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Support Economic Complexes of the Arctic Region of Russia

Sergey S. Vopilovskiy ^{1✉}, Cand. Sci. (Econ.), Associate Professor, Senior Researcher

¹ Luzin Institute for Economic Studies — Subdivision of the Federal Research Centre “Kola Science Centre of the Russian Academy of Sciences”, ul. Fersmana, 24a, Apatity, Russia

¹ simonovich.63@yandex.ru ✉, ORCID: <https://orcid.org/0000-0002-2873-1425>

Abstract. The study examines the key vectors of economic intensification of the formation of support complexes for the regions of the Arctic zone of the Russian Federation. In the high latitudes of the country, Russian scientists conduct research in a wide range of scientific areas related to the study of the climatic state of the Arctic, the availability of natural resources, changes in the natural landscape, the application of high-tech methods in the industrial production of strategic products and materials. Climatic and environmental components are the main focus of Arctic scientific research, ensuring the sustainable development of the Far North regions. An important role is given to international cooperation within the framework of the Arctic Council, which is responsible for implementing timely decisions to promote situational approaches related to rapid climate change and other urgent tasks in the Arctic. The study presents newly created industrial facilities in the areas of large open deposits, the construction of new ports and port infrastructure, implemented investment projects in the Arctic agglomerations, on the basis of which it is possible to conclude that the system of state support has been optimized and that businesses are ready to assist in the development of existing and promising projects. It is specified that the economic potential of natural resources and the degree of their use depend on the effectiveness of the applied measures of technological and regulatory nature. The role of the cities of the Far North as large industrial and energy centers with a diversified economy, developed urban environment, high-quality medical care and decent educational activities, which are the basis of the supporting economic complexes of the Arctic zone of the country, is noted. The main directions for transport and logistics support, development of mineral resource centers, energy and infrastructure support are presented in order to form the support economic complexes of the Arctic region of Russia.

Keywords: *economy, Arctic, support complexes, scientific research, infrastructure development, logistics, transport hub, cities of the Far North*

Introduction

In the current geopolitical environment, modern Russia continues its large-scale development of Arctic territories. The tasks set provide support for strategically important areas of development of the entire Arctic zone of the Russian Federation (AZRF) on a wide range of significant criteria. The focus is on national security, economic development, increasing the quality and life expectancy of the population of the Far North and many other promising Arctic projects, but the key task is to preserve the unique nature and biological resources of the northern seas and Arctic territories.

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Scientific research and international academic cooperation

The climatic state of the Arctic has a dominant influence on the climate of the Earth. The implementation of Arctic scientific and industrial programs, investment projects and other research by Russian scientists is an indicator of rationality and an invitation to cooperation, first of all, to the countries of the Arctic Council, as well as many other states that think reasonably and prospectively. According to scientists, the Arctic Ocean could be ice-free for an entire month (August — September) by the end of the 2020s — beginning of the 2030s. The reduction of snow and ice cover in the Arctic has a significant impact on the population, animals and other local ecosystems, and serves as a reminder of the catastrophic consequences of global sea level rise. The ice of the Arctic Ocean acts as a “safety cushion”, which is an essential component in mitigating the impact of ocean waves on the coastal area. The melting of glaciers and the reduction in the area of sea ice (“ice sheet”) in the Arctic zone will create conditions for an increase in ocean wave height, which will cause coastal erosion and possibly changes in the natural landscape [1].

