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Implementations of measures for the development of the economic potential of the
infrastructure of the Arctic zone

Implementaciones de medidas para el desarrollo del potencial económico de la
infraestructura de la zona ártica

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Resumen

La zona ártica juega un papel importante en el desarrollo económico, social y ambiental de la comunidad mundial. Las condiciones climáticas de esta región complican la exploración, extracción y desarrollo de los recursos árticos y el descubrimiento de yacimientos minerales. Los autores llevaron a cabo un análisis de planes y estrategias para el desarrollo de infraestructura de transporte en la Zona Ártica de la Federación Rusa. Sin embargo, teniendo en cuenta las medidas gubernamentales, es posible que se produzcan cambios que materialicen de manera efectiva el potencial económico de la zona del Ártico. Los autores concluyen que los indicadores objetivo y la cantidad requerida de financiamiento aún deben ajustarse teniendo debidamente en cuenta las especificidades regionales.

Palabras clave: Zona ártica; Potencial económico; Transporte de tierra. Recursos.

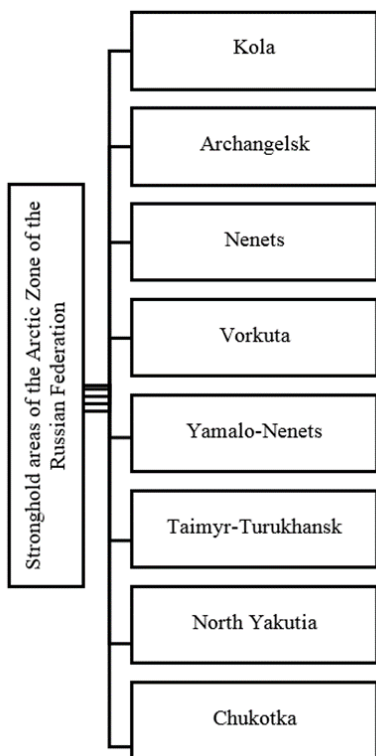
Abstract

the Arctic zone plays an important role in the economic, social and environmental development of the world community. the climatic conditions of this region complicate the exploration, extraction and development of Arctic resources and the discovery of mineral deposits. The authors carried out an analysis of plans and strategies for the development of transportation infrastructure in the Arctic Zone of the Russian Federation. However, taking into account government measures, changes are possible that will effectively realize the economic potential of the Arctic zone. The authors conclude that the target indicators and the required amount of funding still need to be adjusted with due regard to regional specifics.

Keywords: Arctic zone; Economic potential; Land transport; Resources.

Introduction

The development of transport infrastructure in the Arctic Zone of the Russian Federation is a strategically important task for the Russian Federation. This territory includes the main regions shown in Figure 1.



Source: compiled by the authors

Figure 1: Stronghold areas of the Arctic Zone of the Russian Federation

The importance of the scientific substantiation of a set of measures financing the development of transport infrastructure in the Arctic Zone of the Russian Federation is determined by the following factors:

- Expanding the geostrategic dimension;
- Promising development to strengthen the Russian presence in the Asia-Pacific region;
- Increasing the sale of energy resources in the region;
- Environmental control;
- Ensuring the country's security.

Materials and Methods

The foregoing highlights the importance of consistent and multi-stage modernization of the existing infrastructure, as well as improvement of the living conditions of the local population entrusted to Russia. The state finances various programs for the development of regions, which causes significant processes in each stronghold area of the Arctic Zone of the Russian Federation. REICE | 118

The authors carried out an analysis of plans and strategies for the development of transportation infrastructure in the Arctic Zone of the Russian Federation.

The analysis of the implementation of state programs and subprograms has shown that 546 out of 568 indicators (96%) were met and exceeded, while 22 indicators (4%) were not satisfied.

Resulted and Discussion

Currently, there are two decrees approved: "On the foundations of the state policy of the Russian Federation in the Arctic until 2035" (Decree of the President of the Russian Federation No. 164, 2020) and "On the development strategy of the Arctic Zone of the Russian Federation and the national security until 2035" (Decree of the President of the Russian Federation No. 645, 2020). These documents contain long-term goals, objectives, priorities, and directions for the development of the Arctic Zone and address social, economic, environmental, and political issues. Special attention is paid to the development of its transport system which significantly lags behind the southern regions of the Russian Federation in terms of a ramified transport structure.

