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The Role of Regional Transport and Logistics Infrastructure in Development of a Single Economic Space

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ABSTRACT

The objective of the article is to show the importance of modernisation and development of the transport and logistics system of the Yamal-Nenets Autonomous Area (hereinafter – YNAA) for socio-economic development of the country, of its single economic space, and implementation of its export capacity.

The current state of the transport system of YNAA is analysed considering a particular role of transport system of the region in development of the Arctic zone of the Russian Federation (hereinafter –the AZRF), while showing the inconsistency of the existing level of its development with the needs of the economy and the population of the area, the strategic goals of development of the Russian Arctic and the country. The research used general scientific methods, e.g., analysis and synthesis.

The implementation of several large infrastructure projects in YNAA being initiated at the federal level requires the corresponding development of the regional transport and logistics infrastructure and the solution of transport problems in this region. Modernisation and development of the regional transport and logistics infrastructure through implementation of infrastructure projects will allow: to form a single interconnected transport space with a significant reduction in infrastructure constraints for development of YNAA; to achieve the required level of population mobility and transport accessibility of municipalities for all categories of population; to combine the mainland and port infrastructure within a single logistics system through implementation of federal infrastructure projects in parallel with measures to develop the existing regional transport infrastructure; to integrate the transport complex of YNAA as part of the transport system of the Russian Federation into the world transport system.

The development of an effective regional transport and logistics system within the framework of the corresponding federal system, considering the geostrategic features and geo-economic potential of the region, will remove infrastructural constraints for development of the national economy and the region's economy.

Keywords: transport and logistics infrastructure, a single economic space, the Arctic zone of the Russian Federation.

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INTRODUCTION

At the present stage of economic development of the Russian Federation, considering the need for accelerated economic growth, the role of the transport system is strengthening considerably. The tasks of developing the transport system at this stage of the country's development are aimed at ensuring economic growth through transport, improving the quality of life of the population [1]. Development of a single economic space of the country through growth of its territorial connectivity as one of the determining functions of transport activity is acquiring further importance.

The development and improvement of the transport and logistics infrastructure in Russia is determined by the need to eliminate existing constraints for socio-economic development of the country: a certain lag in development of transport infrastructure as compared with the production sector, the presence of infrastructural problems in development of a single transport space and implementation of the transit potential of the Russian Federation, logistics constraints for exports of Russian goods to world markets [2].

Research of transport logistics infrastructure problems was described in works of J. Bowersox [3], G. Ghiani [4], S. Yu. Maksimova [5], L. B. Mirotin [6], T. A. Prokofieva [7], Zh. S. Raimbekova [8] and others.

The transport complex plays a special role in the development of the Arctic zone of the Russian Federation (AZRF), the development of which in modern geo-economic conditions is of great importance. Recognition of the Russian Arctic not just as a raw-material appendage of the country, but as a zone of its strategic interests, determines the increasing role of its socio-economic development [9].

According to Ya. A. Bolshakov, the development of the Arctic zone is viewed not only as an opportunity to explore new natural resources, but also as a means of launching the innovative development of the Russian economy as a whole [10].

N. A. Komleva notes that «while the strategies of the developed Arctic states are focused mainly on development of their northern Arctic territories, the Arctic Strategy of Russia, in addition to the development of the AZRF itself, is aimed at solving the overarching task: based on implementation of the potential of the Arctic to promote modernisation of the economy of the whole country. The most important challenge is precisely how to use the Arctic natural resources and mega-projects to launch the process of innovative development, both in the Arctic itself and in the Russian economy» [11].

Besides, this is due to a significant increase in the geostrategic and economic potential of the AZRF at the present stage of development of the Russian Federation [12]. The growth of economic potential is primarily due to the prospects for increasing the resource potential of the Russian Arctic. The developed hydrocarbon fields provide for production of more than 80 % of natural gas and 17 % of oil produced in Russia, additional growth will be provided due to the exploration of new fields on the Gydan Peninsula and the Yamal Peninsula already prepared for operation. Oil and gas reserves on the continental shelf of the Russian Federation in the Arctic are a strategic reserve for development of the mineral resource base of the Russian Federation in terms of hydrocarbon raw materials. According to experts, the reserves amount to 85,1 trillion m^3 of natural gas, 17,3 billion tons of oil[1].

