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Article



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ON THE IMPORTANCE OF THE SYMBIOSIS OF THE NORTHERN SEA ROUTE AND THE RAILWAY FOR THE EFFECTIVE IMPLEMENTATION OF THE DEVELOPMENT STRATEGY OF THE RUSSIAN ARCTIC

Abstract: in the article, the authors drew the attention of the leaders of the Russian Arctic regions to the need for a symbiosis of the sea route and the railway, which is possible with a large-scale modernization of two Siberian railway arteries. The first stage of the project (2016-2020) worth 562.4 billion rubles. (reduced as a result of the audit to 520.5 billion rubles) provides for an increase in the carrying capacity of the BAM and the Trans-Siberian Railway in the direction of seaports and border crossings of the Far East to 124.9 million tons (+66.8 million tons compared to 2018). In 2022 alone, Russian Railways will spend 30 billion rubles on the development of the Eastern railway range. At the second stage (2021-2025), it is necessary to build 1,310 km of additional main tracks, 32 sidings and reconstruct 29 stations, as a result of which cargo transportation along highways will increase to 182 million tons, and by 2025, according to the new order of the president, up to 200 million tons. In total, it is planned to spend about 493.2 billion rubles for these purposes, but these costs will be justified, since the throughput of goods using the Northern Sea Route will increase significantly.

Key words: infrastructure, strategy, development, cost, profitability, financial condition, profit, value of TEP, economic potential, accessibility, priority, preferences.

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Introduction

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The Government of the Russian Federation develops and approves a unified action plan for the implementation of the Fundamentals of State Policy

in the Arctic and this Strategy, which should reflect all stages of the implementation of this Strategy.

The implementation of this Strategy is ensured by coordinated actions of federal government bodies, executive authorities of the constituent entities of the Russian Federation, local authorities, state academies

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of sciences, other scientific and educational organizations, funds for supporting scientific, scientific, technical and innovative activities, public organizations, state corporations, state companies, joint-stock companies with state participation and the business community.

To implement this Strategy, it will be necessary to make changes to the state program of the Russian Federation "Socio-economic development of the Arctic zone of the Russian Federation", other state programs of the Russian Federation, state programs of the constituent entities of the Russian Federation, as well as to the development plan for the infrastructure of the Northern Sea Route for the period up to 2035.

The solution of tasks in the field of military security, protection and protection of the state border of the Russian Federation is ensured through the implementation of measures provided for by the state armament program within the framework of the state defense order and state programs of the Russian Federation.

General management of the implementation of this Strategy is carried out by the President of the Russian Federation.

The tasks, functions, procedure for coordinating the activities and interaction of state authorities, local authorities and organizations in the implementation of this Strategy are determined in accordance with the legislation of the Russian Federation.

The implementation of this Strategy is carried out at the expense of the budgets of the budgetary system of the Russian Federation, including at the expense of funds provided for the implementation of the state program of the Russian Federation "Socio-economic development of the Arctic zone of the Russian Federation", and extra-budgetary sources.

The strategy for the development of railway transport in the regions of the Arctic and Eastern Russia has long been in development by the Russian government. State. In 2020, by Presidential Decree No. 645 of October 26, 2020, work began on the implementation of the "Strategy for the Development of the Arctic Zone until 2035". It affects the areas of healthcare, science, education, housing construction, investment, oil and gas production, ecology, etc. The problem of the strategy is one thing - there is no profitable way of transportation for citizens working in the Arctic. The air route is expensive for one person (the average price of a Moscow-Magadan ticket is about 70,000 rubles), sea transport is expensive, long and highly dependent on the time of year and weather. For motorway transport, there are no opportunities to create and maintain road infrastructure. That's why, Of all existing, the most economically and socially beneficial transport is the railway. The prospect of creation is clear on the face. Only under the condition of doing, initially, well. We offer three development options from the solution options -The first implies the usual principle based on the "raw material

appendage", i.e. export of energy resources as an economic base. In the future, according to this principle, it will be possible to increase cargo turnover by almost one and a half times, and passenger turnover by 1.16 compared to the previous year.

The second option is already innovations in the development of the country, in which most of the exports will be industrial products made in Russia, which will also make it possible to implement the most ambitious project of the Strategy - the construction of the North Siberian Railway for almost 1900 km. The second most important is the project of the road "Ural Industrial - Ural Polar". Big changes are also expected in Eastern Siberia, where the construction of three canvases will be completed at once. Also, the modernization of old roads and the laying of detours of railway junctions to ensure the safety of passengers and increase throughput are to be carried out.

And in case of failure of the implementation of the first and second development options, a third option is provided. It involves the modernization of the existing communication system and, based on it, the construction of new routes.

It is planned to dynamically expand railways by at least 16,000 km by 2035, freight turnover will increase by more than 1.5 times, and passenger traffic - by 1.33 times.

The Great Northern Route or the North Russian Eurasian Railway, which would connect the main industrial regions of the Urals and Siberia with the seaports of the Arctic Basin by the shortest route, has been an unrealized dream of state-minded Russian industrialists, transport workers and economists for a century and a half.

The need to create ports in directions independent of Europe was well understood by our ancestors, evidence of which is the creation of ports on the coast of the seas of the Arctic Ocean from the semi-legendary Mangazeya to Arkhangelsk and Kola.

However, the Russian politicians of the modern era not only failed to develop the infrastructure in the Arctic that was created with blood and sweat during the Soviet period, but actually brought it to destruction. Fortunately, the strategic mistake was recently recognized, and in recent years, interest in the Arctic has shown itself with renewed vigor.

In accordance with the "Strategy for the development of maritime activities of the Russian Federation until 2035", developed by the State Federal Research Institution "Council for the Study of Productive Forces" (SOPS) and approved by the Decree of the Government of the Russian Federation of December 8, 2010 No. 2205-r, the port infrastructure of Russia must process at all regional sea routes at least 1.1 billion tons of foreign trade cargo. Moreover, a significant increase in capacity in accordance with the previously adopted "Fundamentals of the State Policy of the Russian

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Federation in the Arctic for the period up to 2025 and beyond" should be provided mainly through the construction of new and modernization of existing ports on the coast of the seas of the Arctic Ocean.

A doubling of the volume of cargo transshipment through Russian ports from the current level (535.5 million tons in 2021) will also require a doubling of the transportation capacity of railway transport, and, consequently, a serious development of its transport infrastructure, including in the northern direction.