Russian scientists and polar explorers have been researching the Arctic Ocean for many years. For example, with the commissioning of the ice-resistant self-propelled platform “North Pole”, polar researchers got a new type of station. The drifting station “North Pole-41” successfully completed its work in May 2024 and returned to the port of Murmansk. The expedition lasted 20 months, the drift of “NP-41” was 3,000 nautical miles, modern equipment provided new opportunities for studying the natural components of the Arctic zone: from the bottom of the Arctic Ocean to the stratosphere. A program of 50 areas of scientific research was implemented, including geophysical, glaciological, seismic and aerological studies. In September 2024, the “NP-42” expedition was launched, which demonstrates Russia’s broad capabilities to conduct long-term scientific research in high latitudes to understand and predict climatic conditions, develop safety measures for living in Arctic regions, and navigate the Northern Sea Route effectively. The work of scientists from the Arctic and Antarctic Research Institute at the “NP-42” station may last until 2026, with the station drifting freely across the entire polar region until it reaches open water.

A new Russian station “Vostok” has been built at the South Pole, where Russian scientists conduct research on climate change, identify the features of the influence of cosmic radiation on the Earth, which is clearly visible in the southernmost latitudes, and carry out a wide range of important scientific research and tasks. Analysis of their research indicates the relationship between natural phenomena of both the North and South Poles. The breakaway of the giant iceberg A23a from Antarctica and its movement to the Southern Ocean provides scientists with the opportunity to collect information on changes in the polar ecosystem, since the beginning of ice movement is influenced by many environmental factors, and icebergs are indicators of changes in the external environment, since they are especially sensitive to temperature fluctuations. The world’s largest iceberg, A23a, has an interesting history: it is an iceberg that refuses to break up into fragments — to melt, and therefore to cease to exist. In 2020, it began drifting and in early April 2024, it entered the Antarctic Circular Current (ACC), which moves a hundred times more water around the

globe than all the Earth's rivers combined. The ACC was supposed to send A23a to the South Atlantic, where it would eventually melt. But something surprising happened: A23a was frozen at the top of a huge rotating cylinder of water and remains in place north of the South Orkney Islands, rotating counterclockwise at a rate of about 15 degrees per day. According to scientists, this could continue for many years.

Predicting and preventing climate disasters is the main task of scientists around the world, therefore, international cooperation between states in this area within the framework of implementing environmental policy in the field of environmental protection and sustainable development of polar regions is important. In this regard, the Arctic is a territory of cooperation, mostly Russian territory, and Russian scientists are ready to interact with academic communities of other countries to create environmental sustainability on the Earth [2; 3].

At the current stage, the work of the Arctic Council is partially restored, but meetings at the political level are not yet possible. Nevertheless, in early 2024, all eight Arctic states (Denmark, Iceland, Canada, Norway, Russia, the USA, Finland, Sweden) in consultation with six permanent participants from among indigenous peoples reached a consensus on resuming official meetings of the Working Group. The value of the Arctic Council lies in the daily work of the Working Groups that address the most pressing issues affecting people living in the Arctic, the ability to promote projects that respond to rapid climate change and other urgent tasks in the Arctic. Today, Norway is the Chairman of the Arctic Council (2023–2025), the country has announced two ambitious goals: to safely hold the Council in these difficult times and to ensure that the Working Groups can continue their vital work.

The Russian Federation calls on the international academic community to cooperate in the implementation of Arctic scientific and industrial programs. An example of the implementation of such programs is cooperation with Belarus and the BRICS countries. The Republic of Belarus plans to actively participate in the construction of an Arctic cargo fleet and cargo terminals in the ports of Murmansk and Arkhangelsk. In August 2024, at the forum on the climate agenda in Moscow, the BRICS countries adopted a framework for climate and sustainable development, which will allow the countries of the association to determine measures to combat climate change without harming the economic well-being of the countries [4; 5].

The solution of strategic tasks for the development of the Arctic zone of the Russian Federation is subject to the logic of the implementation of strategic plans for the development of the Arctic Zone of the Russian Federation. The Decree of the President of the Russian Federation dated October 26, 2020 No. 645 approved the Strategy for the Development of the Arctic until 2035¹, which is a key policy document at the federal level. In conditions of uncertainty caused by geopolitical transformation, there is a need to create support complexes in the Russian Arctic, the strategic goals of which are to ensure the sustainable development of all territories of the Arctic Zone

¹ Strategy for Developing the Russian Arctic Zone and Ensuring National Security until 2035. URL: <https://strategy.arctic2035.ru/> (accessed 10 September 2024).

of the Russian Federation, to optimize the state support system, to strengthen national security, as well as the social and economic power of the country.

