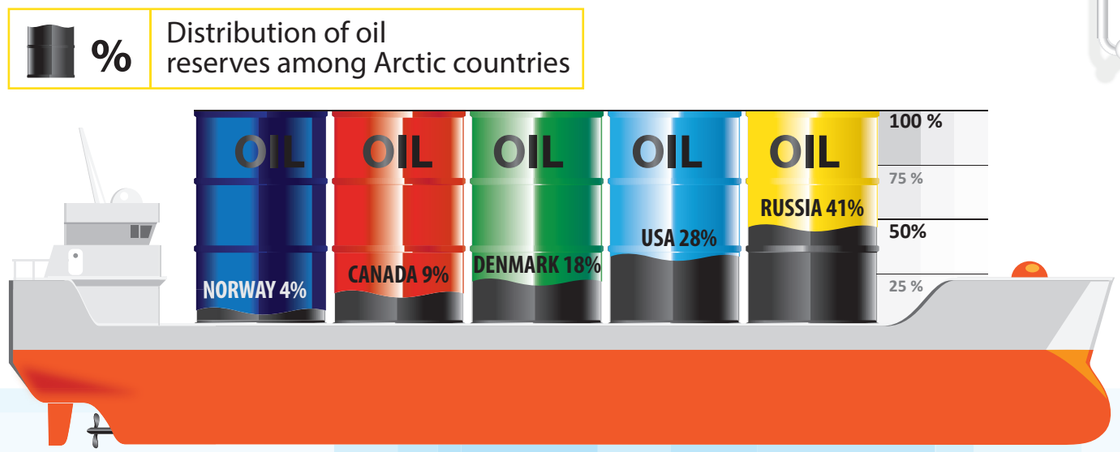
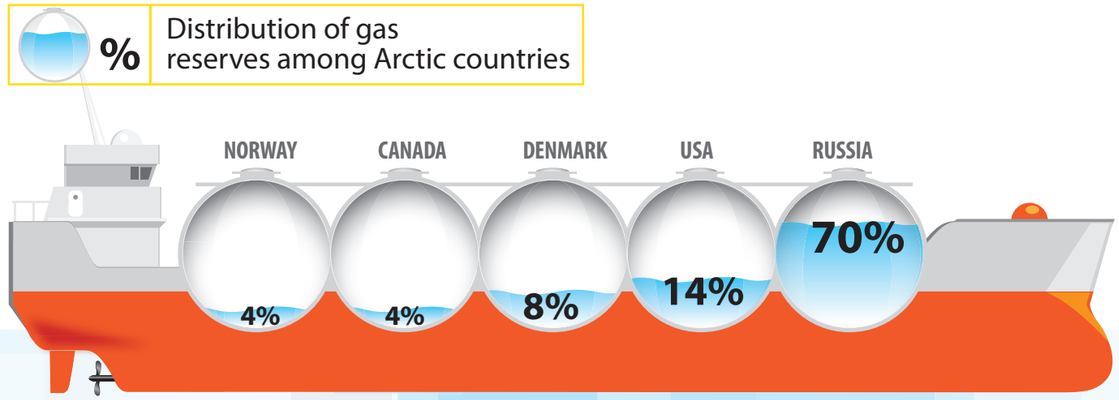
DISTRIBUTION OF OIL AND GAS RESERVES AMONG ARCTIC COUNTRIES





Consequently, the engine of development is found in the area of raw materials. First of all, we are talking about the development of hydrocarbons – oil and gas. Given the permafrost conditions, and especially the multi-meter wide paleo ice, the mining of ores becomes such an expensive and labor intensive task, that no one is likely to undertake such work. Given the enormous mineral wealth of Russia, going to such a degree is still very far away. Yet, the production of liquid and gaseous materials (hydrocarbons), in the Far North, is considered as a promising direction of development.

Major projects, aimed at oil and gas production, will play an important role in the development of the Arctic regions, and what is more, of particular value, according to experts, are Arctic Shelf exploitation projects. It sounds paradoxical: it would seem that offshore projects, especially in the conditions of the Arctic Ocean, are more expensive than similar projects on the mainland. Nevertheless, there really is nothing surprising in the position of experts on this issue, if we recall the general requirements for locomotive projects. These should be super large-scale, extremely profitable and provide the maximum positive impact on the region, forming a framework, the creation of which the abovementioned state program is aimed at.

Obviously, the production of hydrocarbons in the Arctic Shelf may be exercised only within the framework of a truly large and profitable project that can give a powerful impetus to the socio-economic development of the regions. Among other things, the production of hydrocarbons on the shelf requires sophisticated advanced technologies. This situation, in itself, gives rise to innovative developments, and the need for their replication (the installation of new platforms, etc.) involves the creation of a large-scale high-tech production, based on an extensive body of experts who are familiar with technologies of such level of complexity, and are able to develop them.

However, production – that is still not everything. The oil must also be delivered to the consumer, and therefore, a large-scale transport infrastructure must also be established. Communication lines will be laid over territories of currently inaccessible regions and will serve as the basis for intercommunications, both among themselves and with the outside world. The creation of new and the loading of old plants, the development and maintenance of infrastructure – all this leads to the appearance of new jobs, especially in the high-tech field. And this, in turn, will give rise to the need for an educated work force, which will lead to the creation of new and the modernization of existing schools. Finally, the need for information on the environment and the laws of its existence will give additional impetus to carrying out research in the Arctic.

Thus, the production of hydrocarbons on the shelf will become the locomotive of development for the northern territories and the country as a whole. This realization should change attitudes towards the oil and gas production industry: in the North, the notorious "oil needle" will become an engine of development, ensuring that the Russia's return to the Arctic is carried out at a qualitatively new level.

The situation in shelf oil production

Today in Russia, at various stages of implementation, are two major projects involving oil production on the shelf of the Arctic Ocean. The first, in terms of being the first to start – is oil production at the Prirazlomnoe Field. It is located on the shelf of the Pechora Sea, 55 km north of the village of Varandey and 320 km northeast of the city of Naryan-Mar (Pechora River). The sea depth in the area of the field is 19-20 meters. The work here is being carried out by Gazprom, through its subsidiary company Gazprom Neft Shelf LLC, created specifically for the development of offshore oil and gas fields. Production commenced in December 2013 and by September 2014, the millionth barrel of oil was produced. Plans for 2014 and 2015 call for producing 300,000 tons of oil per year. In the future, the maximum level of production can reach 5 million tons. Field life is not less than 25 years.

In September 2014, in the Kara Sea, OJSC NK Rosneft, based on the results of drilling an exploratory well – the Universitetskaya-1 on the East-Prinovozemelsky licensed area – opened a new field called Pobeda (Victory). The revised estimate of the resource base is up to 499,2 billion cubic meters of gas and 130 million tons of oil, with the oil quality being defined as very high. This superlight oil, based on key performance indicators (density and sulfur content), exceeds the benchmark Brent crude, as well as the brands Siberian Light and WTI and is comparable in performance to the shelf oil field "White Tiger" in Vietnam. Moreover, there are many such parcels on the nearby territory. Expert evaluations of the resource base of the three parcels estimate the presence of 87 billion barrels, or 13 billion tons of oil equivalent. The Kara Sea oil province, according to experts, by the amount of resources, will surpass oil and gas provinces such as the Gulf of Mexico, the Brazilian Shelf, the Arctic Shelf of Alaska and Canada, and is comparable with the entire current resource base of Saudi Arabia. We can state that the development of the new province may well become a breakthrough for Russia, similar to the Samotlor Field in the 1960s, thus ensuring a rebirth of the domestic oil industry.