Based on the fact that the Trans-Siberian Railway is currently largely loaded, and the transportation of export coal from Kuzbass to Western ports is characterized by signs of collapse, it is necessary to create a new transport complex based on a new railway line in the main latitudinal direction, which brings cargo flows to seaports like the Arctic and the Pacific basins. And this is exactly the idea, which is already more than 150 years old.

Main part

The idea of building the Great Northern Railway, connecting the future ports of the Arctic and Pacific Oceans, was formed over a century and a half.

Already in 1906, for a more convenient, short and cheap exit of goods from Siberia and the Urals to the Western European market, bypassing St. Petersburg and the Baltic ports, a number of projects were proposed to create a highway through the Urals to one of the bays on the Arctic coast of the European part of Russia, in particular to such as the Indian Bay. The problems of creating a seaport on the Indiga River, connecting it by rail with the Urals and Siberia were actively discussed in the 20s and 40s of the 20th century.

At first, however, preference was given to the Arkhangelsk port due to the centuries-old experience of its operation, as well as the limited technical and economic capabilities of the country to create an additional transport hub. With all the preference for the Arkhangelsk option, even its staunch supporters agreed that over time, the creation of a new seaport serving the export potential of the Urals, Siberia and the North-East of Russia would become an economic necessity.

With the beginning of the Second World War, the situation of the First World War was repeated, when the northwestern ports were cut off by enemy troops. Twice the governments of the country had to urgently look for safety options and turn to the idea of building a port in the Indiga Bay, which is very instructive. However, neither the tsarist nor the Soviet state succeeded in building a new port and a railway to it under military conditions.

The concept of the transport-geographic development of Siberia and the North for the new conditions was developed by the Institute of Economics and Organization of Industrial Production (IEOPP) of the Siberian Branch of the Russian

Academy of Sciences under the guidance of Doctor of Economics. Bandman M.K. towards the end of the 1980s.

New Russia received a project that included: completion of the construction of the Baikal-Amur Mainline (BAM) and its transformation into a link in the intercontinental transport bridge "Asia-Pacific Region (APR) - Western Europe" (Tokyo - Dublin); reconstruction of the Trans-Siberian Railway and its transformation into a specialized international-class highway "Trans-Asian Railway", as well as the completion of the construction of the North Siberian Railway (Sevsib) with the commissioning of the Nizhnevartovsk-Ust-Ilimsk section and its connection with a seaport in the southeastern non-freezing part of the Barents Region seas.

According to the developers, this highway (code name - the North Russian Eurasian Railway) should become the axis of the future northern latitudinal transport corridor and the basis for the integration of the Urals, Siberian and Far Eastern problem regions of the resource type. The creation of this highway with a new port in Indiga Bay (in the 30s of the last century - the Northern Gate project) will connect the port of Vanino on the coast of the Sea of Japan with the ports of the White (Arkhangelsk) and Barents Seas. The western link of this highway Ivdel - Indiga with a length of 1200 km (Barentskomur) will give Russia a new sea access to world markets through the western sector of the Arctic Ocean, and the middle link - Ivdel - Khrebtovaya with a length of 3400 km (Sevsib) - access to the BAM (Khrebtovaya - Vanino 4358 km).

Passing entirely through the Russian territory at a considerable distance from the state borders of Russia, near the promising oil and gas bearing territories of Western and Eastern Siberia, the highway can significantly increase the efficiency of the BAM, as well as the national and transport security of the country.

The organizing idea of the Barents Sea project is a geostrategic and feasibility study for the construction of the Ural-Komi-Barents Sea (Indiga) railway, which can not only combine the richest oil and gas reserves of the Siberian North, the unique metallurgical production of the Urals, ore, coal and timber resources of the Komi Republic, but also to open the shortest direct export route for these resources from the continental depths of the Asian part of Russia to the coast of the Barents Sea.

According to Academician V. V. Alekseev, "this road, bringing the heart of continental Asia closer to Western Europe, will create a completely new geo-economic configuration and an inter-civilizational perspective for that set of strategic problems that is today characterized as the "northern dimension" of European integration."

To solve this problem, scientists of the Siberian and Ural branches of the Russian Academy of Sciences finalized the ideas of Siberian industrialists

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and developed a special scientific program "Problem regions of the resource type: economic integration of the European North-East, the Urals and Siberia", which presents the goals and conditions for the integration of neighboring, but transport-disconnected regions. The problematic regions of the Komi Republic, the Sverdlovsk and Tyumen regions, the Krasnoyarsk Territory, the Nenets, Khanty-Mansiysk, Yamalo-Nenets and Taimyr Autonomous Okrugs, as well as the Arctic and Trans-Siberian transport corridors were chosen as the main objects of study. The conducted studies demonstrate a deep synthesis of historical and economic analysis of regional integration processes in the powerful resource-industrial continental core of Russia, which is still rare in science. The detailed analysis given in this work turned out to be extremely useful, since historical experience even today speaks much more about the real background of regional interests and the peculiarities of Russian spatial thinking than the most daring, but abstract projects.

It is also obvious that the new highway, thanks to the reduction in the cost of transportation by reducing the distances for the delivery of goods, will significantly contribute to the development of foreign economic relations of the regions. The development of the country's transport potential is one of the priority tasks of modern Russia, in connection with this, the "Strategy for the Development of Railway Transport until 2035" has been developed. It notes that rail transport is the basis of the country's transport infrastructure. A number of goals for the development of Russian railway transport have been identified:

- build a modern, efficient and developed transport infrastructure;
- increase the availability of transport services for the population of the country;
- increase the level of competitiveness, as well as realize the country's transport potential;
- strengthen the integrated security and sustainability of the transport system;
- improve the investment situation and give impetus to the development of market relations in the transport complex.

The creation of the North Siberian Railway is an urgent task today, as this will allow us to use new territories of our country, expand the exchange of resources with the regions, which will positively affect the economic situation as a whole.

It is assumed that the Sevsib will pass from Nizhnevartovsk through Bely Yar, Lesosibirsk,

Karabula to Ust-Ilimsk, from where there is an exit to the BAM.

This idea was supported by the Institute of Economics and Trade of the Siberian Branch of the Russian Academy of Sciences due to the fact that the construction of the highway allows:

- open access to large deposits of Siberia;
- shorten the way to the Far Eastern ports;
- unload the Trans-Siberian Railway.