Support economic complexes: role and importance

The Government of the Russian Federation has approved a list of support settlements of the Arctic Zone of the Russian Federation², which are divided into three groups: (1) border zone centers, (2) locations of emergency response services and law enforcement agencies, (3) socio-economic development group, which has five subcategories: infrastructure, logistics and socio-cultural centers, unique production facilities, information and innovation support for the socio-economic development of the Arctic Zone of the Russian Federation, and bases for the development of mineral resource projects.

The Northern Sea Route (NSR) is the most important transport corridor of national and global significance, the development of which is a priority strategic task in the Arctic Zone of the Russian Federation. The NSR is an extensive component of the AZRF development for both domestic needs and international transport communications; therefore, the support complexes that have been created and are being created are prestigious sea, land and air gateways to the Arctic. There should be many “supports” along the entire length of the NSR waterway, since they will ensure timely and high-quality monitoring and ice reconnaissance, ship supply, emergency assistance, comfortable conditions for rest and accommodation of crews and the population in harsh Arctic conditions [6].

Arctic ports are important support areas for the NSR: without a significant increase in port capacity on the coast of the Arctic Ocean, it will be incredibly difficult to achieve the target of transporting 90 million tons of cargo in the NSR water area by 2030. At the current stage, the growth of cargo turnover along the NSR is due to the export of energy resources extracted in the Arctic Zone of the Russian Federation and the growth of the import of equipment and materials intended for the development of production, the construction of critical infrastructure and the arrangement of support settlements, which is very important for the economic and social development of the territories. Nevertheless, serious work is underway to create and develop an Arctic transit corridor to the countries of the Asia-Pacific region (APR) [7; 8].

For example, in 2023, China's Newnew Shipping Line launched regular container shipping between St. Petersburg, Arkhangelsk and the ports of the People's Republic of China (PRC) along the NSR, and in 2024, an agreement was signed to organize a year-round container line and create a joint venture for the design and construction of high ice class Arc7 vessels [9].

² Order of the Government of the Russian Federation of November 28, 2023 No. 3377-r "On approval of the list of support settlements (municipalities) of the Arctic zone of the Russian Federation, including those performing functions to ensure national security and (or) functions of a base for the development of mineral resource centers, the implementation of economic and (or) infrastructure projects in the Arctic". URL: <http://publication.pravo.gov.ru/document/0001202312040019> (accessed 10 September 2024).

In 2023, the joint venture International Container Logistics LLC was registered, 51% of the shares belong to Rosatom State Corporation through its subsidiary Rusatom Cargo LLC and 49% — to the port operator DP World, United Arab Emirates (UAE), which can be considered the starting point for the creation of a mega-cluster in the Arctic. The UAE's investments in International Container Logistics LLC are aimed at developing transport logistics along the Northern Sea Route for the transportation of containers, which will increase the overall cargo flow along the NSR. The interests of Russia and the UAE are obvious: (1) Dubai Port World (DP World) is the largest port operator in the world, operating 78 sea terminals and the world's largest industrial park Jebel Ali Free Zone (JAFZA), (2) Russia has the most powerful icebreaker fleet in the world. As a result, Russia gets a reliable hub for loading, unloading and storage, and the UAE receives a wide geography for the supply of its goods and goods from other countries. The total revenue of companies invested from UAE funds amounted to 8.4 trillion rubles in 2022 [10; 11].

As part of the tasks set, the reconstruction of key Arctic ports is being carried out consistently: Murmansk and Arkhangelsk transport hubs are multimodal transport hubs (terminals and transshipment complexes are being built in these territories).