Both projects are already having and will continue to have an impact on the development of the Arctic regions. However, although production at Prirazlomnoye is already underway, and Pobeda is just beginning, in terms of the theme of this report, the potential of Pobeda is higher. Prirazlomnoe is located in the western part of the Russian Arctic, and to ensure its operation there is no need to develop infrastructure, create jobs or promote innovation, education and research in the eastern part of the Russian North. However, it is there, on the Asian side, significantly exceeding the European by its size, where the main wealth is located, and that is where there is an urgent need for economic and social development.

Pobeda lies in the Kara Sea, and this is the eastern part of the Arctic. To be able to carry out oil production, we must develop infrastructure, create jobs, and not only in the Murmansk Oblast, but also in other Arctic regions. In addition, the harsh conditions of the Kara Sea require large-scale projects and innovative technical solutions, because no one will work in such difficult conditions for meager results. Therefore, the issue of innovation and scale of activity here must be very high.

Impact on regions

Thus, shelf hydrocarbon production should become the main engine of development for the Russian Arctic. Can this tool work effectively in the regions?

In search of an answer to this question, the Institute of Regional Problems conducted an expert survey in several regions that are relevant to the problems of Arctic territories. The statements made by the oil companies and the opinions of experts in various industries were analyzed. Taking into account that the Gazprom project is already working, and the Rosneft project is only beginning, the subject of the study were the actual results and forecasts. The material is grouped by the main directions of development.

Infrastructure

Infrastructure development has already begun. The first well on the Universitetskaya Field required the creation of a strong sea-fleet support system: on the Kara Sea, there already operate rescue and transport ships, icebreakers, and floating hotels. It is obvious that in the near future, when the number of exploratory wells will increase, and then commercial production of Arctic oil begins, much more infrastructure will be needed. Rosneft sees its tasks in this regard as follows: the company is developing two clusters – creating a shipyard in the Far East and production facilities in the Murmansk Oblast.

"Naturally, production in the Arctic requires a strong infrastructure – the two bases here will not be enough. This should be an entire series of supply bases, meteorological and research stations," said A. Shishkin, vice president of OJSC NK Rosneft.

In the Arctic, most likely, there will appear civilian airfields and airports, such as those, for example, which have been built by Rosneft in Igarka. A specialized supply base was created in the village of Lavna on the coast of Kola Bay.

The most extensive direction of work, being carried out in the Arctic by Gazprom OJSC, is the strategic megaproject Yamal. The company, together with the administration of the Yamal-Nenets Autonomous Okrug, on behalf of the President and the Prime Minister of Russia, in 2002 created a comprehensive Development Program for the Yamal Peninsula and adjacent offshore areas, and in 2007, this document was augmented. Integrated development of these areas requires the formation of three industrial zones – Bovanenkovskaya, Tambeyskaya and Yuzhnaya – each of which is connected to its own group of fields. The plans until 2030, include the creation on Yamal Peninsula of a gas transportation system of a new generation, which will be unique for Russia. Among those already implemented steps in this direction, we should note the already commissioned in early 2011 railroad – the Obskaya–Bovanenkovo Line with a length of 572 km, which has improved the transport infrastructure of the region. The most difficult stage of the work here was

the construction of a four-kilometer bridge across the Yuribey River. In the future, we plan to extend this line to Kharasavey, which will open its access to the NSR. In addition, as part of the development of the Bovanenkovo Field, in 2012 the Bovanenkovo Airport was placed into operation.

In addition, in the Yamal-Nenets Autonomous Okrug, the Development Corporation OJSC is proposing to implement the already mentioned Northern Latitudinal Railway project, which will provide Yamal with a constant communication link with the mainland, connecting the Northern and the Sverdlovsk Railways. The polar line Obskaya - Salekhard - Nadym - Korotchaevo will open the way to the Northern Sea Route and the Arctic Shelf, thus enhancing the transport security in Russia. This project in 2015-2020 will cost 102 billion rubles.

The experts also believe that the exploitation of the shelf will lead to the comprehensive development of territories and industries focused on them – the construction of new ports, offshore platforms, nuclear and diesel-powered icebreakers, improvements in navigation and communication systems throughout the NSR. Arctic projects will stimulate the construction of airports, aviation and helicopter equipment intended for the Polar Regions, production of equipment for subsea production, the creation of power lines in the Arctic, the development of cold-resistant materials. Moreover, experts believe that the most effective route for the transportation of oil is not the Kara Sea to the west but to the east. Therefore, the development of Pobeda will prove as a stimulus to the construction of pipelines from the north of the Asian part of Russia, to the southeast.

I. LEBEDEV, founder of the Murmansk Center for Economic and Policy Research, and former adviser to the governor of the Murmansk Oblast, believes that the development of Murmansk Transport Hub (its modernization is being carried out with the support of Rosneft, claiming a controlling stake in the project) – is a top priority for the region. This object has quite a strategic importance not only for the Arctic, but also for the country as a whole.

V. SELIN, director of Economic Policy and Economic Activities in the Arctic and the Far North at the G.P. Luzina Institute of Economic Problems, Apatity, draws attention to the construction of a new port on the western shore of Kola Bay. According to him, the Murmansk Oblast is becoming a key infrastructure center fort exploitation of the shelf, where Rosneft is now creating its large base. We are talking here about a dedicated supply base in the village of Lavna, as well as a base to support Arctic projects and a specialized shipyard in the village of Roslyakovo.

D. SOSNIN, Minister of Transport and Roads of Murmansk Oblast, says: Rosneft has chosen the port of Murmansk as one of the main points to support drilling in the Arctic. Accordingly, we expect to see from this project the development of coastal and transport infrastructure, and the attraction of quite significant

investments. There is also quite significant interest in ensuring supplies to the port of Sabetta and the Yamal-LNG from the side of Novatek. As a result of cooperation, the capacity of the port of Murmansk is expected to increase and the western shore of Kola Bay should also be developed. Now only the eastern shore is developed, while the project includes the construction of federal infrastructure on the western shore – a 46-km railway with intermediate stations and the development of new port capacities."

K. ROBBEK, plenipotentiary of the Republic of Sakha (Yakutia) on the Rights of Indigenous Peoples: "First of all, we expect to see the development of transport infrastructure. Without this, there can be no sustainable socio-economic development or successful implementation of industrial development projects on the territory of Yakutia."

I. NORKO, First Deputy Head of the Administration of the Arkhangelsk Oblast on infrastructural development issues, former director of Varandeyneftegas, believes that access to polar areas will increase thanks to the exploitation of the Kara Sea shelf and other, more remote territories, the construction of a tanker fleet with increased ice stability and new airfields.