The geostrategic potential of the AZRF is based on the capabilities of a unique transcontinental route – the Northern Sea Route (NSR), whose task is to ensure the interests of the Russian Federation on sea routes that are effectively interfaced on the coast of the Arctic Ocean with routes of other modes of transport. Emphasising the importance of the geostrategic potential of the AZRF and its connection with infrastructural development of the territory, political scientist D. Orlov notes that this territory, besides the presence of the richest natural resources, «infrastructural development acquires an important geostrategic dimension» [13].

The importance of the task of creating and developing an efficient transport infrastructure

[1] Strategy for development of the Arctic zone of the Russian Federation and ensuring national security for the period up to 2035. App. by the Decree of the President of the Russian Federation dated October 26, 2020, No. 645. [Electronic resource]: http:// garant.ru/products/ipo/prime/doc/74710556/. Last accessed 18.01.2021.

of this macro-region is emphasised in several strategic documents of socio-economic and spatial development of the Russian Federation and in the adopted government documents on development of the AZRF. So, in accordance with the Fundamentals of the state policy of the Russian Federation in the Arctic for the period up to 2035 [2], the main national interests of the Russian Federation in the Arctic include development of infrastructure for all modes of transport; the measures for development of all modes of transport in the AZRF and the transport and logistics system of the macro-region are highlighted as the main measures aimed at implementation of the Strategy for development of the Arctic zone of the Russian Federation and ensuring national security for the period up to 2035[1]. These strategic documents contain the main measures in the field of infrastructure development of the AZRF:

• Development of the NSR as a competitive national transport communication route of the Russian Federation on the world market.

• A set of measures aimed at developing the mainland and port infrastructure and combining them within a single transport and logistics system.

As V. S. Selin notes, «one of the important tasks is to improve the transport infrastructure in the regions of the exploration of the Arctic continental shelf to diversify the main routes for supply of Russian hydrocarbons to world markets» [14].

The development of the transport and logistics infrastructure of the AZRF from the standpoint of development of a single economic space of the country is discussed in detail in the Strategy for spatial development of the Russian Federation for the period up to 2025 [3]. The Strategy stipulates creation of a single backbone transport network of the Russian Federation as the most important direction of spatial development, and sets the task of removing infrastructure constraints including those that prevent an increase in the scale of economic development of the Arctic, as well as an increase in the importance of the Northern Sea Route as an international transport corridor. These infrastructural constraints are associated with difficult natural, geographic, and climatic conditions, an outdated configuration of the transport network due to the focal nature of economic development of the territory, as well as the technological and structural lag in development of the transport infrastructure of the Arctic territories. A set of measures presented in the Comprehensive plan for modernisation and expansion of the trunk infrastructure for the period up to 2024 is aimed at reducing the infrastructural constraints for development of the Russian Federation, including in the northern regions of the Russian Federation. The transport part of the Comprehensive plan includes, among other things, measures for development of the transport infrastructure of the AZRF:

• A set of measures for development of the port infrastructure of the Arctic basin (as part of the federal project «Russian seaports»).

• A set of measures as part of the federal project «Northern Sea Route».

Considering the economic potential of YNAA and its geostrategic position, the role of its regional transport and logistics infrastructure is increasing regarding development of the country's economy, implementation of its export potential and development of a single economic space. The main directions of development of the transport and logistics infrastructure of YNAA, considering the national interests of the Russian Federation and the specifics of this constituent entity of the Russian Federation, are outlined in paragraph 23 of section IV of the Strategy for development of the Arctic zone of the Russian Federation and ensuring national security for the period up to 2035[1].

The *objective* of the article is to show the importance of modernisation and development of the transport and logistics system of the Yamal-Nenets Autonomous Area as a territory within the Arctic zone of the Russian Federation for socio-economic development of the country, of its single economic space, and implementation of its export capacity

[2] Fundamentals of the state policy of the Russian Federation in the Arctic for the period up to 2035. App. by the Decree of the President of the Russian Federation dated March 5, 2020, No. 164. [Electronic resource]: http://garant.ru/products/ipo/prime/doc/3606526/. Last accessed 18.01.2021.