According to the Federal Service of State Statistics, the length of roads in the Arctic Zone of the Russian Federation is 6,230 km, which amounts to 0.64% of the total length of roads in the territory of Russia (the Arctic Zone occupies 20% of the total area). The local railway transportation consists of several branches in the Murmansk Region, the Komi Republic, the Yamalo-Nenets Autonomous Okrug, and the Norilsk Region, amounting to 3,000 km in total. The air service is also unstable due to the expensive maintenance of civil airports since the level of passenger traffic is low in the Arctic Zone.

The only full-fledged transportation artery is the Northern Sea Route which ensures the delivery of goods to the remote Arctic areas (northern delivery), as well as the export of mining products (gas, oil, nickel, copper, coal, gold, etc.) due to historical conditions.

The transport strategy of Russia states the long-term priorities of the state policy regarding the development of the Arctic transportation infrastructure (Resolution of the Government of the Russian Federation No. 1734-r, 2008). It is realized through federal and regional state programs based on the principles of program-targeted management. These documents define the goals, objectives, and target indicators of development and form specific investment plans on both a sectoral and territorial basis. REICE | 119

Currently, the directions for developing the Russian transportation infrastructure, including the Arctic Zone, are defined in the sectoral state program "The development of the transport system" (Resolution of the Government of the Russian Federation No. 1596, 2017), as well as in the territorial state program "The social-economic development of the Arctic Zone of the Russian Federation until 2020" (Resolution of the Government of the Russian Federation No. 366, 2014) and "The social-economic development of the Arctic Zone of the Russian Federation" (Resolution of the Government of the Russian Federation No. 484, 2021) (hereinafter referred to as "the Arctic state program"), which replaced the former.

The Arctic state program is essentially a key document aimed at the development of the transport system, including in the Arctic Zone. The total amount of funds allocated for the Arctic transportation infrastructure is 397.14 billion rubles until 2022, including 235 billion rubles for the development of railway transport, 51.95 billion rubles for road infrastructure and road facilities, 23.21 billion rubles for airport and air navigation services, and 86.98 billion rubles for sea and river transportation.

Within the Arctic-related part of the railway subprogram, the pledged funds are planned to be spent on the construction of the Northern Latitudinal Railway line with a length of 707 km, which will connect the railway network of the Komi Republic and the Yamalo-Nenets Autonomous Okrug with a possible extension to the Yenisey line (the Norilsk industrial region). This line should be built for the full-fledged development of the Northern Sea Route and speeding up the transportation of goods to western ports and back to Russia, which is now impossible and corresponds to the goal of the Arctic state program

to accelerate the movement of goods due to improving the quality index of transportation infrastructure.

The current status of projects to connect the Northern Railway (the Komi Republic and the Arkhangelsk Region) with ports under construction on the coast of the Arctic Ocean is rather unclear. At the same time, they are relevant for connecting land transport and the Northern Sea Route to increase cargo flows.

To successfully implement major projects for the development of railway transport in the Arctic Zone of the Russian Federation, it is necessary to attract both public and private investments, including foreign capital. Thus, private investments in such a large-scale project as Belkomur (the White Sea – the Komi Peninsula – the Urals) are expected to be recouped within 30 years at the expense of freight rates and state support funds. Then this railway line will come under the control of the Russian Railways. However, the events of February 2022 cut any foreign investments.

The road subprogram covers new construction projects, as well as activities for the current repair and maintenance of the road network (Table 1). The financing of new projects is about 18 billion rubles, with expenses for the current repairs in the amount of 33 billion rubles.

Table 1: Performance indicators of the subprogram for developing the road infrastructure of the Arctic Zone between 2019 and 2022

Performance indicators	Regions within the Arctic zone	Planned value	Annual standards			
			2019	2020	2021	2022
Share of regional roads that meet regulatory requirements is 50.9% (average for the Russian Federation)	Arkhangelsk Region	29.1%	15.9	17.4	19.8	22.6
	Murmansk Region	50%	38	41	43	45
	Nenets Autonomous Okrug	63.1%	35.6	37.2	46.9	62.1
	Chukotka Autonomous Okrug	63.9%	63.1	63.2	63.5	63.5
	Yamalo-Nenets Autonomous Okrug	67.7%	66.9	67.2	67.3	67.5
Share of the road network of urban agglomerations in satisfactory conditions is 85% (average for the Russian Federation)	Arkhangelsk Region	85%	45.8	53.3	63.1	70.5
	Murmansk Region	85%	60	65	70	75
	Nenets Autonomous Okrug	85.7%	41.7	50.6	59.6	69.8
	Chukotka Autonomous Okrug	86.8%	54.6	57.8	59.1	60.5
	Yamalo-Nenets Autonomous Okrug	85%	57.3	64	71	76