The Murmansk port is the largest, ice-free and deep-water, with a developed infrastructure, having undeniable advantages of its geographical location, is a key support territory for the economic development of the AZRF.

More than 20% of the total cargo turnover of the Murmansk Commercial Sea Port (MCSP) — mainly coal, anthracite, coke — are shipped along new transport routes: East, South, Southeast and Southwest Asia, the Middle East and West Africa. MCSP is actively developing new transport and logistics routes, taking into account existing and developing opportunities to ensure the presence of in-demand Russian products on international markets. Nevertheless, the Arctic direction remains one of the key areas of activity. According to the results of 2023, the volume of cabotage cargo handled by MCSP amounted to 1.3 million tons: inert cargo — crushed stone, sand; general cargo — machinery, equipment.

Investments in digital transformation and modern technologies make it possible to increase the efficiency of ship servicing and improve logistics [12; 13]. In December 2023, an agreement was signed to expand the sea container terminal — the creation of the Western transport and logistics terminal in Murmansk³. The project involves large-scale construction and reconstruction of port infrastructure facilities: the construction of coal transshipment terminals, the construction of 10 railway stations and parks, the reconstruction of 4 stations and railway lines. The investment volume is estimated at more than 44.5 billion rubles. In 2024, the opening of the Lavna port (western coast of the Kola Bay) is planned; according to experts, the capacity will be from 18 to 34 million tons.

³ An agreement was signed on the construction of the WTLH sea terminal in the Murmansk Oblast worth 44.5 billion rubles. URL: <https://portnews.ru/news/357832/> (accessed 10 September 2024).

The new Murmansk transport hub will make a significant contribution to the development of the international North-South transport corridor; in particular, communication will be provided from Murmansk to Bandar Abbas in Iran; the delivery of goods from Murmansk to Mumbai will be reduced by 4 times compared to traditional routes. In the current geopolitical situation — the shift of centers of economic activity to China, the countries of Southeast Asia and the Persian Gulf — the North-South route is becoming the transport infrastructure for new logistics solutions [14].

The port of Murmansk undoubtedly serves as a fundamental support territory from which the formation of the Arctic zone of the Russian Federation began, and at each new stage of development of the country and the world economy, it is a unique, in-demand economic mechanism.

The Arkhangelsk transport hub is the oldest, most significant and promising complex for increasing cargo turnover along the NSR, in particular, for increasing the capacity of the railway approaches to the Arctic highway. Without the necessary land routes, the construction of a new deep-water terminal in the Arkhangelsk seaport in the Sukhoe More area will not be profitable. Consequently, the construction of a new railway line to the coast of the Dvina Bay is being considered. In the future, taking into account the development of the port infrastructure of Arkhangelsk, the Belkomur railway project will be implemented, which will directly connect the regions of the Urals and Siberia with the industrial and mining enterprises of the Northwestern Federal District (NWFD). The deep-water port of Arkhangelsk with a currently confirmed cargo volume of 20 million tons is planned to be built by 2035.

The phased construction includes:

- Stage 1 — construction of a terminal for mineral fertilizers with a capacity of up to 3 million tons of cargo per year in the interests of PJSC PhosAgro ⁴;
- Stage 2 — construction of a terminal for bulk oil cargoes and gas condensate with a capacity of up to 4 million tons of cargo per year in the interests of PJSC Gazprom;
- Stage 3 — a universal terminal with a capacity of 38 million tons per year in the interests of Russian Transport Company LLC.

In the future, it is planned to build a sea terminal on the Novaya Zemlya archipelago for the shipment of lead-zinc concentrate in the interests of the Rosatom State Corporation, commissioning — in 2026.