[3] Strategy for spatial development of the Russian Federation for the period up to 2035. App. By the Resolution of the Government of the Russian Federation dated February 13, 2019, No. 207-r. [Electronic resource]: http://static.government.ru/media/files/UVAlqUtT08o60RktoOXl22JjAe7irNxc.pdf. Last accessed 18.01.2021.

based on the analysis of the current state of the transport system of YNAA.

RESULTS

General Characteristics of the Transport Complex of YNAA and the Prospects for its Development

The transport complex of YNAA serves the population of 546,9 thousand people and economic entities operating on an area of 769,3 thousand km[4].

A feature of this territory is the presence of the richest natural resources of hydrocarbons, usually located in a remote, inaccessible area with extreme climatic conditions, as well as its unique geopolitical position due to its access to the coast of the Arctic Ocean with its transport artery, the Northern Sea Route.

The transport complex of YNAA is represented by the following modes of transport: railway, road, inland water, sea, air, pipeline transport. At the same time, the transport infrastructure does not cover all the needs of socio-economic development of the area and the Russian Federation: the total density of public transport networks is extremely low, there is no single backbone network of land transport while there are two local backbone transport districts (Western and Eastern) not connected by land transport[5]. As a result of this gap, communication between the western and eastern territories of the area is carried out only by air transport since:

• Waterways have a meridional direction and the use of water transport is seasonal.

• The road network is underdeveloped, it includes many winter roads, which also predetermines a significant level of seasonality of road vehicles' operation.

The Western transport region of YNAA is based on the largest transport axis: the Ob River with a branch of the Northern Railway (Obskaya station) approaching it in the area of Labytnangi. In this area, Salekhard-Labytnangi industrial and transport hub has been developed. There, large volumes of cargo are transshipped from water transport to railway and vice versa. There is a railway from Obskaya station to Yamal (Obskaya–Bovanenkovo–Karskaya railroad), which allows the delivery of goods necessary for development of mineral deposits. The sea transport of the Western region is based on the seaports of Kharasavey and Sabetta, located on the Yamal Peninsula.

The eastern transport region was formed based on Novy Urengoy–Tyumen railway section of Sverdlovsk railway, river navigable routes along the Nadym, Pur and Taz rivers with the ports of Nadym and Korotchaevo, a relatively developed network of highways with access to a single road system of the country [15].

The presence of two local backbone transport areas (Western and Eastern), practically not connected with each other by land transport, is currently the most important transport problem for the area. Another problem is territorial unevenness in development of land transport modes followed by an extremely low average total density of public transport networks. This has a negative impact on functioning of the life support system for the population and on provision [with materials and equipment] of activities of economic entities. For economic entities, aggravation of this problem, observed in recent years, is associated, among other things, with implementation of large projects for exploration, extraction, mining, and processing of hydrocarbons on the territory of YNAA. The imperfection of the regional transport infrastructure entails high transport costs, complicates supply of products from enterprises of other constituent entities of the Russian Federation, necessary for development of oil and gas fields, hydrocarbon production, construction of pipelines, etc.

Railways

The most important role in ensuring the system of daily living activity of the population and sustainable economic development of YNAA belongs to railway transport which is the only mode of transport operating all year round and which is used for mass transportation of large-tonnage cargo

[4] Information passport of Yamal-Nenets Autonomous District (data as of 19.02.2021) // Ministry of Foreign Affairs of the Russian Federation. [Electronic resource]: https://mid.ru/maps/ru-yan/-asset_publisher…128534/. Last accessed 23.03.2021.

[5] This is due to the focal nature of economic development of the area's territory during implementation of the program for development of the gas and oil industry of the USSR in 1970–1990.

and passengers [6]. The development of railway transport on the territory of the area is limited by the state of its infrastructure. The total length of railways in YNAA is 1648 km (including 496 km owned by JSC Russian Railways [7]), the network density is more than eight times lower than the national average [8]. Insufficient length of the railway network, lack of railway connection (including year-round) between several significant settlements of the area and with neighbouring regions is a serious problem for socio-economic development of the area, which is complicated by the peculiarity of the configuration of the railway network on its territory. Two railway lines run through the territory of the area, while they are not connected with each other and are in different parts of the area: in the Western and Eastern transport regions. The line of the Northern Railway (Obskaya station) [9] approaches from the west the region of the upper reaches of the Ob River, the town of Labytnangi. This railway does not have a year-round transport crossing over the river near the town of Salekhard. Thus, the administrative centre of the area (Salekhard) does not have a year-round railway connection with the north-western regions of the Russian Federation and the municipalities of YNAA located in the eastern and southern parts of the area.