It is much easier to resolve issues with the foundation of a parallel to the Trans-Siberian main line in the northern part of the country than to lead a technological branch from each production to the main line. The plans are to leave container and passenger transportation on the Trans-Siberian, thereby giving it the opportunity to become an international high-speed highway, due to the fact that it runs closer to the eastern part of the country. In the future, with the development of other lines, it is planned to connect them to a large highway. The only direction that will not be properly covered is the west.

But if the planned Barents Sea (Barents Sea - Komi - Ural) highway is included in the Northern Siberian Railway, which will be able to redirect the export of products from enterprises in such regions as the Republic of Komi and the Perm Territory from the ports of Ukraine and the Baltic countries to the northern ones closest to them, then this direction will be enabled.

The creation of the North Siberian Railway, according to Leonid Reznikov, Deputy Governor of the Tomsk Region, during the VIth International Forum "Transport and Transit Potential", will bring a significant multiplier effect (taking into account the payback period, it will be about 40 trillion rubles, which is 2, 9 times higher than investments in the development of railway transport).

This will create infrastructural prerequisites for the development of the rich natural resources of the northern regions of the European and Asian parts of the country, which, as a result, will increase the country's transport and raw material security. In the analysis of the Institute of Economics and Trade of the Siberian Branch of the Russian Academy of Sciences, its role was assessed by solving the problem of the national economic level in the options "with the Northern Siberian" and "without the Northern Siberian".

With the presence of the Northern Siberian Railway, the average annual rates of gross output in Russia as a whole and its European part will be higher than without the Northern Siberian Railway (Table 1).

Table 1. Average annual growth rates of gross output, %

Territory	Without SevSib	With SevSib
Russia as a whole	5	6.1

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European part of Russia	4.5	6.4
Asian part of Russia	6.4	5.7

A similar situation is expected for individual industries (Table 2). In the “with SevSib” option, the coal industry in the European part of the country hardly increases production, and the incoming new needs are covered with coal from Kuzbass and from the Kansk-Achinsk fuel and energy complex. In the variant “without the Northern Siberian Railway”, production costs increase to increase coal production in the European part of the country and reduce the

likelihood of an increase in the level of the entire economy, all the main decisive branches of industry.

In the option with SevSib, the funds of the European part of the country are intended for the growth of more profitable industries here - mechanical engineering, light industry, and ferrous metallurgy. At the same time, in the Asian part of Russia, there is an opportunity to apply economies of scale - to carry out production at new large fields.

Table 2. Annual growth rates of gross output by sectors (%) and territories

Industry	European part		Asian part	
	without SevSib	with SevSib	without SevSib	with SevSib
Coal	8	0.2	2.5	8.3
Energy	0.4	2.1	3.8	3
Non-ferrous metallurgy	5.1	6.9	3.7	6.5
Ferrous metallurgy	2.7	2.5	8.4	2.8
woodworking	7	9	3	12
Light industry	0.9	5	1	2.4
mechanical engineering	9.5	11.5	12.1	12.4

The processing complexes of the European part of the country are more interested in the creation of SevSib, since it is they who receive a stable resource base of the Asian part of Russia, also using it as a guarantee against price fluctuations of the corresponding resources on the world market. Thus, the construction of the North Siberian Railway is one

of the main priorities in the development of the transport system of Siberia and the economy of the whole of Russia.

The SevSib project can be compared with similar railway lines, for example, with the Canadian Pacific Railway, which is located in a similar climate zone (Table 3).

Table 3. Comparative evaluation of the North Siberian and Canadian Pacific Railways

	Length, km	Cost, billion dollars
North Siberian Railway	2002	6-12
Canadian Pacific Railway	14000	6

Canadian Pacific Railway (CP) is the second largest Class I railroad in terms of revenue and route miles. During 2020, CP transported intermodal

containers (22% of revenue), chemicals, plastics and crude oil (14%), grain (24%), coal (10%), fertilizers

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and potash (10%), automotive industries, products (6%) and a wide range of other goods.

Canadian Pacific Railway is a paradigmatic example of long-term sustainable business performance and shareholder value creation that has been achieved in core assets.

This comparative analysis makes it possible to construct a hypothesis that the project to create the North Siberian Railway will be no less effective than the Canadian railway.

Back in October 2007, the administration of the Krasnoyarsk Territory announced that it was ready to begin construction of the first section of the Sevsib - the connecting branch of Karabul - Yarka. The cost of the bridge across the Angara and the road, 44 km long, will be about 5.1 billion rubles.

It is noted that SevSib is able to bring even greater returns to the region than the construction of the Boguchanskaya hydroelectric power station, an aluminum plant, a pulp and paper mill, a manganese mine and other facilities of this project.

As a result, it can be noted that in addition to such important aspects as the development of new territories, the unloading of the Trans-Siberian Railway, which is especially talked about today, or the creation of new routes for export, first of all, this is a significant contribution to the development of railway infrastructure, which, according to the state plan, should become the key to the successful development of not only the Siberian region, but Russia as a whole.

Nevertheless, the Sevsib was included in the Strategy for the development of railway transport until 2035 (in its maximum version), but in a greatly curtailed form - only up to Nizhnevartovsk.

And this is a fundamental shortcoming of the project - the closeness of the highway in the western direction. It is not worth counting on the existing line Surgut - Tyumen - Sverdlovsk - it is overloaded and will not take on several tens of millions of tons of additional cargo traffic. The strategy does not envisage the development of the Sevsib in a western direction for the period after 2035.

It makes no sense to build a "castrated" Sevsib. All its multiplier effects will be fully manifested only as part of a single railway line - the North Russian Eurasian - provided that it includes all three blocks: BAM, Sevsib and Barentskomur.

The most probable point of connection between the Barentskomur and the Sevsib is Ivdel (Polunochnoye station), which makes sense to reach from Kolpashevo through Tobolsk (a major port on the Irtysh and the former capital of the Siberian Territory), and not through Nizhnevartovsk. From Tobolsk, the highway should be built through Ustye-Akha and directed to Ivdel along the eastern bank of the river. Tavda. In this case, the Sevsib will be shortened by the segment Bely Yar - Nizhnevartovsk (538 km), and the capital of the Khanty-Mansiysk Autonomous Okrug may be connected to the Russian

railway network via Salym (200 km). The missing sections of the connecting line should be included in the railway construction plans.

The Barents Sea will solve the problem of implementing large-scale interregional projects in the problematic resource regions of Russia and, above all, the Ural region, whose reserves have become significantly depleted as a result of intensive two centuries of exploitation.