Arkhangelsk is a freezing port; from November to April, icebreakers provide year-round navigation for ice-class vessels. The flow of fuel cargo on the Arctic line is the main one for the port. General cargoes, vehicles, and containers are delivered to the Arctic ports of Sabetta, Dikson, Dudinka and others. In 2024, Ruscon organized accelerated delivery of containers by rail from Moscow to Arkhangelsk, and then by the Northern Sea Route to the ports of the Far East. In ac-

⁴ PhosAgro PJSC. URL: <https://ibprom.ru/fosagro> (accessed 10 September 2024).

cordance with the plan for the development of the NSR until 2035, the Government of the Russian Federation will allocate more than 7.8 billion rubles to subsidize transportation ⁵.

Table 1 shows the cargo turnover of seaports in the Arctic Basin of Russia for the period 2020–2023.

Table 1

Cargo turnover of seaports in the Arctic Basin of Russia for the period 2020–2023 (mln t)

Port	2020	2021	2022	2023
Murmansk	56.1	54.5	56.3	57.8
Arkhangelsk	3.3	3.2	2.3	1.9
Sabetta	27.8	27.9	28.4	27.8
Varandey	4.9	4.6	5.9	5.2
Sea ports of Russia, total	820.8	835.2	841.5	883.8

An analysis of the period 2020–2023 shows a real increase in cargo turnover at all Russian seaports by 5% in 2023 compared to 2022. The ports presented in Table 1 (except Arkhangelsk) show stable results, while the capacity of the Arkhangelsk port allows handling ten times more cargo. It should be noted that the port of Arkhangelsk has a good future, and taking into account new challenges in the international economy, logistics and geopolitics, the port is adapting and organizing work in promising areas:

- creation of a multidirectional network of railways and roads;
- development of infrastructure in the field of education, medicine and culture;
- application of the mechanism of integrated development of territories and digitalization in professional activities;
- expansion of international cooperation with China: in August 2024, the Arctic Express No. 1 arrived in Arkhangelsk via the NSR with imported products delivered by NewNew Shipping Line. This route will ensure the regularity of the export-import container line between Russia and China, the Republic of Belarus, as well as the ports of the Gulf of Guinea and the Indian Ocean;
- entry into the shipbuilding market;
- creation of an educational and industrial cluster for ship repair and shipbuilding at the base sites of Arkhangelsk and Severodvinsk;
- improvement of the quality of life of the population, in particular, housing construction: Arkhangelsk and Arkhangelsk Oblast are among the top five leaders in the Arctic, the total housing per person built with an indicator of 0.63; Krasnoyarsk — 0.76; Salekhard — 0.58; Petrozavodsk — 0.5; the leader is Yakutsk with an indicator of 0.89. Housing construction is a key indicator characterizing the development of regional economies [15; 16] (See Table 2).

⁵ Ruscon organized the delivery of containers from Moscow to the Far East via the Northern Sea Route. URL: <https://portnews.ru/news/364343/> (accessed 10 September 2024).

Table 2

Rating of the AZRF cities by housing construction volume in 2023

City	Volume of housing constructed, thousand m ²	Total floor area of new buildings per person
Yakutsk	338.9	0.89
Krasnoyarsk	911	0.76
Arkhangelsk	189.9	0.63
Salekhard	28.5	0.58
Petrozavodsk	117.9	0.5
Sykt'ykvar	111.9	0.48
Naryan-Mar	8.4	0.35
Murmansk	3.1	0.01

The port of Arkhangelsk is a significant, large-scale support complex for the region and for the entire Russian transport industry as a whole. An integrated approach and a high degree of involvement of government agencies and strategic partners create the prerequisites for building a high-tech and efficient infrastructure of a deep-water sea port. The new port, high-quality ship repair, construction of ice-class vessels, scientific and educational activities of the Northern Arctic Federal University (NArFU) open up broad promising opportunities for the Pomor Gate in the development of the AZRF [17].