The transport gap between the western and eastern parts of YNAA will be bridged following implementation of the Northern Latitudinal Railway (hereinafter – NLR) project, which envisages construction of an Obskaya–Salekhard–Nadym railroad and of feeding railway lines. The volume of transportation along the NLR, mainly of gas condensate and oil cargo, will amount to 23,9 million tons [10]. The significance of implementation of this project for YNAA is associated with creation of a railway connection between all major municipalities in YNAA, and unification of the Western and Eastern transport regions of YNAA. Reducing infrastructural constraints for development of the region due to construction of the NLR will contribute to diversification of YNAA economy by creating new processing industries, new jobs, increasing the mobility of the population and improving transport services for the residents of the area.

For the Russian Federation, the Northern Latitudinal Railway project is of great importance. There are 19 hydrocarbon

[6] Currently, railway transport remains the only available mode of transport for about a third of the area's residents.

[7] YNAA is characterised by departmental diversity of railways, they belong to various owners: JSC Russian Railways, Yamal railway company, Gazprom.

[8] Federal State Statistics Service website. [Electronic resource]: https:// Rosstat.gov.ru/free_doc/new_site/business…sv/plot. Last accessed 23.03.2021.

[9] Chum-Obskaya section with a length of 97 km (a railway branch from the Northern Railway at Vorkuta station).

[10] Kuraeva, O. Three whales of Yamal [Tri kita Yamala]. Kommersant, 2016, Iss. 129. [Electronic resource]: http://im.kommersant.ru. Last accessed 18.01.2021.

deposits in its zone, enterprises of the industrial complex created in the process of exploiting the resource base of this territory are also located in its area. The NLR will transport hydrocarbons from the northern fields and local refined petroleum products. The bulk of the cargo will come from NOVATEK (8,3 million tons of gas condensate), polyethylene and WFLH (wide fraction of light hydrocarbons) from Noviy Urengoy gas chemical complex, oil and gas condensate from Rospan, Geotransgaz companies, etc.[10]

The implementation of the NLR project will provide:

• Creation, due to the connection of the Northern and Sverdlovsk railways, of the shortest route for transportation of gas condensate and oil cargo in the western direction, including those sent for export to the ports of the North-West part of Russia, as well as of transit (including export-import) cargo of enterprises of the Urals and Western Siberia.

• Provision of transport links for delivery of products from the enterprises of the Urals and Western Siberia, necessary for development of gas condensate and oil fields in YNAA and Khanty-Mansi Autonomous Area.

• Optimisation of loading on the existing sections of the railway network, contributing to diversification of the Russian transport system, decrease in excessive loading of the Trans-Siberian Railway.

The northern latitudinal railway is one of the most important mainline elements of Russia's strategic railway frame, which is necessary for development of the Arctic. The other two mainline elements are the Obskaya–Bovanenkovo[11] railway line and non-public Bovanenkovo–Sabetta railway. These infrastructure projects represent a single complex mega-project implemented based on intersectoral and interregional cooperation[12].

The project of construction of Bovanenkovo–Sabetta railway with a length of 170 km is of particular importance for development of the transport complex of YNAA and the Arctic transport system of Russia[10]. This railway line will provide a year-round transport connection of the seaport of Sabetta to the mainland infrastructure and to the hydrocarbon fields of Bovanenkovo and Tambey groups; will allow in the future, with significantly lower costs, to start development of the fields close to Sabetta: Salmanovskoye (Utrenny)[13], West and North Tambeyskoye, Tasiysky and Malyginsky[14] fields and several others.

Road Facilities

The road network is used within the transport network of YNAA for intraregional road cargo and passenger transportation. In

[11] Service traffic on the new line was opened on January 12, 2010.

[12] Priorities and mechanisms of interregional interactions between YNAA and the Ural macro-region are considered in a study carried out by the Institute of Economics of the Ural Branch of the Russian Academy of Sciences as part of development of the interregional project «Arctic vector of the Ural constellation» in 2018.

[13] Within the framework of the Arctic LNG-2 project implemented by JSC NOVATEK.

[14] The Gazprom Group obtained licenses for their development.