Implementaciones de medidas para el desarrollo del potencial económico de la infraestructura de la zona ártica

Performance indicators	Regions within the Arctic zone	Planned value	Annual standards			
			2019	2020	2021	2022
Share of crowded federal and regional highways is 9.1% (average for the Russian Federation)	Arkhangelsk Region	0.9%	1.13	1.13	1.03	1.03
	Murmansk Region	1.1%	1.3	1.3	1.3	1.3
	Nenets Autonomous Okrug	-	-	-	-	-
	Chukotka Autonomous Okrug	-	-	-	-	-
	Yamalo-Nenets Autonomous Okrug	-	0.096	0.096	0.06	0.06
Number of places of concentration of traffic accidents (accident clusters) on the road network is 50% (average for the Russian Federation)	Arkhangelsk Region	-	-	-	-	-
	Murmansk Region	50%	100	90	80	70
	Nenets Autonomous Okrug	50%	85	77	70	64
	Chukotka Autonomous Okrug	-	-	-	-	-
	Yamalo-Nenets Autonomous Okrug	50%	100	88	88	75
Length of constructed and reconstructed federal highways is 958.8 km (30.93 km in the Arctic Zone of the Russian Federation)	Arkhangelsk Region	-	-	-	-	-
	Murmansk Region	30.93 km	2.516	-	28.413	-
	Nenets Autonomous Okrug	-	-	-	-	-
	Chukotka Autonomous Okrug	-	-	-	-	-
	Yamalo-Nenets Autonomous Okrug	-	-	-	-	-
Length of the constructed and reconstructed sections of regional, intermunicipal and local highways is 31.71 km	Arkhangelsk Region	-	-	-	-	-
	Murmansk Region	7.404 km	-	2.604	-	-
	Nenets Autonomous Okrug	-	-	-	-	-
	Chukotka Autonomous Okrug	-	-	-	-	-
	Yamalo-Nenets Autonomous Okrug	-	-	-	-	-
Length of constructed (reconstructed) federal highways, providing access to the seaports of the Russian Federation is 308 km	Arkhangelsk Region	0.37 km	-	0.37	-	-
	Murmansk Region	-	-	-	-	-
	Nenets Autonomous Okrug	-	-	-	-	-
	Chukotka Autonomous Okrug	-	-	-	-	-
	Yamalo-Nenets Autonomous Okrug	-	-	-	-	-
Construction and reconstruction of 271.7 km of federal highways	Arkhangelsk Region	-	-	-	-	-
	Murmansk Region	-	-	-	-	-
	Nenets Autonomous Okrug	-	-	-	-	-
	Chukotka Autonomous Okrug	-	-	-	-	-
	Yamalo-Nenets Autonomous Okrug	-	-	-	-	-

Source: compiled by the authors

The current repairs are done at the expense of subsidies and subventions to regional budgets, and hardly correlate with the program-targeted approach since they are annual expenses for the reconstruction and maintenance of the existing property complexes that do not depend on any programs. Given this circumstance, their existence in the state transport program is debatable and we can assume that the program is only a cover for conducting financial transactions for the purpose of maintenance.

According to the data presented in the table above, the planned performance indicators will not be achieved in 2022. The annual standards of some regions are also controversial. For example, improving the quality of all roads in the Nenets Autonomous Okrug, the Chukotka Autonomous Okrug, the Murmansk Region, and the Arkhangelsk REgion by 1.5-2 times over four years if compared to 2019 seems quite optimistic. The main reason for the decrease in the efficiency of programs (subprograms) is the difficult epidemiological situation due to the COVID-19 pandemic, as well as the restrictive measures to prevent the spread of the coronavirus infection.

The existing problems in the road infrastructure of the Arctic Zone of the Russian Federation can be solved when setting certain tasks. The latter are achieved at the expense of allocated financial resources.

According to the Federal Service of State Statistics, the total length of regional and municipal roads in the Arctic Zone is 85.5 thousand km. On average, 47.9% of these roads do not meet the standards. Their average density is 10.7 km, which is six times lower than the national indicator. Almost $\frac{3}{4}$ of the roads do not meet the quality standards in the regions indicated in the program (the Nenets Autonomous Okrug and the Arkhangelsk Region).