The Severnaya Bukhta seaport in the Yenisei Gulf of the Kara Sea, which is being built as part of the Vostok Oil project, will become one of the key elements in the development of the Arctic. At the current stage, cargo is delivered to the sea terminals of Dikson, Severnaya Zvezda, and Sever Bay from the ports of Murmansk, Arkhangelsk, Krasnoyarsk, Lesosibirsk, and Dudinka, as well as from the rivers of the Ob-Irtysh basin. More than 330 vessels were involved in the transportation of equipment and cargo in the 2024 navigation season; 14 terminals and 5 production and technical support bases have been equipped in the north of Krasnoyarsk Krai alone for the construction of key facilities of the Vostok-Oil project. Construction of the berths of the Sever Bay oil loading terminal, external transport facilities, the Vankor – Payakha – Sever Bay oil pipeline, energy supply facilities, and logistics infrastructure is underway around the clock. The total length of all facilities will be about 1.3 km.

The resource base of the Vostok-Oil project is estimated at 6.5 billion tons of liquid hydrocarbons. It is planned to export more than 100 million tons of oil per year via the Northern Sea Route from the port of Sever Bay. The planned investment volume in the Vostok-Oil project is estimated at 10 trillion rubles. It should be noted that the project, for which an extensive infrastructure is being built, is the largest in terms of oil field development and significant in terms of port infrastructure development and the AZRF production capacities modernization. Further, the prospects for the formation of a Russian benchmark based on premium oil from the Vostok-Oil project with a price base in Murmansk are assessed. The growing demand for Russian oil from the countries of the Asia-Pacific Region (APR), considerable production volumes and the possibility of reducing costs due to the operation of the NSR are significant sources of liquidity for the new Arctic benchmark [18].

A large transport and logistics center is being created in the Tiksi-Naiba agglomeration. The investment project envisages the construction of a new deep-water port of Naiba in Kharaulakh Bay, which includes three components: (1) the deep-water port of Naiba; (2) piers and infrastructure for cruise ships; (3) a cargo base with a planned capacity of up to 15 million tons per year, the completion of construction is expected in 2030–2032. In the Arctic settlement of Tiksi, the existing port is being reconstructed, and in order to strengthen work on scientific support for the study of the Arctic, the State Corporation Roscosmos is creating an observation point for Arctic devices. In general, this project will enable the full-scale development of the Arctic, the exploration of a number of large deposits, the formation of transport and energy infrastructure, and will improve the socio-economic situation of the residents of the Bulunskiy Ulus (district) in northern Yakutia.

The port of Pevek is the main port in the Eastern Arctic. The unique geographical location of the port and the city allows for the implementation of investment projects to develop the NSR infrastructure necessary for the resource provision of the economy and security of the country. The urban district of Pevek, as a support territory of the AZRF, is formed taking into account the innovative focus, in particular, using new energy technologies for the launch of floating power units of the PEB-106 project. According to experts, this is the future of energy, implemented to support Arctic projects. Four PEB-106 units with a total capacity of 420 MW will be installed in the new Pevek sea terminal, the first is planned to be installed in 2028. With the launch of the Biamskiy MPP, expected tax revenues will amount to 1 trillion rubles, and the gross regional product of Chukotka will increase by 100%. The deposit resources are estimated at 23 million tons of copper and 2 tons of gold, it is planned to create 3.5 thousand jobs. The project implementation also has a synergistic effect, launching a chain of new small businesses through the initiative of local entrepreneurs. In particular, a ship towing and special equipment repair service is planned to be created in the new harbor. A shift camp for 5 thousand people is being built, airport infrastructure is being created, and power supply issues are being resolved — the construction of a high-voltage power line “Nagleinyn Cape — Bilibino — Biamskiy MPP”. In the context of the planned launch of year-round navigation, achieving energy independence of the NSR will be a valuable factor in attracting freight carriers.