YNAA there is a poorly developed system of hard-surface roads, which provides a permanent connection with the all-Russian road system only in the direction of Nadym–Surgut. A full-fledged automobile access of the area to the country' road network will be provided after the completion of Tyumen–Surgut–Salekhard federal highway. Implementation of this project followed by the transfer of Surgut–Salekhard highway to federal ownership will result in development of Moscow–Yekaterinburg–Tyumen–Surgut–Salekhard transport corridor.

The configuration of the network of regional highways is characterised by a tree-like structure, the basis of which is Surgut–Salekhard highway with branch roads to district centres. The disadvantage of the existing configuration is the insufficient number of connecting and chord roads, which, along with other factors, makes it difficult to form a full-fledged road network.

In terms of transport and operational status, quality of roads does not meet the needs of the economy and the population for road transportation. The general condition of the area's road facilities is characterised by a low density of public highways, the presence of many industry's owned roads of a low technical category.

Engineering Structures

The regional public roads include 225 bridges with a total length of 9148,92 l. m, which is insufficient in the presence of many water courses. The river network of Yamal-Nenets Autonomous Area is represented by more than 50 thousand rivers and streams with a total length of about 291 thousand km (the density of the river network is 0,38 km/km^2)[15]. There are no permanent bridges when crossing water courses on Salekhard–Labytnangi, Nadym–Stary Nadym, Korotchaevo–Urengoy–Tazovsky highways. Therefore, traffic on these sections is carried out with pontoon and ferry crossings in summer, and via ice crossings in winter.

The absence of permanent bridges, low quality of highways in terms of their transport and operational condition, the low density of the road network are factors that significantly limit provision of transport services to business entities and population. Thus, with the system-forming role of highways in the area, their existing network, and its conditions are lagging the requirements of the developing economy and the state of the social sphere of YNAA. Several investment projects are aimed at solving this problem. One of the largest

[15] Handbook of water resources. Water resources of Yamal-Nenets Autonomous District. [Electronic resource]: https://waterresources/region/yamal/avtonomnyy-okrug|. Last accessed 18.01.2021.

transport projects in YNAA was construction of Nadym–Salekhard highway. Its route runs in the same corridor as for the Northern Latitudinal Railway. The road will significantly reduce infrastructural constraints in the area, contribute to comprehensive development of the resource potential of YNAA[4]. The highway was commissioned in December 2020.

Air Transport

The main prerequisites for the development of air transport in YNAA are the absence in many municipalities of railway and year-round road connectivity, the seasonality of the use of water transport, and significant distances between settlements and industrial facilities. In these areas, the main transport load falls on aviation, which provides communication with remote, hard-to-reach settlements: this is the transportation of passengers, mail, urgent cargo, health care for the population, and meeting the needs of economic entities.

Airports are the most important elements of the air transport infrastructure. On the territory of YNAA there are nine airports that serve passengers, mail, and cargo along inter-municipal and inter-regional routes[16].

The airports of the cities of Salekhard, Novy Urengoy, Nadym and Noyabrsk have runways with artificial turf and can receive aircraft of all types. Airports in the settlements of Tarko-Sale, Urengoy and Tolka have unpaved runways and are served by turboprop aircraft and helicopters[17].

There are departmental and industry's owned airports on the territory of YNAA: in the villages of Yamburg and Bovanenkovo (owned and operated by Air enterprise «Gazprom avia» LLC), and Sabetta international airport (owned by NOVATEK, operated by «Sabetta International Airport» LLC). Those airports provide transportation of shift personnel and cargo transportation.

The main problems in implementation of airport activities on the territory of YNAA are:[18]

• The need to reconstruct artificial turf runways at the airports of the cities of Novy Urengoy and Nadym due to the high level of their physical and moral aging (up to 100 %).

• Significant wear of the structures of unpaved airfields in the settlements of Krasnoselkup, Tolka (56 % wear), Tarko-Sale (20 % wear), with a significant loss of their performance properties.

Helicopter pads[18]

Inter-municipal passenger air transportation to serve population of remote, inaccessible settlements is carried out using helicopters. On the territory of the autonomous area, 22 helicopter pads are equipped for inter-municipal passenger transportation, located in settlements of six municipalities (Nadym, Yamal, Priuralsky, Shuryshkarsky, Tazovsky districts, the city of Labytnangi).