Table 2: Indicators of the road infrastructure of regions within the Arctic Zone in 2019

Region	Length of regional and municipal roads (km)	Share of non-standard roads (%)	Road traffic accidents (per 100,000 people)	Road density (km per 1,000 km ² of the area)
On average in the Russian Federation	1.5 billion km	55.8	114.5	64
Murmansk Region	3,023.7	58.7	117.9	24
Arkhangelsk Region	18,655.9	83.1	136.3	29

Implementaciones de medidas para el desarrollo del potencial económico de la infraestructura de la zona ártica

Nenets Autonomous Okrug	378.0	70.6	72.9	1.6
Yamalo-Nenets Autonomous Okrug	2,770.4	34.4	92.4	3.3
Krasnoyarsk Krai	31,560.9	32.2	124.7	12
Republic of Sakha (Yakutia)	27,057.3	68.4	103.8	4.0
Chukotka Autonomous Okrug	2,135.2	36.4	64.6	1.2

REICE | 123

Source: compiled by the authors

The data presented in Table 2 indicate that two criteria should stipulate the primary direction for the program implementation of the program:

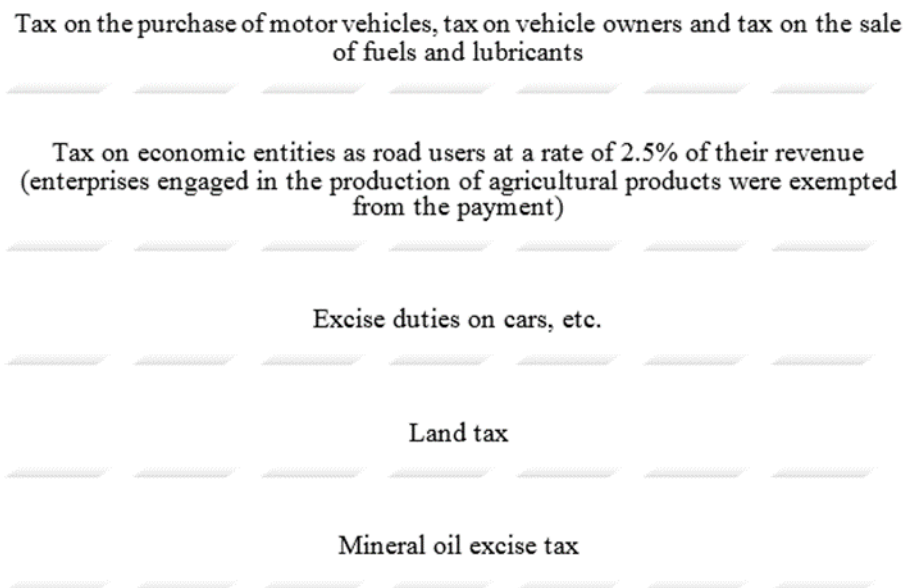
- The growing length of motor roads (the construction of new routes);
- Improving the quality indicators of roads (the reconstruction of old roads).

Since the quality of roads is low in the regions, it is necessary to direct the main financial resources to their development. Based on the above-mentioned statistics, these regions are as follows:

- The Arkhangelsk Region;
- The Nenets Autonomous Okrug;
- The Chukotka Autonomous Okrug;
- The Republic of Sakha (Yakutia).

For Russia, the need to develop the Arctic transportation infrastructure is of paramount importance (Resolution of the Government of the Russian Federation No. 877-r, 2008). The sources forming target off-budget road funds are the state-fixed taxes shown in Figure 2.

Implementaciones de medidas para el desarrollo del potencial económico de la infraestructura de la zona ártica



Source: compiled by the authors

Figure 2: The sources of off-budget road funds

The Arctic-related part of the state transport program pays much attention to the development of civil aviation. To implement projects in this area, it is planned to spend 23.21 billion rubles, which slightly exceeds the expenditure side of the road construction program in the Arctic. However, road transport plays a significant role in the economic activity of the Arctic Zone.

The subprogram for developing the aviation segment of the transport system includes two indicators: the reconstruction of the existing runways and the modernization of air navigation equipment. The main task of the subprogram is to modernize and reconstruct 48 Arctic airfields. Seventy-three objects are registered in the state register of civil airports in the Arctic Zone, with 24 of them having an artificial asphalt-concrete strip and the rest with an unpaved strip.