The Northern Sea Route unites more than 70 ports, which are considered the gateway to the Arctic and the strongholds of the Arctic Zone of the Russian Federation; in the context of complex international economic relations, logistics, and limited resources, all implemented Arctic projects pursue several strategic goals: the development of sea and river port infrastructure, the creation of transport and logistics centers, the industrial development and advancement of northern regions, etc.

Industrial development of the Arctic Zone of the Russian Federation

The growth of cargo transportation along the NSR requires the development of port infrastructure, including the creation of new northern ports in conjunction with more efficient devel-

opment of the navigable rivers of the Arctic Ocean. In the context of the reorientation of cargo flow from West to East, Russian Railways (RZhD) has become overloaded in this direction; therefore, the delivery of goods along navigable rivers via the NSR is a promising opportunity to solve transport and logistics issues with a high economic effect. The effectiveness of the projects will be significantly higher if RZhD is connected to river ports with access to the Arctic zone, in particular, the Siberian basins of Rosmorrechflot: Ob-Irtysh, Yenisei and Lena. In a situation of limited material and financial resources, there are problems with connecting railways and river ports. Nevertheless, the companies PJSC NK Rosneft, PJSC Gazprom, PJSC MMC Norilsk Nickel are implementing their investment projects related to the development of the NSR in the Yenisei basin.

In Yakutia, projects are being implemented not only to expand logistics routes, but also to open new corridors for the transportation of goods in the Arctic direction. Under the auspices of the Lenskoe United River Shipping Company, the construction of a new multimodal transport and logistics complex Nizhniy Bestyakh is being carried out. The terminal is located at the intersection of two federal highways — the railway and river transport, which were connected in 2024. Consequently, for the first time in the history of the transport complex of Yakutia, a railway exit to the Lena River has been opened. The area of the Nizhniy Bestyakh Cargo Terminal will be approximately 46 thousand m², it will include three berths 400 m long, three cargo processing and storage areas and access railway tracks. The opening of a direct rail-water connection enables the organization of multimodal transportation, which significantly reduces the cost of cargo transportation and allows for more efficient implementation of the Northern Sea Route development program. The implementation of this important logistics initiative and its further development is becoming a key factor for the economy in the creation of support complexes in the northern regions of the country.

Industrial development of the Arctic Zone of the Russian Federation is a basic component in improving the economic and social status of the territories. At the current stage, almost all agglomerations of the Arctic zone are actively implementing projects to develop oil and gas, coal and other resource deposits. New investment projects “Arctic Lithium” and “Murmansk LNG” have been initiated in the Murmansk Oblast.

The field stage of geological exploration has been completed at the Kolmozerskoe lithium deposit (Murmansk Oblast), confirming previously explored lithium reserves and identifying new, previously unknown reserves with improved ore quality. The lithium deposits in Kolmozero are unique: they account for almost a quarter of its balance reserves in the country with a lithium oxide content of 1.13%, at the level of world deposits. The planned volumes of production: 45 thousand tons of lithium carbonate and hydroxide per year. With the extraction of up to 2 million tons of ore annually, the deposit can be operated for about 40 years. Polar Nickel (a joint venture of PJSC MMC Norilsk Nickel and Rosatom State Corporation) drilled 184 wells at the Kolmozerskoe deposit in 2023–2024 — hydrogeological, geomechanical, exploration — with a total length of over 40 km. Specialists have established a high lithium content with large volumes, and in terms of

extraction, high efficiency at low cost has been determined. When the Kolmozerskoe deposit is launched, it is possible to cover 30% of domestic consumption by the industry that uses lithium and lithium compounds. At the current stage, the optimal option for opening and developing the Kolmozerskoe deposit is being selected, a plan for the placement of production facilities for the future mining and processing plant is being prepared, which will become a testing ground for the latest technologies in mining metallurgy with a full cycle: from extraction to processing. The operation of the deposit is planned to begin in 2026.