Considering the unsatisfactory condition of most of helicopter pads, it was deemed necessary to carry out measures for their reconstruction to make them compliant with regulatory requirements, as well as to build seven new helicopter pads in the settlements of Katravozh, Beloyarsk, Samburg, Purovsk, Khalyasavey, Tolka (Purovskaya), Purpe.

The main measures aimed at solving problems of airport activities, reconstruction and construction of new helicopter pads are contained in YNAA state program Development of transport infrastructure for 2014–2024, updated following the results of its implementation in 2014–2020[18].

Pipelines

The infrastructure of pipeline transport is represented by a network of pipelines connecting the area to the central and southern regions of the Russian Federation and foreign countries. Its development is associated with development of new fields and maintenance of production at existing hydrocarbon fields through the use of new production technologies.

River Transport

River transport is the main mode of transportation for many municipalities in YNAA during the summer. River transport carries a significant amount of food, fuel, industrial goods, and construction materials imported to YNAA from other regions of

[16] State register of civil aviation aerodromes and heliports. Tyumen MTU Federal Air Transport Agency. https://favt.gov.ru/reestry-aerodromy-vertodromy/. Last accessed 18.01.2021.

[17] About Yamal // Investment portal of Yamal-Nenets Autonomous District. [Electronic resource]: https:// invest.yanao.ru/. Last accessed 18.01.2021.

[18] State program of Yamal-Nenets Autonomous District «Development of Transport Infrastructure» (as amended on February 11, 2021). App. by the Resolution of the Government of Yamal-Nenets Autonomous District dated December 25, 2013 No. 1124-P. [Electronic resource]: http://docs.cntd.ru/. Last accessed 23.02.2021.

Russia [15]. The use of natural waterways makes it possible to solve to a certain extent the problems of transport services provided to the population of the area and to promote development of new areas of oil and gas production that are remote and hard-to-reach for other modes of transport.

The main waterways in YNAA are the Ob River with tributaries, as well as the Nadym, Pur, and Taz rivers. The length of inland waterways on the territory of the area is 4,1 thousand km, including 3,55 thousand km of waterways equipped with aids to navigation. Currently, rivers provide seasonal connection between 52 settlements with a resident population of up to 120 thousand people[19].

The problems are associated with insufficient length, unsatisfactory condition of waterways and of infrastructural facilities necessary to meet the growing demand for cargo transportation in connection with the prospects for development of new hydrocarbon deposits in the territory of the area. The solution to the problems is associated with implementation of a set of measures provided for by the Transport Strategy of the Russian Federation for the period up to 2030[20]. The Strategy provides for a comprehensive reconstruction of inland waterways and hydraulic structures of the Ob-Irtysh water basin, including an increase in the length of inland waterways with guaranteed dimensions of fairways, as well as creation of navigable conditions for delivery of goods to hard-to-reach regions of the Far North, including small rivers and rivers rapidly becoming shallow.

There are five river ports on the territory of YNAA: in the cities of Salekhard, Labytnangi, Tarko-Sale, the villages of Yamburg and Korotchaevo. The largest river ports (Salekhard, Nadym, Urengoy) have access to railways. Salekhard river port plays an important role in the intra-area communications of Tyumen region and carries out the most important work for development of YNAA: passenger transportation, transportation of oil products, transportation of goods by towing fleet in non-self-propelled vessels, loading and unloading operations, and comprehensive fleet services. The solution of these tasks is carried out through development of technical equipment of the port and adoption of modern technological processes for delivery of goods to the regions of the Far North. An effective model has been created for delivery of large-diameter pipes by sea with transportation by river barges in Novy Port area. With the help of floating crane mechanisation, the port is able to unload ships in any settlement of YNAA, even in the absence of equipped berths. The availability of railway auxiliary tracks in the city of Labytnangi contributes to rapid transshipment of goods.

Passenger transportation through river ports is carried out in the following main directions:

• In the northern direction to Yar-Sale, Novy Port and Antipayuta.

• In the southern direction to Muzhi, Gorki, Khanty-Mansiysk, Tobolsk and Omsk.

The network of inland waterways on the territory of the area has access to the shelf in the sea, which determines promising development of inland waterways and river ports of YNAA, considering creation of large-scale transport and logistics projects on inland waterways as part of development of international river–sea–railway transport corridors. Thus, the river ports of YNAA, considering their connection to the Arctic seaports, acquire a strategic functionality: they become one of the elements of the Arctic transport system.