In the strategic building of a model of transport development in the Arctic, I consider the task of laying a railway from the station. Sosnogorsk to Indiga Bay and the creation of a base seaport there. This will ensure the shortest passage of large-scale cargo from the south of the industrial Urals, from Siberia, Kazakhstan, Asian countries to the Northern Sea Route and further westward - to the countries of Northern Europe and America (east coast), eastward - to the Asia-Pacific countries, Canada and America (west coast), which is also part of the establishment of the Northern Sea Corridor agreed within the Barents Council, and the seaport of Indiga will be developed as the "Northern Gate" of the EU-funded Northern Sea Corridor (NMC) project.

The total length of the railway section Ivdel - Indiga is about 1200 km, the section of the new transport construction of the railway, according to preliminary estimates, is about 1000 km, which is about 250 km less than under the Belkomur project. If we take into account the fact that the branch of the railway Sosnogorsk - Troitsko-Pechorsk was deliberately built with the prospect of continuing to the station. Polunochnoe (project of the 60s, that is, it was more modern than Belkomur), then the conclusion follows that the initial construction of the railway to Indiga Bay is more expedient.

A tangible plus in favor of Indiga is that the distance of exporting goods by rail from the Urals, Siberia, Kazakhstan, the Far East to this seaport is 350-400 km shorter than along Belkomur, which also implies significant savings on the construction of the railway itself and its operation (by about 15-20%).

The construction of the Sosnogorsk-Indiga railway is already included in the Transport Strategy of the Russian Federation for the period up to 2035, however, neither the road nor the port was included in the Federal Target Program "Development of the Russian transport system for 2020-2025" and, accordingly, are not provided with funding. The need to build this railway in conjunction with the creation of a new seaport in Indiga Bay is beyond doubt - the potential cargo-generating base of the area of gravity to the port can range from 15 million tons of cargo in 2018 to 120 million tons in 2035.

The new multi-profile seaport Indiga, in combination with the new Sosnogorsk-Indiga approach line, as part of the Barentskomur railway, will become a basic element of sustainable socio-economic development not only in the Nenets

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Autonomous Okrug. In terms of its significance and scale, this project goes beyond the regional framework, since it will be able to make a significant contribution to the formation of a backbone transport network in the North-East of the European part of Russia.

Such an arrangement of railway branches solves the social problems of the regions of the Russian Arctic. As already mentioned, the Tobolsk direction is considered the most preferable option for the withdrawal of Siberian cargo to the Barents Sea, although there are options for continuing the Sevsib through Nizhnevartovsk, Surgut, Khanty-Mansiysk, and the Ob region with a subsequent exit through Nyaksimvol to Troitsko-Pechorsk. But the last option is possible if the project "Ural Industrial - Ural Polar" is implemented.

The Tobolsk option is also attractive in that it is possible to create a large transport hub in its area at the intersection of a railway, road and large river artery, which is part of the Ob water transport system serving an area of about 3 million km (also in the Tobolsk area towards the European part of Russia passes a number of main oil and gas pipelines). This option is also preferable because it will make it possible to create a large transport and logistics center to ensure the "northern delivery" and the polar highway Salekhard - Igarka - Norilsk. Also important is such a moment as the release of the overloaded section of the Tyumen-Yekaterinburg railway from the transport flows of the Khanty-Mansi Autonomous Okrug.

Belkomur or Barentskomur?

The western part of the North-Russian Eurasian Railway provides access to seaports in two directions: Belkomur - to the port of Arkhangelsk and Barentskomur - to the port of Indiga.

There has been a long-standing struggle between these areas, today it is unfolding for state investments in projects: in the first case, to modernize the Arkhangelsk port complex with the construction of a new large port area (Dry Sea) and a railway to it with a length of 1251 km (Belkomur project), in the second case, the creation of a new port of Indiga and the construction of two sections of the railway to it 612 km and 412 km, respectively (Barentskomur project).

Also such cities as Yakutsk, Megino-Andan, Ust-Nera, Moma, Coal, Ust-Oloy, Dachny, Anyui, Amguzma, Ioniveem, Uzlen and others. These cities have a huge potential for the production of products in demand for the inhabitants of the Arctic zone. This railway branch will ensure the sustainable development of the industrial rise of these cities and the regions in which they are located, and the solution of social problems will follow.

The North-Russian Eurasian Railway from the Pacific port of Vanino (Vanino-Sovetsko-Gavansky industrial and transport hub) to the proposed port of Indiga in the southeastern part of the Barents Sea (hereinafter referred to as the Vanino-Indiga mainline) structurally consists of three sections: Baikal-Amur Mainline (BAM), North Siberian (Sevsib) and Barents Mur. A general view of the new highway is shown in Figure 1.



Picture 1. General scheme and components of the North Russian Eurasian Railway

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BAM has already stitched together our vast spaces with “steel stitches”, connecting Taishet and the port of Sovetskaya Gavan. Even in its current state, the BAM with a length of 4287 km (and together with branches - 5.5 thousand km) is one of the largest railway lines in the world. BAM runs north of the Trans-Siberian Railway, branching off from it in Taishet, crosses the Angara in Bratsk, the Lena in Ust-Kut, goes around the lake. Baikal from the north, then passes through Tynda, crosses the Amur at Komsomolsk-on-Amur and ends on the Pacific coast at Sovetskaya Gavan.

BAM has branches, the most important of which is the Amur-Yakutsk Mainline (AYAM) with a length of 1078 km, as well as: to Ust-Ilimsk (215 km); to the Chineyskoye field (66 km); to the Bamovskaya station (179 km), to the Elginskoye coal deposit, to the Izvestkovaya station (326 km); to Chegdomyn (16 km); to the Volochaevka station (351 km), to the Cherny Mys station, where the construction of an underwater tunnel to Sakhalin Island began.

The State Duma of the Russian Federation supported the project for the development of the Baikal-Amur Mainline for the period up to 2025 (the BAM-2 project), pointing out that the sustainable development of the regions of the Far East and Transbaikalia, as well as the solution of federal and regional tasks for the use of the resource, industrial and transit potential of the East of the country are possible only with the implementation of a comprehensive infrastructure project for the reconstruction of BAM. According to the calculations of the developers, the total load on the Northern Latitudinal Railway by 2025 will be 106.8 million tons per year.

The construction of the second section of the North-Russian Eurasian Mainline - the Sevsib - in contrast to the BAM is still only provided for by the Transport Strategy until 2035.