Capital investments, production and innovation

NK Rosneft plans to invest $400 billion into equipment for offshore operations. It is assumed that these investments will provide a multiplier effect.

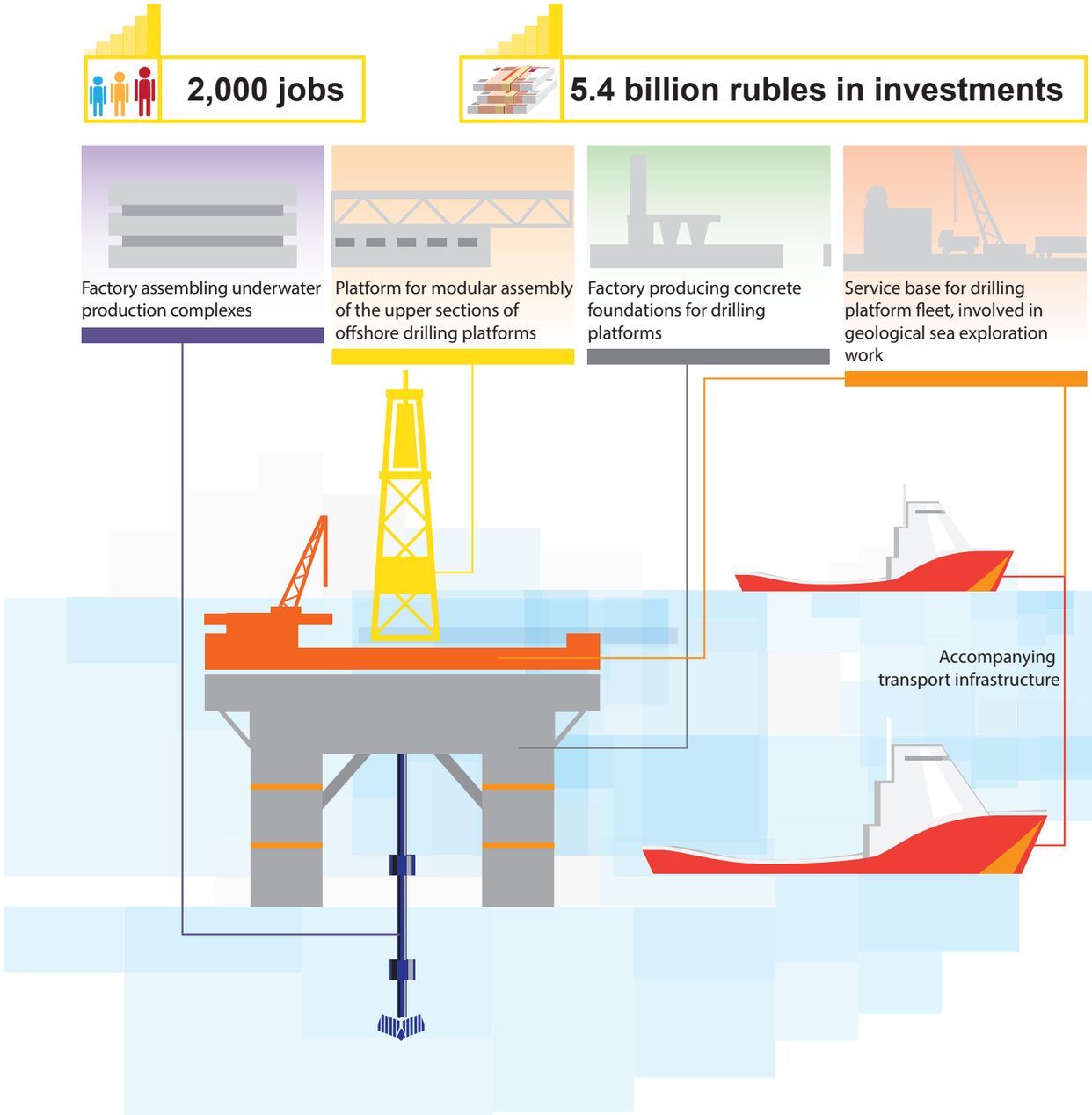
"Every dollar invested into offshore projects generates 7.7 dollars in other sectors of the economy," says Igor Sechin, head of Rosneft. "It seems to me, this is a key position, which justifies support for offshore projects."

The investment program of Gazprom in 2013 amounted to more than one trillion rubles, an increase of 30% over the originally planned level. One of the priorities of the program is the comprehensive development of Yamal fields. This program is estimated by Gazprom to be worth 170 billion dollars by 2030.

Rosneft is actively working to create a unique production base for marine equipment. On the basis of the Far Eastern Center of Shipbuilding and Ship Repair OJSC, they are creating an industrial and shipbuilding cluster, the core of which will become the Zvyezda Complex in the town of Bolshoy Kamen. They are also planning to begin transforming the 82nd Plant, located in the village of Roslyakovo, Murmansk Oblast, into a specialized shipyard for the construction of platforms for offshore oil production. Rosneft has already published a list of equipment and technology that are required at different stages of exploitation of offshore oil and gas fields. Russian manufactures were informed about orders for more than 20 types of ships and aircraft, as well as 30 units of oilfield and drilling equipment. Only in the Arkhangelsk and Murmansk Oblasts, as well as in the Yamal-Nenets Autonomous Okrug, more than 100 companies will

IMPLEMENTATION OF ROSNEFT INVESTMENT PROJECT IN ROSLYAKOVO

The implementation of Rosneft investment project will create up to 2,000 jobs within five years, most of which will be filled by residents of the Murmansk Oblast.



be involved in the execution of NK Rosneft orders. Experts are also expecting a breakthrough in the development of the high-tech industry.

A. LEVITSKY, Director of the Center for Social and Economic Monitoring of the Ministry of Economy and Regional Development of Krasnoyarsk Krai, highly evaluates the prospects for participation of Krasnoyarsk enterprises in work on innovative projects: "We have a radio factory, the Reshetnev Scientific and Production Association, satellite communications, and Krasmash OJSC. They may very well be involved in this work."

V. SAPSAY, Deputy Head of the Department of Local Government at the Administration of the Head of the Government of the Republic of Sakha (Yakutia), talks about the possibilities for new construction, within the development of the Arctic oil production, of an oil refinery in Lensk.

Many local enterprises will be involved in Rosneft and Gazprom projects, said **I. LEBEDEV.**

V. SELIN draws attention to the multiplier effect, arguing that essentially only large companies, primarily in the oil and gas sphere, by virtue of their investment capacity and ability to attract credit financing, can stimulate industrial production of drilling and exploration equipment. After this, the chain will lead to the development of other industries – metallurgy, chemistry, and electronics. "Especially since they have nowhere else to go: they are on our land, on our resources, and in this respect, I think that now there will be a greater impact," the expert estimates the importance of this trend for the region.

Workplaces

Investments into innovation and infrastructure development will inevitably lead to the creation of new jobs. In this case, these are not just abstract jobs, but high-tech, and consequently high-paying, jobs, many of which are based at innovative production plants.