PJSC Novatek continues to implement its Arctic projects, in particular, the construction of a new gas liquefaction complex, Murmansk LNG. The plant will include three liquefaction lines with a capacity of 6.8 million tons each, the resource base will be gas produced by Novatek from fields in Yamal. The Volkhov-Murmansk gas pipeline, 1.3 thousand km long, will be built with a capacity of 40 billion m³, which will ensure gas supplies to the Murmansk Oblast and northern Karelia. The project is to be powered by the Kola NPP. The launch of the first two lines is scheduled for 2027, the third one — for 2029 [19; 20].

The port of Sabetta will soon include a new cargo “remote terminal” for the Geograficheskoe field, the license for which is owned by PJSC Novatek, or rather its subsidiary, Arctic LNG-1. The terminal capacity is planned at up to 1.6 million tons of cargo per year; its construction will start in 2026 on a pre-filled artificial site. The construction of the terminal expands the port infrastructure of the Sabetta seaport, creates new jobs, and contributes to an increase in cargo traffic along the NSR.

PJSC Gazprom Neft is starting to explore the East Terelskaya group of fields, which will become part of a large oil production cluster in the Yamal-Nenets Autonomous Okrug.

PJSC MMC Norilsk Nickel is building the deepest mine in Eurasia at the Skalisty mine in the Norilsk industrial region, 2,050 m deep, to extract rich ore with reserves for decades. Skalisty ore contains copper, nickel, palladium and many other metals, including rare ones, which will justify the costs and bring the unique project to high economic efficiency. The project is expected to reach its design capacity for ore extraction in 2028, and in the future the Glubokaya mine will be ready to operate according to unmanned production standards, making it a high-tech facility [21].

The Nadezhdinskiy Metallurgical Plant named after B. Kolesnikov, which processes nickel-pyrrhotite, nickel concentrates and other metal-containing products coming from the enrichment plants of the Norilsk industrial district, is undergoing a major modernization with the aim of increasing metallurgical capacity and improving the efficiency, reliability and environmental friendliness of production. PJSC MMC Norilsk Nickel's investments in this project will amount to approximately 30 billion rubles.

The Norilsk-Dudinka agglomeration is developing dynamically, using its unique geographical location and territory rich in natural resources. The port of Dudinka is another “gateway to the Arctic”, unique and the northernmost international port, providing both sea and river transport along the Northern Sea Route in the western and eastern directions to ports in Russia and abroad,

and along the Yenisei River to Igarka, Krasnoyarsk and other destinations. The use of sea and river communications, as well as air links with the country's industrial centers, creates new opportunities for the organization of economically efficient Arctic complexes. At the current stage, serious work is being carried out in Dudinka and Norilsk to renovate the old housing stock and build a new one, improve cultural and educational levels with the aim of increasing the quality of life of the population of the Norilsk-Dudinka agglomeration.

Conclusion

In the creation of support economic complexes, Arctic cities are the center of attraction for economic and social development, an integral supporting element. The cities have ports, the so-called "gateways to the Arctic", through which the outflow and inflow of goods in the Arctic direction is carried out. Considering the Arctic cities from the standpoint of the production of the gross domestic product of the Russian Federation, it can be concluded that the cities are inferior to non-urban areas due to the extraction of raw materials (oil, gas, metals, etc.), which are produced outside the cities and make up the main product in terms of value.

The concept of spatial development of the Arctic Zone of the Russian Federation provides for the development of large cities and agglomerations. Murmansk, Arkhangelsk, Norilsk are large modern Arctic cities, which serve as support centers of economic growth. Social and industrial complexes are forming around them with a scientific and educational environment, personnel training, transport and logistics centers, information support centers, sufficient resource base and, most importantly, centers for ensuring health and quality of life, preserving and developing culture, and stability of national security.

The agglomerations presented in the Order of November 28, 2023 No. 3377-r mostly demonstrate high investment potential, proving the effectiveness of special support measures and economic preferences in the Arctic, and make it possible to optimize the system of state support for the Arctic region.

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