Sea Transport

Sea transportation is carried out through the developing seaports of Kharasavey and Sabetta. Kharasavey is a seaport under construction in the area of Kharasavey settlement in Yamal region of YNAA, intended for transshipment of hydrocarbons from Bovanenkovskoye gas condensate field and deposits of the Kara Sea shelf. The port of Sabetta is the youngest seaport in Russia, and one of the most actively developing, located on the western coast of the Gulf of Ob in the northeast of Yamal Peninsula. Initially, construction of the port was part of

[19] Passenger transportation by river transport is carried out on interregional (Omsk–Tobolsk–Salekhard, Tobolsk–Khanty-Mansiysk–Salekhard), inter-municipal and intra-municipal routes.

[20] On the Transport Strategy of the Russian Federation for the period up to 2030 (with amendments and additions). App. by the Resolution of the Government of the Russian Federation dated 22.11.2008 No. 1734-r. [Electronic resource]: http:// base.garant.ru/194460/. Last accessed 18.01.2021.

the Yamal LNG project[21]. In this regard, the port was considered as a cargo port intended for transportation of liquefied natural gas by sea. At present, the port is developing as a multifunctional port, with the possibility of using it for export transportation of products manufactured in neighbouring regions. The port development project provides for construction of sea and approach channels, onshore facilities, and a navigation control system. This project is an integral part of the federal Northern Sea Route project, which is being implemented as part of the Comprehensive plan for modernisation and expansion of the main infrastructure for the period up to 2024[22]. In 2019, Utrenny terminal, located on the Gydan peninsula, on the opposite side of Sabetta, was included in Sabetta port complex. The terminal is intended for shipment of liquefied gas and condensate as part of the second gas liquefication project (Arctic LNG 2)[23]. It is planned to reach full capacity (19,8 million tons per year) by the end of 2024[24]. With implementation of Arctic LNG 2 project, part of the production will go eastward, by icebreakers to Bechevinskaya Bay (Kamchatka region), where NOVATEK plans to create an LNG transshipment terminal[25]. Further, the products are sent by ordinary tankers (without icebreakers) to Asia.

Sea transportation in Yamal district is also carried out through the Arctic Gate terminal, built in the village of Mys Kamenny, and designed to ship oil from Novoportovskoye field. Due to the fact that the field is located far from the pipeline infrastructure, the option of shipment through the Arctic Gate marine terminal was chosen for transportation of raw materials. Oil shipment under this option has been carried out from 2016 year-round by Gazpromneft[26].

In the future, the Arctic ports of YNAA (primarily Sabetta) are considered as multifunctional ones, focused not only on transshipment of fuel and energy resources, but also on export transportation of products from enterprises of the Urals and Western Siberia.

The implementation of the listed large infrastructure projects of the federal level requires corresponding development of the regional transport and logistics infrastructure and solution of transport problems in YNAA. Analysis of the current state of the transport system of YNAA showed the inconsistency of the existing level of development of the transport infrastructure with the needs of the economy and the population of the area, and its inconsistency with the strategic goals of the country in the AZRF. To solve the problem of its development, considering comprehensive assessment of the current state of the transport infrastructure of YNAA, the State program of YNAA on Development of the transport infrastructure for 2014–2024» (as amended on February 11, 2021) was developed[18].

CONCLUSIONS

Solving the problem of modernisation and development of a full-fledged regional transport infrastructure through implementation of regional and federal infrastructure projects will provide:

1) Development of a single interconnected transport space on the territory of the area with a significant reduction of infrastructural constraints for development of the area's economy.

2) Achievement of the required level of population mobility and transport accessibility of municipalities for all categories of population.

3) Integration of the mainland and port infrastructure into a single logistics system through implementation of federal infrastructure projects carried out in parallel with measures to maintain, modernise, and develop the existing regional transport infrastructure.

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4) Integration of the transport complex of YNAA as part of the transport complex of Russia into the world transport system.

Thus, development of an effective regional transport and logistics system, integrated into the corresponding federal system, taking into account the geostrategic features and geo-economic potential of the area, will ensure removal of infrastructural constraints for development of the national economy and the economy of the area.

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