Expectations at the federal level are very significant. **The implementation of Arctic projects will help create one million jobs and will stimulate the development of Russian manufacturing.** This opinion was expressed by A. Krutov, member of the State Duma Committee on Energy, during the 'Arctic Projects – Today and Tomorrow' International Forum in Arkhangelsk.

According to the Rosneft Company, exploitation of the shelf will generate 300 to 400 thousand highly-skilled jobs in the various sectors of the Russian economy. This will create favorable conditions for the development of innovation and the creation of high-tech products. The Arctic project can become a catalyst for a major oil company to evolve into a kind of an incubator for the development of a domestic service industry, a technological "hub" connecting fuel-and-energy companies with sectors such as electric power, machine building, and transportation.

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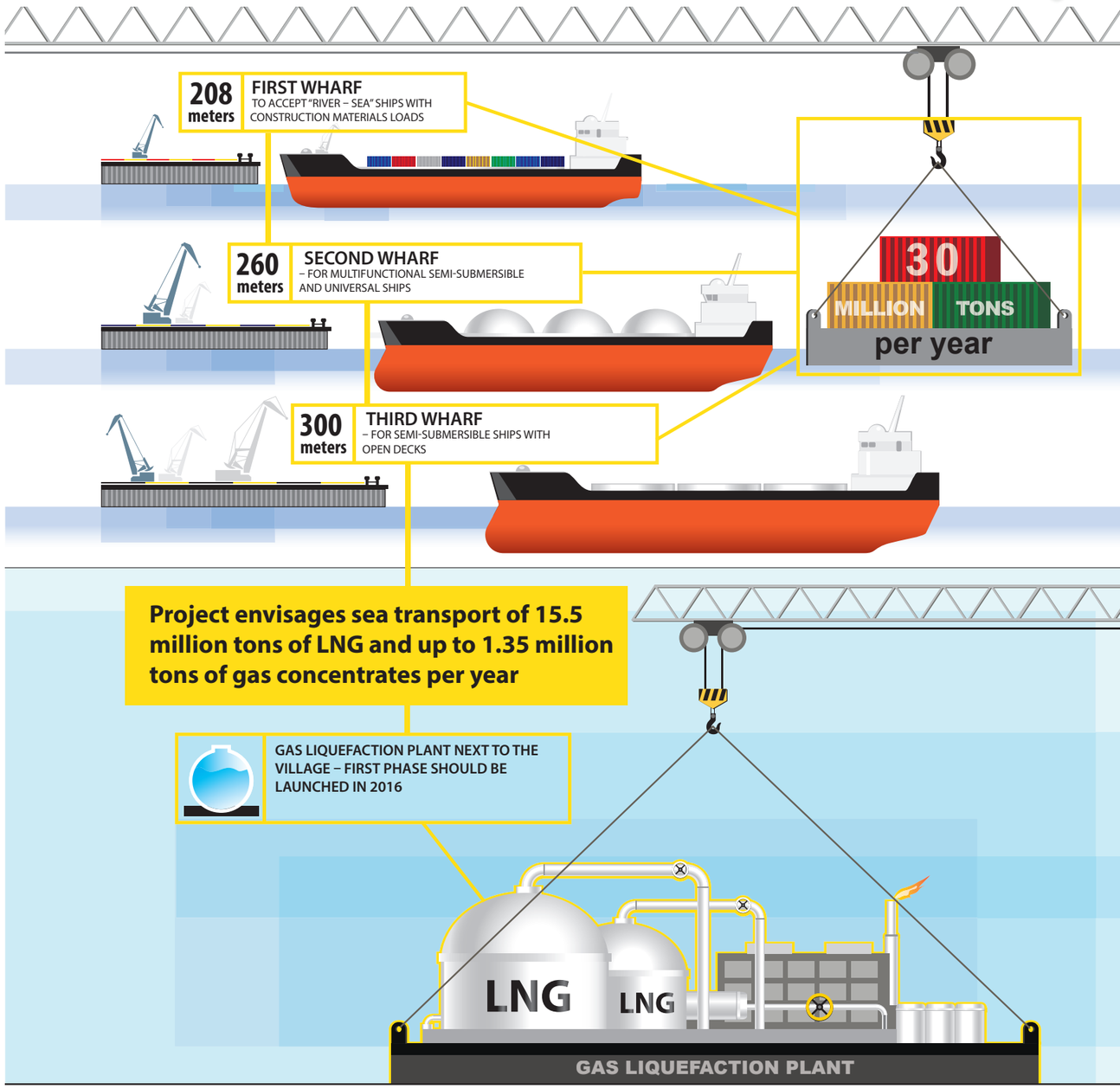
CONSTRUCTION AND DEVELOPMENT PROJECT OF THE ARCTIC PORT OF SABETTA



Regional experts also expect a sharp growth in the labor market, focusing directly on the interests and the immediate prospects of their own regions.

V. SELIN (Apatity): "Today this means more jobs, I think about 2000, although this is quite a lot, because these are only the main positions. Each of them, in turn, will create at least 2-3 jobs in the infrastructure, maintenance, transport, and social spheres. This is quite important for Arctic industry."

Specific figures for his region are also listed by **A. LEVITSKY** (Krasnoyarsk): "Rosneft and Gazprom are working here now, which guarantees the emergence of 8-15 thousand new jobs, that is, those people who will be directly engaged in the work. Then there will also be jobs in the infrastructure, but how many of these there will be – is difficult to calculate for now."

Education

High-tech jobs require trained personnel, and therefore, there will certainly be an increase in the demand for education, in connection with the implementation of the Arctic projects. Moreover, when it comes to oil companies, this is effective demand, and not only for personnel, but also for the development of the educational sphere.

A striking example is the Rosneft Company. In all, the company is now involved in systemic work with 26 universities. One of the most ambitious projects is the creation of an Institute of Oil and Gas in the Siberian Federal University. For the construction of the teaching and laboratory building of the new school, the company allocated about 900 million rubles.

For the training of workers, required for offshore projects, the Government of the Murmansk Oblast, together with Rosneft, is creating on the basis of the Murmansk State Technical University, a special education department – the Center for Arctic Competencies.

Expert assessments of the situation are also favorable.

D. SOSNIN (Murmansk) notes that in connection with the advancement in the Arctic, there is a need for skilled workers, not only in the stevedoring professions, but also in engineering specializations – that is, people who are engaged in the construction of platforms, subsea equipment, etc. – and this is essential.

A. LEVITSKY (Krasnoyarsk) notes: "The Siberian Federal University has an Institute of Oil and Gas, where they also train specialists in northern technologies. At the Space University they are training people in specific types of communications that may also be required."

V. SELIN (Apatity) focuses on the role of Rosneft, a company that has already demonstrated significant achievements in the field of education: Rosneft has already almost created a college. We have the Murmansk State Technical University, where fairly large groups of oil workers are being prepared for the maintenance of oil platforms and infrastructure. Therefore, in the last five years, training of personnel for the oil industry has increased markedly."