Although by the beginning of the 1980s on the Sevsib route, it would seem that everything was ready for action. A serious impetus was given to the project in 1983 by the Ministry of Transport Construction of the USSR. On his behalf, the Central Research Institute of Transport Construction (TsNIITS) of the Ministry carried out cameral tracing of the Sevsib. In the terms of reference, the need to build a highway was justified by the following words: “At the moment, the Siberian railway network is excessively overloaded. About 70% of rail freight traffic is carried out on lines with a traffic density exceeding 70 million tons per kilometer. In a number of sections there are “bottlenecks” that significantly limit the possibility of increasing cargo turnover. In this situation, the transport network cannot ensure the development of the expected increase in traffic.”

Government decrees officially recognized the completion of all necessary work to substantiate, prepare and develop a program for the development of

this region and the construction of the North Siberian Railway. But the year 1991 struck, then the August crisis of 1998 happened, which led to a halt in the project and gave the opponents of the Northern Siberia a pretext to promote the development program for the Lower Angara region.

In this version, the highway will bypass the Vasyugan swamps and pass through the newly discovered unique Bakcharsko-Kolpashevskoye iron ore deposit of the West Siberian iron ore basin, which will make it possible in the near future to provide the Kuznetsk and West Siberian Iron and Steel Works with Bakchar ore and replace the raw materials supplied to the plants from Kovdorsky (?), Mikhailovsky, Korshunovsky and Kachkanarsky mining and processing plants.

Having received a connection with the Sevsib, the Barents Sea will solve the problem of implementing large-scale interregional projects in the problematic resource regions of Russia and, above all, the Ural region, whose reserves have been significantly depleted as a result of intensive two centuries of exploitation.

In the strategic building of a model of transport development in the Arctic, I consider the task of laying a railway from the station. Sosnogorsk to Indiga Bay and the creation of a base seaport there. This will ensure the shortest passage of large-scale cargo from the south of the industrial Urals, from Siberia, Kazakhstan, Asian countries to the Northern Sea Route and further westward - to the countries of Northern Europe and America (east coast), eastward - to the Asia-Pacific countries, Canada and America (west coast), which is also part of the establishment of the Northern Sea Corridor agreed within the Barents Council, and the seaport of Indiga will be developed as the “Northern Gate” of the EU-funded Northern Sea Corridor (NMC) project.

The total length of the railway section Ivdel - Indiga is about 1200 km, the section of the new transport construction of the railway, according to preliminary estimates, is about 1000 km, which is about 250 km less than under the Belkomur project. If we take into account the fact that the branch of the railway Sosnogorsk - Troitsko-Pechorsk was deliberately built with the prospect of continuing to the station. Polunochnoe (project of the 60s, that is, it was more modern than Belkomur), then the conclusion follows that the initial construction of the railway to Indiga Bay is more expedient.

A tangible plus in favor of Indiga is that the distance of exporting goods by rail from the Urals, Siberia, Kazakhstan, the Far East to this seaport is 350-400 km shorter than along Belkomur, which also implies significant savings on the construction of the railway itself and its operation (by about 15–20%).

The construction of the Sosnogorsk-Indiga railway is already included in the Transport Strategy of the Russian Federation for the period up to 2035,

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however, neither the road nor the port was included in the Federal Target Program "Development of the Russian transport system for 2020-2025" and, accordingly, are not provided with funding. The need to build this railway in conjunction with the creation of a new seaport in Indiga Bay is beyond doubt - the potential cargo base of the area of gravity to the port can range from 15 million tons of cargo in 2020 to 120 million tons in 2035 (Figure 2).

The creation of a port transport hub in Indiga will turn hundreds of mineral deposits in the Nenets Autonomous Okrug, previously "locked" in vast expanses of tundra and taiga, into profitable and

economically more attractive for investors, both domestic and foreign.

The new multi-profile seaport Indiga, in combination with the new Sosnogorsk-Indiga approach line, as part of the Barentskomur railway, will become a basic element of sustainable socio-economic development not only in the Nenets Autonomous Okrug. In terms of its significance and scale, this project goes beyond the regional framework, since it will be able to make a significant contribution to the formation of a backbone transport network in the North-East of the European part of Russia.



Figure 2. Scheme of the railway line Barentskomur on the territory of the Nenets Autonomous Okrug

As already mentioned, the Tobolsk direction is considered the most preferable option for the withdrawal of Siberian cargo to the Barents Sea, although there are options for continuing the Sevsib through Nizhnevartovsk, Surgut, Khanty-Mansiysk, and the Ob region with a subsequent exit through Nyaksimvol to Troitsko-Pechorsk. But the last option is possible if the project "Ural Industrial - Ural Polar" is implemented.

The Tobolsk option is also attractive in that it is possible to create a large transport hub in its area at the intersection of a railway, road and large river artery, which is part of the Ob water transport system serving an area of about 3 million km (also in the Tobolsk area towards the European part of Russia

passes a number of main oil and gas pipelines). This option is also preferable because it will make it possible to create a large transport and logistics center to ensure the "northern delivery" and the polar highway Salekhard - Igarka - Norilsk. Also important is such a moment as the release of the overloaded section of the Tyumen-Yekaterinburg railway from the transport flows of the Khanty-Mansi Autonomous Okrug.

The western part of the North-Russian Eurasian Railway provides access to seaports in two directions: Belkomur - to the port of Arkhangelsk and Barentskomur - to the port of Indiga.

There has been a long-standing struggle between these areas, today it is unfolding for state investments

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in projects: in the first case, to modernize the Arkhangelsk port complex with the construction of a new large port area (Dry Sea) and a railway to it with a length of 1251 km (Belkomur project), in the second case, the creation of a new port of Indiga and the construction of two sections of the railway to it 612 km and 412 km, respectively (Barentskomur project).

Which of the projects is the most profitable and promising?

Large-scale development of the Arkhangelsk seaport is hindered by many circumstances. First of all, this is the shallow water of the mouth of the Northern Dvina River, where the port complex is located, which necessitates the constant performance of a large amount of dredging to maintain the fairways and berths. Also, there is practically no possibility of increasing the carrying capacity of received vessels - the limit of their deadweight is 10-12 thousand tons. Although in the planned new area of the port (Dry Sea), located at the exit from the mouth 60 km from the city, it is possible to receive ships of a larger carrying capacity - up to 150 thousand tons, but this is due to large dredging and construction of additional transport infrastructure linking the port with the city.