According to the planned values, it is assumed that two landing strips will be reconstructed in the Arkhangelsk Region and the Nenets Autonomous Okrug by 2022. The comprehensive modernization of the air navigation infrastructure in Krasnoyarsk Krai is also expected to be completed (Table 3).

Table 3: The performance and financial support indicators of the aviation and airport infrastructure development subprogram

Performance indicators	Regions within the Arctic Zone	Planned value (units)	Financing by years (billion rubles)			
			2019	2020	2021	2022
Number of runways put into operation after reconstruction (construction)	Arkhangelsk Region	1	0.122	0.59	0.53	1.19
	Murmansk Region	0	-	-	-	-
	Nenets Autonomous Okrug	1	0.226	0.277	0.386	0.9
	Krasnoyarsk Krai	0	0.600	-	-	-
	Yakutia	0	0.947	0.728	1.438	5.289
	Chukotka Autonomous Okrug	0	-	-	-	-
Completed reconstruction (construction) of auxiliary facilities of the airport infrastructure	Arkhangelsk Region	0	0.209	0.793	0.850	0.850
	Murmansk Region	0	-	-	-	-
	Nenets Autonomous Okrug	0	0.584	0.330	-	-
	Krasnoyarsk Krai	1	-	-	0.171	0.233
	Yakutia	0	-	-	-	-
	Chukotka Autonomous Okrug	0	-	-	-	-

The main problems of northern aviation are as follows: a high degree of depreciation of the airport and airfield infrastructure; the low intensity of flights; insufficient funds for operational maintenance, purchase of special equipment, etc. (Kruglov, 2014).

In general, the problems are understandable and can be solved through additional investments based on a set of socio-economic measures for the development of the Arctic Zone. From the viewpoint of the program-target approach, the performance indicators correspond to the goals of airport modernization. We should also consider the distribution of funds for various projects. In fact, three projects will be completed in four years, and funds are allocated for eight projects. This seems illogical since the completion of these projects goes beyond planning and there is a risk of disrupting the ongoing projects due to a possible lack of funding.

The last subprogram within the state transport program seems to be one of the most important from both socio-economic and geopolitical positions. This is a subprogram that aims at developing and operating the Northern Sea Route. In the strategy for developing the Arctic Zone until 2035, the Northern Sea Route is the main transport artery that will connect the Arctic space.

The total funding for the subprogram is 83.68 billion rubles until 2022. In fact, the funds are directed to reconstructing and increasing the capacity of the Murmansk seaport up to 9 million tons of cargo, as well as reconstructing and developing sea and river ports in Krasnoyarsk Krai. 56.1 billion rubles will be allocated to the Murmansk seaport, and 27.58 billion rubles will be directed at the comprehensive reconstruction of the ports of Krasnoyarsk Krai. In addition, 3.3 billion rubles are planned to subsidize the cost of navigation and hydrographic support for navigation along the Northern Sea Route. REICE | 126

Conclusion

The main challenge of developing sea and river transportation within the framework of the state transport program is multi-channel and multi-task financing. Thus, Rosatom, which is the operator of nuclear-powered linear icebreakers, receives budget funds for the construction of an icebreaker fleet. The Rosmorflot Federal State Unitary Enterprise acquires diesel-powered icebreakers for escort in the coastal zone. Some funds will be allocated as part of a comprehensive plan for the development of the Northern Sea Route infrastructure. Individual activities are funded through the Arctic state program.

The immediate priorities for this subprogram are somewhat debatable since the main funds are directed to the implementation of only one large-scale project for the reconstruction of the Murmansk seaport, although there are ten more ports along the Northern Sea Route that need reconstruction, especially in the eastern part of the Arctic Zone (Krasnoyarsk Krai, Yakutia, Chukotka). This is a significant component of the Northern Sea Route, considering the priorities for increasing freight traffic in the eastern direction.

This focus on the implementation of single projects is too complicated since each department and each special program has its own goals, objectives, plans, activities, and deadlines. Their coordination, the determination of priority, and the calculation of necessary funding take too much time and do not always lead to the desired result. Therefore, it is necessary to revise all plans and finances within the state transport program for the development of the Northern Sea Route in order to unify them.

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Implementaciones de medidas para el desarrollo del potencial económico de la infraestructura de la zona ártica

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