Science

Naturally, the prospects for activity in sparsely populated areas and the need for innovative development, are spurring research on the environment and the development of technological innovations. For example, Rosneft has created a special Arctic Research and Design Center of Offshore Development, which will propose technological solutions, develop criteria for the design of offshore structures, explore the seabed soil conditions, and create new technologies for underwater geotechnical drilling, design subsea production systems, underwater pipelines, floating vessels for hydrocarbon exploration and production, drilling rigs, ships and platforms of the ice class. In the laboratories of this Research Center, special technologies are being developed to produce plastics, being able to withstand temperatures of up to -44 °C, without loss of technological qualities, as well as fuel and oil for aviation and marine equipment, which will not freeze at -60 °C. In a few years, Russian scientists expect to overcome the country's dependence on foreign products that are needed to work in the Far North.

In recent years, Rosneft also financed and organized ten Arctic research expeditions. As a result of this work, the system of meteorological observations in the Kara Sea has been re-established.

The general public has learned about the joint plans of Gazprom, the Siberian Branch of the Russian Academy of Sciences and the government of the Yamal-Nenets Autonomous Okrug, to create on Yamal Peninsula a new territorial research center for studying the Arctic. According to media reports, the center will have four divisions, in accordance with the directions of research. The Salekhard division will study socio-economic problems, questions of archeology, ethnology and ecology. The Nadym division will study geology, geophysics, biology and medicine. The area of research of the division on Beliy (White) Island will be comprehensive monitoring of the environment and geocryology. The Novy Urengoy division will study oil and gas chemistry and new technologies for the processing of hydrocarbons. In addition, one of the research priorities will be information technologies.

Experts are also expecting to see a rapid development of scientific research in the Northern regions.

E. AGBALYAN, Section Head of Environmental Studies at the scientific Center for the Study of the Arctic, Salekhard: "Very likely, the new influx of Arctic projects will require the training of personnel, and a variety of organizations will get these orders, including scientific ones, such as our state fiscal institutions of the Yamal-Nenets Autonomous Okrug."

It is obvious that the positions of oil and gas workers in key areas coincide with the estimates of experts. Arctic offshore projects, playing the role of a locomotive for the intensive and integrated development of the Russian Arctic, have begun to yield the expected results, or such results can be expected in the foreseeable future.

CHAPTER THREE

Ecology

The Arctic is one of the planet's most complexly organized ecosystems and includes natural systems of continental tundra and coasts, Arctic islands and shelf, as well as specific complex ice formations of the Arctic Ocean. In addition to the unique flora and fauna, among its features is the specific set of environmental conditions that have led to the formation of permafrost – a unique natural phenomenon, which requires careful attention and in many ways is changing the nature of human existence in the Arctic.

Global factors

The ecological system of the Arctic is very fragile. This condition was noted also by Russian President Vladimir Putin, when speaking at the 'Arctic – a Territory of Dialogue' International Forum in the autumn of 2011: "Despite the image of severity, the Arctic has a very fragile ecosystem on our planet. The price of inattentive, careless attitude towards it is very high, and the consequences – are extremely serious."

Indeed, the natural environment of the macro-region is extremely vulnerable to anthropogenic influences. Given that in society, a common stereotype has been widespread – that dynamic economic activity is a source of environmental risks, the logical question arises – Will not the development and settlement of the Artic, mean a death sentence for its unique ecosystem?

During an analysis of the situation, we must take into consideration that the determining factor in the intensification of development in the Arctic is not the increased population pressure or its attractiveness to settlers (the population level of the Arctic territories remains critically low, and the prerequisites that will lead to a change in this trend are currently not observed), but the growing demands of economic actors on its specific resource capabilities. First of all, interest here is in the minerals, especially deposits of hydrocarbons, and exclusive logistics capabilities (creation and/or development of maritime and land transport infrastructure, delivery of extracted hydrocarbons and products made from them to the consumer). Thus, we are talking about focused development, accompanied by the formation of local "economic bridgeheads", which should be capable of doing business in a limited area. Experts creating this report also believe that development of the Arctic will be of focused character.

V. SAPSAY: "At the initial stage, when we are talking exclusively about mineral exploration, talking about some kind of damage to the environment, in principle, is not necessary, because exploration is conducted within a very limited area, and therefore no harm is caused."

I. LEBEDEV: "We should not seek globalism. It is necessary to start working on those objects that already exist, and if there are places that need to be explored – we should invest into exploration anyway. This must

be very carefully carried out, with information looked at from all sides, in order to minimize environmental damage, or simply to avoid risks for the environment."

Customer, developer and operator of each created "bridgehead" are specific business actors, which, acting with the support of the state, submit to monitoring and bear full responsibility for their actions. Optimization of such monitoring, including a precise definition of its tasks and the creation of high quality working arrangements, as well as improving the regulatory framework, are priority tasks of the state and environmental non-governmental organizations.

Main challenges and responses to them

According to experts, the most important directions of environmental activities today in the Russian Arctic are the implementation of measures to prevent and minimize the consequences of potential accidents at offshore oil and gas production sites and the elimination of the consequences of man-made pollution of the Arctic during the preceding periods, as well as the prevention of increased pollution during the expansion of developed territories.

Environmental security during drilling

Environmental risks, associated with drilling in the Arctic Shelf, and more precisely, the possibility of anthropogenic accidents during the drilling process, are traditionally the focus of environmental and expert communities. Moreover, this is apparently justified, especially in the context of the recent accident on a drilling rig in the Gulf of Mexico, which created a local environmental disaster.

I. LEBEDEV: "The situation is this: there are no claims against any operations today, but this does not eliminate the issue that work on environmental safety must be continued and strengthened.<...> It is necessary to improve our technologies – we need extremely reliable and proven ones – as well as raising the requirements for monitoring systems and regular automated control."

However, experts do not tend to assume that the level of risk is an insurmountable obstacle to industrial development of the Arctic. The determining factors here, in their opinion, are responsible attitude of the interested businesses towards expansion on the Arctic Shelf, the quality of the used technologies, a comprehensive solution to the problems of security, which allows building a multi-level innovative system. The experts recognize that it is this approach that is now being demonstrated by Rosneft and Gazprom, but they still expect further movement by these companies in this direction, new steps to increase the trust between the major production businesses and the public.

The main source of risk that the experts see is not even a deficit of necessary technologies, but their high cost, and the high cost of their maintenance, which leads to concerns that the mining companies will try to