Another negative factor hindering the significant development of the Arkhangelsk port is the need to provide icebreaking assistance to ships for most of the year. The situation is exacerbated by the fact that the neck of the passage from the White Sea to the Barents Sea between the Kola Peninsula and the Mainland is clogged with ice for most of the year, driven here by currents and pushed out of the northern rivers. Due to these two circumstances alone, the costs of maintaining normal navigation in the port of Arkhangelsk are estimated to be several times higher than in Murmansk and even in the supposed more northerly port of Indiga, not to mention the fact that the distance of ice assistance from the port of Arkhangelsk is about 4 times longer, than from Indiga (about 800 km versus 200 km).

In addition, the development of the Arkhangelsk port is counterproductive for organizing transportation to the East.

Vice-President of the Komi Republican Association of Independent Experts Vladimir Andrianov, since 1971, having been engaged in the justification of the logistics of the development of mainline railways in the European North of Russia, in collaboration with well-known transport specialists in relation to the Belkomur project, in particular, indicates the following:

“A significant drawback (minus) in the emphasis on the use of Belkomur appears after an audit review of the technical condition of existing railways in the Arkhangelsk-Grigorievskaya (Gorkovskaya railway) and Indiga-Polunochnoye zones. The creators of Belkomur either do not have reliable and complete

information, or deliberately keep silent about some facts. Let's consider them specifically.

The railway line from Arkhangelsk to Karpogor was built as a deliberately lightly loaded, dead-end logging route. The construction technology and the equipment used in the late 40s do not allow using it without a radical reconstruction. From this it follows that this section of the new railway line will have to be built practically from scratch, since over the 70 years of its operation, the technical conditions of the main railway construction and operation have changed dramatically. Approximately the same technically obsolete are the railway lines from Vendinga (Ertom), located on the border of the Komi Republic and the Arkhangelsk region, to Mikun station and further to Syktyvkar. These are also dead-end, underutilized and technically obsolete railways with an underdeveloped industrial infrastructure. As a matter of fact,

Due to these reasons, the capital investments in the construction of the highway, interpreted by the current developers of the Belkomur project, should be increased by two to three times compared to those currently presented. Now let's look at the same indicators of the Barents Sea project. In terms of depth, the situation in Indiga Bay is even better than in Murmansk - the carrying capacity of ships there will not be limited by depths, and the construction of the port will not require significant dredging. In addition, the coastline from Cape Svyatoy Nos (the mouth of the Indiga River) to Cape Barmin or Bolshoi Rumychniche, more than 40 km long, is completely free and suitable for the construction of a giant port of any capacity with a developed port infrastructure. For this site, the excess of the coastline above sea level is 8-12 m, which guarantees its stable operation in the event of an increase in the level of the World Ocean, predicted as a result of global warming. Whereas the Arkhangelsk port, along with St. Petersburg and Ust-Luga, is subject to such a threat.

The analysis of ice maps carried out since 2000 shows that the movement of ships without icebreaking escort in the western direction is possible 7-8 months a year, in the eastern direction - 4-5 months. The duration of icebreaking navigation in this area is explained by the influence of the warm current of the Gulf Stream and the systematic destruction of ice in the Indiga Bay by tidal wave energy. A big plus in favor of Indiga, as already mentioned, is that the distance of delivery of goods by rail from the Urals, Siberia, Kazakhstan, the Far East to this seaport is 350-400 km shorter than to Arkhangelsk (savings in the construction of a railway roads).

Another significant advantage of Barentskomur over Belkomur is that the organization of export-import operations through the port of Indiga makes it possible to reduce the sea route of ships by 500-600 km in the western direction and by more than 1000 km in the eastern direction. And this significantly reduces

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the annual transportation costs of cargo owners and reduces the investment payback of the project. Obviously, in general, the Barents Sea is a more profitable and promising project, which, if not today, then in the future, is destined to become the final link of the railway lines - the meridional West Ural and the latitudinal North Russian Eurasian. This will ensure a stable connection between the port of Indiga on the Arctic coast and the port of Vanino on the Pacific coast, as well as many problematic regions of the resource type of the Russian North (Figure 3).

Modernization of BAM and Transsib will pay off with interest. In the coming years, Russia needs to

“make a real breakthrough in the development of the country's transport infrastructure. Among the priorities is a large-scale modernization of the BAM and the Trans-Siberian Railway, an increase in their throughput capacity in 2025 to over 200 million tons of cargo per year.” This task was set by President Vladimir Putin in his [circulation](#) on the occasion of the 45th anniversary of the start of construction of the Baikal-Amur Mainline. He expressed confidence that the current generation of railway workers, builders, workers, engineers will be able to adequately continue the work begun by their predecessors.