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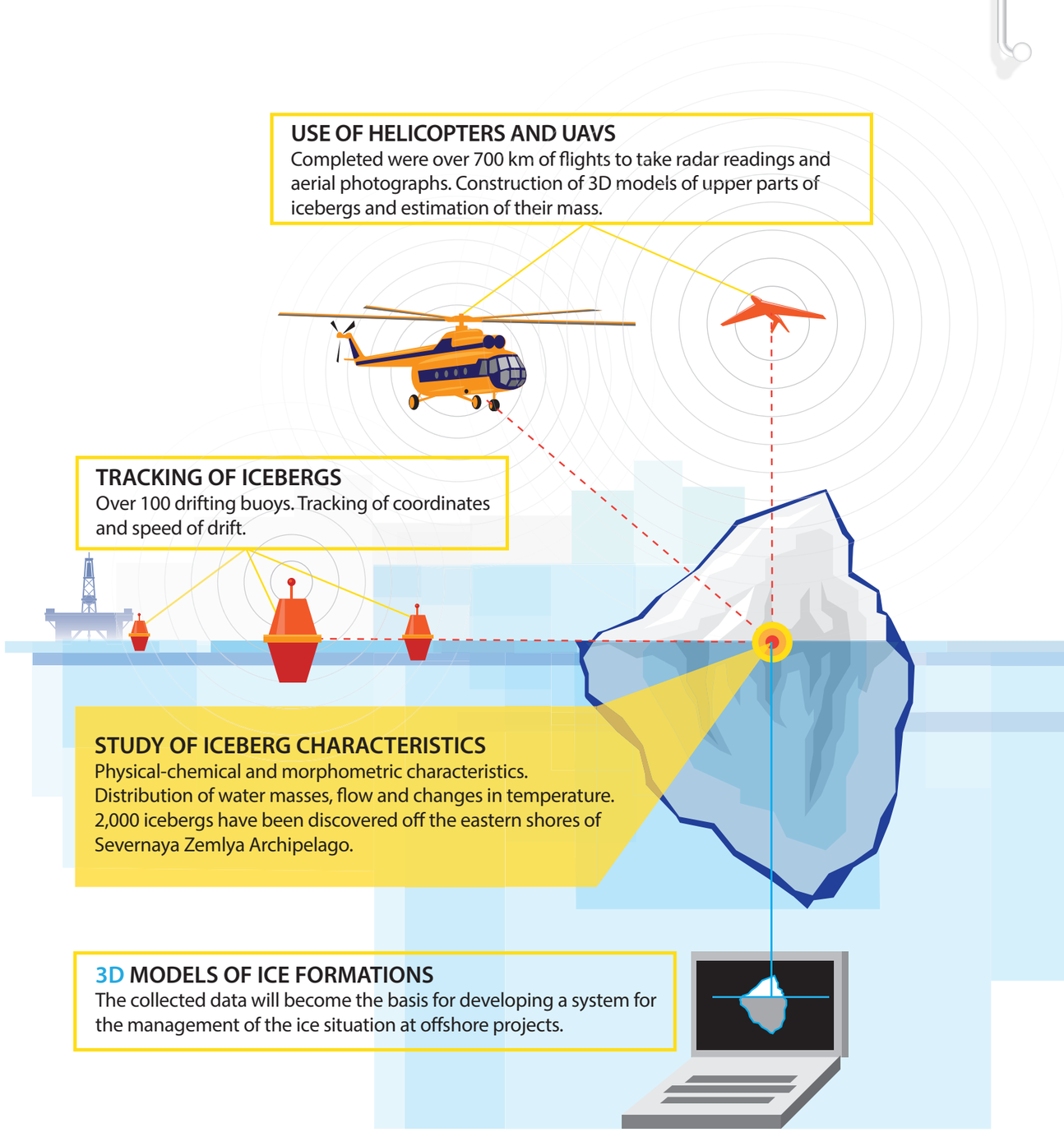
RESEARCH OF ICE AND ICEBERGS – A BREAKTHROUGH IN THE STUDY OF THE ARCTIC



"save money" on the environmental side of the problem. The presence of such concerns seriously raises the issue of the need to develop a system of social control.

V. SELIN: "Cleaning the emissions of gas condensate or clean oil is much more expensive in ice covered conditions, in relation to those territories where there is no ice. And the fact that this is expensive, of course, leads to increased expenses, and increased reassurance activities."

Nevertheless, experts, including professional ecologists, close to public environmental organizations, recognize the fact that in recent years, the attitude of production companies to working in the Far North has undergone a radical change. At the moment, they are implementing effective measures to ensure real security during exploration and production of hydrocarbons. All main claims are associated with the earlier periods of activity, while the oil companies today, besides having their own environmental policies, are making efforts aimed at establishing dialogue with the public, increasing the transparency of their activities and the confidence between the concerned parties.

One of the most effective forms of interaction with the local community and environmental organizations have become the public hearings with the participation of the residents of the settlements located directly in the areas of economic activities of companies. Thus, in November 2014, Arktikshelfneftegaz CJSC, a joint-venture of NK Rosneft and the Federal Property Agency, presented to the residents of the village of Iskateley a program of integrated marine engineering surveys and geochemical studies on the licensed area of Medynskaya-Varandey. During the meeting, the management of Arktikshelfneftegaz together with the local community, assessed the impact factors on the environment of the work being planned in the Pechora Sea. The program came into effect after receiving approval from the representatives of the region's inhabitants.

Extensive planned activities aimed at the protection and rational use of water resources, protection of atmospheric air and land resources from production waste and land reclamation are being carried out by Gazprom. There are new, not previously practiced forms of nature protection activity practiced by the company. Thus, the Gazprom Dobycha Urengoy LLC is implementing a program of activities aimed at the identification of rare and protected species of plants and animals in the Urengoy Field. The examination of materials, from the field research on the territory of economic activities of the company, has identified 17 species of rare and endangered plants and animals, and the company has developed a set of measures for their protection.

E. AGBALYAN: "With regard to implementation by Gazprom and Rosneft of high environmental standards, we can say that this has been the case in recent years. Before that, there were decades of sloppiness and very arbitrary attitudes to environmental regulations. Certain changes for the better have taken place. <...> The undoubted advantage is at least the fact that that companies now regularly report to the public on the measures they are taking in the field of ecology."

I. LEBEDEV: "Here I can only give a general assessment: I think that oil workers are paying sufficiently large attention to the environmental safety of their own facilities. I think there is no reason to claim that safety standards are being violated on projects that are being implemented today."

Cleaning zones of man-made pollution

A second equally important problem related to the protection of the Arctic environment is the need to clean it up from existing man-made pollution. The stereotype perception of the Arctic territories as pristine, untouched by civilization, and basically only in need of conservation, is today largely not true. From the point of view of modern environmental standards, the economic and defense activities in the Soviet period of intensive development, the Arctic does not look civilized. The situation was exacerbated at a later stage, when the areas adjacent to the Arctic coast and on the islands of the Arctic Ocean were abandoned, without the necessary measures being taken. Thus, many industrial and military sites, as well as human-induced and man-made waste landfills are still constant sources of contamination. The newly-started process of Russia's return to the Arctic not only sets the task of providing quality new, hi-tech approaches to the organization of the industrial bridgeheads in the Far North, but also aims at overcoming the negative effects of the activities of its predecessors.

Now this problem is being solved by the regional administrations, the military, some business representatives, and environmental public associations. These efforts are quite scattered and unsystematic in character. Experts have clearly stated the inadequacy of these interventions.

K. ROBBEK: "The question of the need for action at the state level to clean up the Arctic regions from the 'rubbish' has been raised long ago by the public organization Association of Russian Polar Explorers, led by A.N. Chilingarov. In addition, the recommendations made by the 7th Congress of Indigenous Peoples of the North, Siberia and the Far East, held in 2013 in Salekhard, also contain this point. It is true, that at present, according to the available information, some work on cleaning up the Arctic regions from rubbish is being carried on the contaminated territories of islands of the Franz Josef Land Archipelago and on Novaya Zemlya."