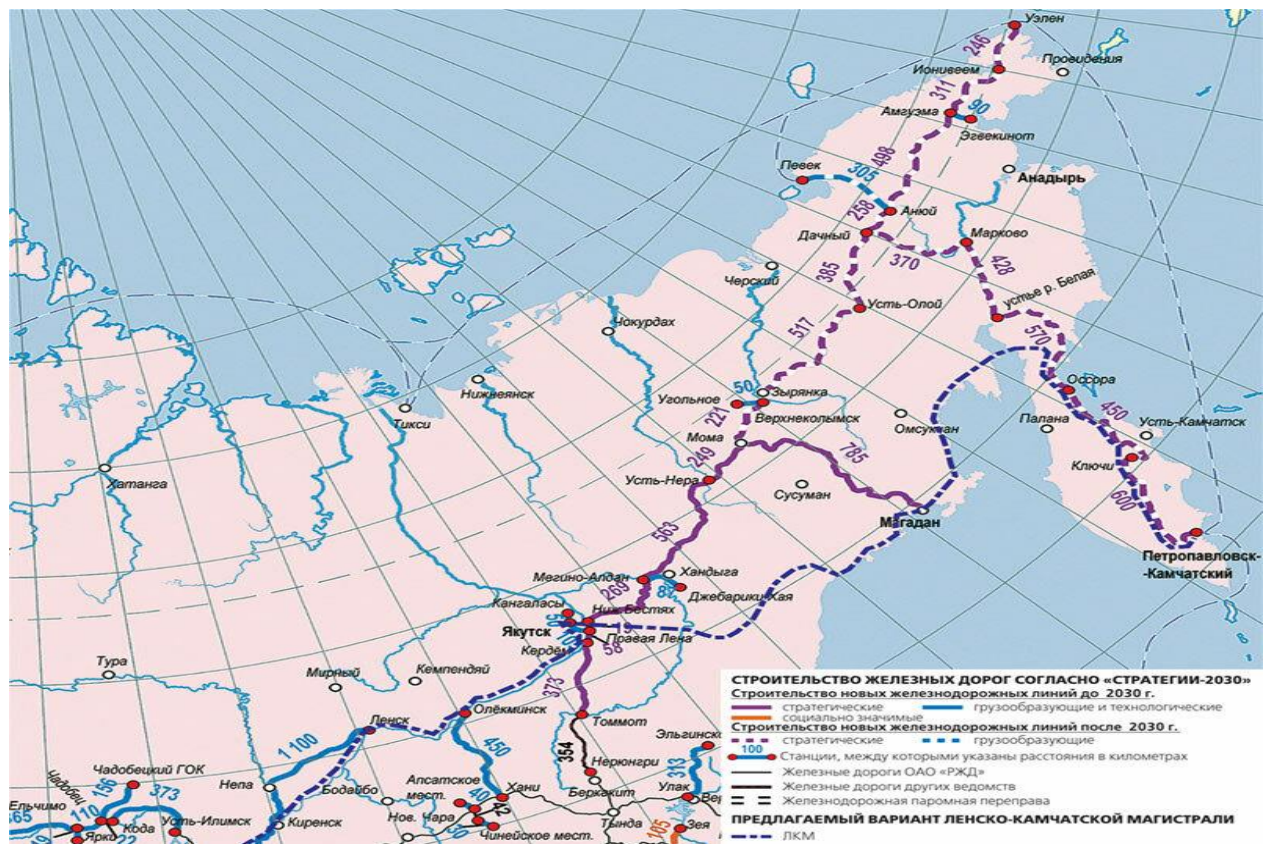


Figure 3. Scheme of the construction of the North Russian Eurasian Railway.

Today BAM is almost 4 thousand km of railway lines from Taishet to Sovetskaya Gavan. The highway has about 200 stations and sidings, crosses 11 large rivers and seven mountain ranges. More than 2,000 bridges have been built here, 10 tunnels have been built, including the recently built longest in Russia (over 15 km) Severomuysky tunnel. The whole country worked on such a large-scale object. “The builders of the route, new cities and towns, surveyors, railway workers, bridge builders and tunnelers, volunteers, inspired by a common idea, worked for the future, accomplished a real feat day after day,” V. Putin emphasized (Figure 4).

Now the country enjoys the fruits of their labor, loading the Far Eastern ports with Siberian products, the cargo turnover of which is growing by leaps and bounds due to the reorientation of business to the Asia-Pacific region (APR). Since 2008, “the busy North-West began to lose traffic volumes, which turned around 180 ° and began to load the Trans-Siberian and BAM. The Far East was not ready for such growth, and in just a few years, the throughput and carrying capacity reached the maximum limit values,” says Pavel Ivankin, chairman of the expert council of the Institute for the Study of Railway Transport Problems (Figure 5).

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From 2004 to 2020, the volume of transshipment in the Far Eastern ports really increased by almost 3 times (from 70 million to 200 million tons), and this is far from the limit. But the problem is that further growth will hit the "bottlenecks" of the railway.

Today, "we have a surplus of port facilities and a shortage of infrastructure," concludes the deputy. General Director of the Managing Port Company Irina Olkhovskaya.

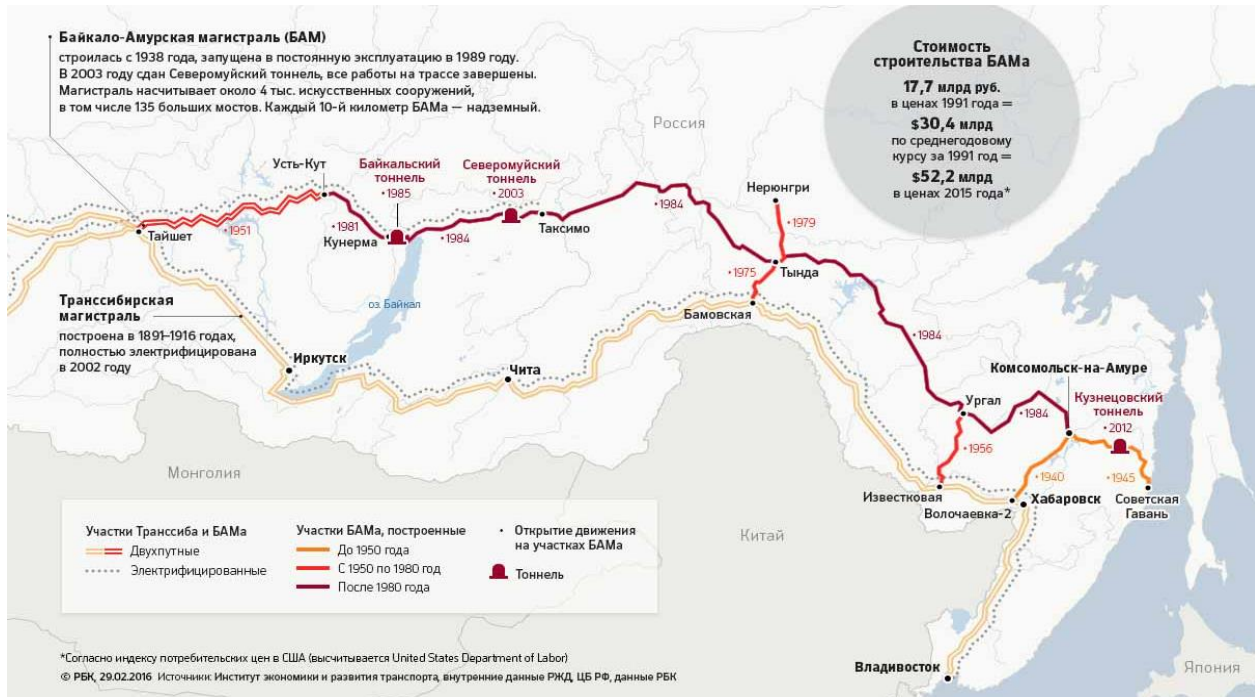


Figure 5. How the Baikal-Amur Railway (BAM) was built

Indicative in this regard was 2017, when the farmers of Western Siberia gathered a record harvest, but faced difficulties in exporting grain. There were simply not enough wagons. Moreover, there is no objective need to drive Siberian grain to distant lands to overloaded Azov-Black Sea or Baltic ports, when the Asia-Pacific region with its largest importers (Indonesia, Japan, China, South Korea) is nearby. Therefore, "it is very promising for us to increase the volume of transportation [to the Far East] by rail," emphasizes Gleb Popovtsev, deputy of the Legislative Assembly of the Novosibirsk Region.