E. AGBALYAN: "Over the past few years, with the help of volunteers and the support of the administration of Yamal-Nenets Autonomous Okrug, the Beliy Island – ecological reserve – has been cleaned up. However, such places that need cleaning, according to ecologists, are many just in our okrug." The main problem in addressing the issue of technogenic pollution of the Far North, according to experts, is the absence of clear, efficient and easily replicable solutions to the problem. Techniques for cheap disposal of the consequences of Arctic exploitation during the Soviet era have not been sufficiently developed in Russia, and the current ones are expensive and not used by enthusiast-volunteers who are now de facto the main labor force engaged in cleaning up the Arctic."

A. LEVITSKY: "This agenda exists, there are discussions held on this subject, and even a variety of conferences are being held, but nothing is being really done. Everything that is located above the Arctic Circle is very difficult to dispose of, and it is not clear where to get rid of it, and how."

Thus, the solution to the problem rests largely in the presence of an effective operator, with the ability to finance the process of cleaning up the Arctic coast and purchase the necessary technical equipment and technologies. In the context of the real market, such an operator can only be a large corporation, interested in working in the Northern Territories, and in the formation of a positive image of itself. The attention of mining companies to the Arctic Shelf makes them the preferred executors of such a global social contract, whose customer should be Russian society, represented by environmental associations. The most promising partners for them – given the scale of the projects, the willingness to invest into Arctic infrastructure and positive experience – could be NK Rosneft and Gazprom.

Thus, Rosneft is actively investing into environmental protection activities: from 2009 to 2014, for this purpose, the company had spent 125 billion rubles, and from 2014 to 2018, the company plans to double this amount. In 2011, the Arctic Research and Design Center of Offshore Development was created, whose main purpose is to support all work carried out on the shelf. This Center carried out a series of comprehensive scientific expeditions – the "Kara-summer" and "Kara-Winter" (2012, 2013, 2014.). Work on geological exploration was preceded by a series of detailed studies of the environment – the weather, ice conditions, its movements, and especially the animal world. For several years, such studies are being conducted in the Kara and Chukchi Seas, and in the Laptev Sea. The data obtained are taken into account when planning exploration, development of a strategy to ensure environmental safety, the design of future platforms and determining all the logistics to support offshore projects.

During the research expeditions, significant amounts of data were collected in the field of ice conditions, meteorology, hydrology, airborne geophysical and geochemical exploration techniques. On the Universitetskaya Field, unprecedented measures were adopted to prepare for emergency responses, in particular, a preventer was installed – this is a device that ensures the sealing of the mouth of oil and gas wells in emergency situations. Environmental monitoring is constantly conducted, both directly during the drilling process, and before it begins, and after the drilling rig at the West Alpha was abandoned. Thus, the current activities of Rosneft demonstrate how large companies, interested in working on the Arctic Shelf, are able to operate effectively in the interests of protecting ecosystems from pollution.

High responsibility in terms of environment safety has been demonstrated by Gazprom as well. By the order of this company, specialists at the Krylov State Research Center carried out research on the hydro-physical characteristics of the marine environment in the area of the Prirazlomnoe Field and on the track of the

underwater gas pipeline in Baydaratskaya Bay. According to media reports, workers carried out research on the physical fields of offshore processing facilities and the ocean during the entire summer of 2012. A hydro-physical hardware complex, created by the Krylov Center, was used to make the measurements.

The data obtained helped determine the safe points for geological exploration, design drilling platforms and other facilities necessary for oil production, select the best routes for transportation of hydrocarbons and the possible route for underwater pipelines, that is, on a scientific basis to minimize environmental risks.

The objective of the environmental community at this stage should not be confrontations with the companies engaged in the production of hydrocarbons on the shelf, but the search for effective interaction mechanisms, establishing long-term partnerships, the formulation of objectives of a social contract and the assumption of monitoring functions in the process of its implementation. The experience of Rosneft and Gazprom will be useful for other large companies interested in the implementation of business projects in the Arctic Circle.

CONCLUSION

The recent successes of Russian oil production companies in developing the Arctic Shelf of Russia, and first of all, the successful drilling of exploration wells in the Pobeda Field, allow us to speak about the birth of a fundamentally new period in the history of not only Russian, but also of world oil production – the beginning of the **Arctic Era.**

The Arctic occupies an important place in the economic life of Russia. Currently, more than 90% of Russian nickel and cobalt, 60% copper, 96% of the platinum metals group, about 80% of the country's gas and 60% of the oil are produced here. **Further exploration of the Arctic – is one of the strategic goals of modern Russia.** However, this goal is complicated by objective and subjective difficulties, including the severe climate; a long period of state neglect of the Arctic territories and the related significant outflow of population; fragile ecosystem that requires expensive environmental measures; poor transportation infrastructure and, as a consequence of all the above-mentioned, high costs and riskiness of carrying out economic activities.

It is fully obvious that the Arctic can be developed only at the expense of large-scale and highly profitable projects that will become the locomotives of development of the Arctic regions. Profit, offsetting the unavoidable additional expenses, will help solve all complex tasks on the development of the producing areas, while preserving the profitability of the projects themselves.

Large-scale programs, serving as the engine of development for the Russian Arctic, should be based on specific competitive advantages offered by the Polar Region – rich resources and transport communications, which can ensure profitability over the next 20 years. However, the transport projects in this area can only exist if they have guaranteed loading, as a prerequisite for settlement of the macro-region. **The production of hydrocarbons, primarily on the shelf, can serve as the locomotive of development for the Arctic region.** Such projects are highly profitable, and the complexity of their implementation requires innovative solutions, which in turn leads to the creation of high-tech industries, and hence well-paying jobs. The basis for the formation of localized effective demand will appear, stimulating services and ensuring livelihoods of people, and the emergence of modern social infrastructure. The need to deliver oil will motivate the construction and expansion of the transport networks. This entire set of factors, in combination, will create a multiplier effect and entail the comprehensive development of territories.

"Every dollar invested into offshore projects generates 7.7 dollars in other sectors of the economy," says Igor Sechin, head of Rosneft. "It seems to me, this is a key position, which justifies support for offshore projects."

Such integrated development programs are already being carried out. A striking example is the Rosneft project in the Pobeda Field in the Kara Sea. Having barely started, it is already affecting the life of the Russian

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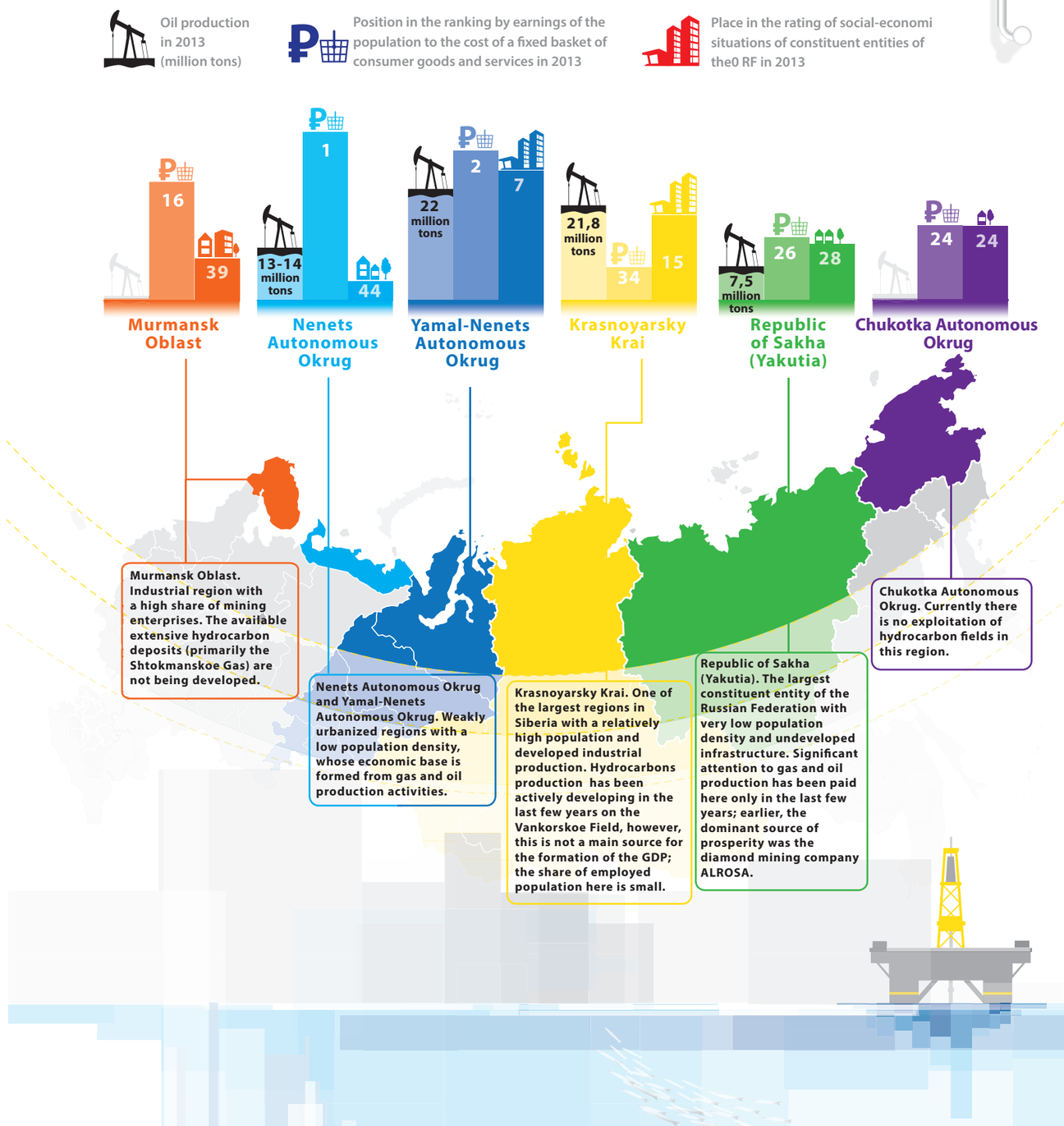
BASIC PARAMETERS FOR REGIONS IN THE ARCTIC ZONE



Arctic, and there is reason to expect even more significant positive results in the foreseeable future. All experts that have worked on the preparation of this report agree with this statement.

Infrastructure

The production of hydrocarbons in the Arctic requires a strong infrastructure, an entire series of technology centers, supply bases, meteorological and research stations. This process has already started, and its first steps can be monitored and analyzed. A specialized supply base was created in the village of Lavna on the coast of Kola Bay. The Murmansk Transport Hub is being upgraded, and the port of Sabetta is being built. The next step in the development of transport infrastructure of Yakutia is the construction of new airports, etc.

Manufacturing and Innovation

Experts are predicting the development of high-tech industries and enterprises in the Murmansk Oblast, Krasnoyarsk Krai, Yakutia, Yamal-Nenets and the Nenets Autonomous Okrugs. The first steps have been taken to create a construction base for drilling platforms for Rosneft in the village of Roslyakovo. The company has already published a list of equipment and technologies that are required at different stages of exploitation of offshore oil and gas fields, and Russian manufactures were informed about orders for more than 20 types of ships and aircraft, as well as 30 units of oilfield and drilling equipment. **Only in the Arkhangelsk and Murmansk Oblasts, as well as in the Yamal-Nenets Autonomous Okrug, more than 100 companies will be involved in the execution of NK Rosneft orders.**

Only large corporations, primarily in the oil and gas sphere, by virtue of their investment capacity and ability to attract credit financing, can stimulate in Arctic lands industrial production of drilling and exploration equipment. After this, the chain will lead to the development of other industries – metallurgy, chemistry, and electronics.

Workplaces

Regional experts, in the near future, expect the emergence of 8-15 thousand new high-tech jobs in Krasnoyarsk Krai, two thousand in Roslyakovo, and 4,000 in the Murmansk Oblast. New jobs will also be created in Yakutia.

If we talk about the long term, according to NK Rosneft, the result of work on the shelf by just this one company, will lead to the appearance of 300-400 thousand highly skilled jobs in various sectors of the Russian economy.

Education and Science

In this direction, the leader is also Rosneft, which is now involved in systemic work with 26 universities. In

particular, the company is rolling out a personnel-training program in Murmansk, but orders for specialists may also be received by universities in Krasnoyarsk, primarily the Siberian Federal University. Thus, one of the most ambitious projects became the creation of an Institute of Oil and Gas in the Siberian Federal University. For the construction of the teaching and laboratory building of the new university, the oil company allocated about 900 million rubles. For training of workers, required for offshore projects, the Government of the Murmansk Oblast, together with Rosneft, will create, on the basis of the Murmansk State Technical University, the Center for Arctic Competencies.

The Company has also established a special Arctic Research and Design Center of Offshore Development, which will propose advanced technological solutions for projects involving the production of oil, as well as environmental safety, and the cleanup of Arctic territories. Many research centers – on the federal and regional levels – are already cooperating with Rosneft, and the company plans that the number of such organizations will only grow in the future. The Arctic Research Center in Salekhard is also hoping to participate in such cooperation.

* * *

The monitoring of processes and analysis of expert opinions, as a whole, confirms that projects involving the development of oil and gas resources of the shelf will have a positive effect on the development of the Arctic. The most striking example of this kind of project today – is the Pobeda, which is associated with the achievement of significant positive results.

The only factor, which is creating negative expectations among the experts, is the environmental threat. The Arctic ecosystem is perceived by public and expert communities as an absolute value, meanwhile humanity cannot abandon economic activities on these lands. The only way out of this situation, experts see as the strengthening of environmental activities by large companies going to the Arctic, which are aware of their responsibilities, have sufficient financial and technological resources to provide the best environmental safeguards and take into account public opinion when planning their work. Here too, the experience of Rosneft is telling, and its creation in 2011 of the Arctic Research and Design Center of Offshore Development. It would also be useful to study foreign experience for ensuring environmental safety of projects in the Arctic.

Based on the foregoing, it can be argued that offshore production of hydrocarbons is now becoming a powerful tool of economic growth in Russia, ensuring the return of Russia to the Arctic and the further systemic development of this strategically important region.

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