The same situation with coal. Today, the Kemerovo region, which produces 60% of Russian coal, and the south of Yakutia, where coal deposits of coking grades are located, are limited in its transportation to the Asia-Pacific region, where the world's largest importers (China, India and Japan) are concentrated. "If the capacity [of the railway] increases, [then] coal production will increase, the taxable base will increase. This is an impetus to the further development of the coal industry and the economy of Kuzbass as a whole," Oleg Tokarev, head of the Department of the coal industry of the region, is sure. Infrastructure is also needed not only for

commodities, but also those subject to containerization.

The second tempting prospect is to become a key transit link in Chinese-European trade by land, which primarily, of course, concerns rail container traffic. So far the dynamics are good. "A few years ago, we could only assume that almost 600,000 containers would go through Russia. To date, this result has been achieved. We see an increase of an additional 30% compared to the previous year," said Oleg Belozеров, Chairman of the Board of Russian Railways, speaking at the International Railway Congress in Vienna.

But you can't stop there. "Now it is very important for us that we make the following decision, move forward, continue construction, develop BAM and the Trans-Siberian Railway. This will give us a job, give us the opportunity to move faster, give a new impetus to the Russian economy," said the head of the Ministry of Transport, Yevgeny Dietrich. By the way, if the composition from China to the EU is full, then in the opposite direction it is half empty, which gives additional opportunities to domestic producers.

Let us recall the milestones of the large-scale modernization of the BAM and the Trans-Siberian Railway, which were determined by V. Putin - an increase in their throughput in 2025 to over 200

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million tons of cargo per year. To achieve such a result, it is necessary not only to build additional tracks, tunnels and interchanges, but also to increase the speed of movement. "Containers will be delivered from Vladivostok to the western border of Russia in 7 days," the president said in his last year's address to the Federal Assembly, and in his May decree he set the task of increasing the volume of transit container traffic by 4 times by 2025. Without a doubt, it will not be possible to do this without a large-scale modernization of the two Siberian railway arteries, but the investments will pay off with interest.

The first stage of the project (2013-2020) worth 562.4 billion rubles. (reduced as a result of the audit to 520.5 billion rubles) provides for an increase in the

carrying capacity of the BAM and the Trans-Siberian Railway in the direction of seaports and border crossings of the Far East to 124.9 million tons (+66.8 million tons compared to 2012) . This year alone, Russian Railways will spend 30 billion rubles on the development of the Eastern railway range.

"In order to increase cargo traffic, it is planned to put into operation more than 45 km of new second tracks on the BAM sections. Open traffic on the stages Lena Vostochnaya - Predlensky and Delbichinda - Daban. It is also planned to reconstruct three stations: Vikhorevka, Bayronovka and Meget," the press service of the East Siberian Railway (VSZhD) notes (Figure 6).



Figure 6. Modernization scheme of the Baikal-Amur Railway (BAM)

True, it will be difficult to meet the deadlines due to the accumulated backlog. "At the end of 2020, Russian Railways did not complete a number of facilities. For example, in accordance with the passport of the project "Development of the BAM and Trans-Siberian Railway", in 2020, 11 sidings and 78 km of additional tracks were to be built. At the end of the year, only one object was accepted (reconstruction of the subgrade at the section of the western BAM "Khani – Tynda")," the Accounts Chamber concluded following the results of the audit. However, the head of Russian Railways, O. Belozеров, assures that the project will be completed on time.

At the second stage (2021-2025), it is necessary to build 1,310 km of additional main tracks, 32 sidings and reconstruct 29 stations, as a result of which cargo transportation along highways will increase to 182 million tons, and by 2025, according to the new order of the President, up to 200 million tons. In total, it is planned to spend about 493.2 billion rubles for these purposes.

Russian Railways has already begun developing project documentation for the construction and

modernization of a total of 84 facilities as part of the second stage of the modernization of BAM and the Trans-Siberian Railway. Particular attention is paid to the 15-kilometer Severomuysky tunnel. Today, it can only pass 16 trains per day (22 including detours). By reducing the interval and strengthening the traction power supply at the mountain pass section, it is possible to get on 27 pairs of trains weighing up to 6300 tons. This is the maximum, but it is too little. The introduction of digital technologies, for example, interval control of train traffic, which are successfully used on the Moscow Central Circle, can expand the "bottleneck" of BAM by 15-20%.

But only the construction of a new tunnel can radically solve the problem. Moreover, state finance may not even be needed here. "We intend to implement this project at our own expense, and we take all the risks," said Mikhail Umrikhin, a representative of the Sibanthracite company, and estimated its cost at 60 billion rubles, and the timeframe at 5 years.

One way or another, without a modern infrastructure, neither "sew" the country, nor unleash

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the economic potential of Siberia and the Far East, nor diversify foreign economic relations for sure. In addition, by increasing the capacity of the railways, “we will build the largest transport corridor from the Asia-Pacific countries to the EU states. Russia will take a key place in the global traffic flows,” Viktor Zubarev, State Duma deputy from the Krasnoyarsk Territory, justifiably emphasizes.

Today, every educated person understands that the Arctic is not just Russia's tomorrow, it is its future, its chance to remain a great maritime power, using its geographical and strategic position to extract economic benefits and increase its influence in the world. And scientists, specialists in the transport industry have a great responsibility to determine specific scientifically based directions for the economic development of Russia and the use of its Arctic resources, including transport.

The entrance to the Severo-Muisky Tunnel provides an increase in freight traffic throughout the country (Figure 4).

Now the country enjoys the fruits of their labor, loading the Far Eastern ports with Siberian products, the cargo turnover of which is growing by leaps and bounds due to the reorientation of business to the Asia-Pacific region (APR). Since 2008, “the busy North-West began to lose traffic volumes, which turned around 180 and began to load the Trans-Siberian and BAM. The Far East was not ready for such growth, and in just a few years, the throughput and carrying capacity reached the maximum limit values,” says Pavel Ivankin, chairman of the expert council of the Institute for the Study of Railway Transport Problems.

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Conclusion

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