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ФГАОУ ВПО «Северный (Арктический)
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We will be glad to see you among the authors of “Arctic and North”!

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Arctic projects of the Arkhangelsk Region



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Abstract. The article analyzes the implementation of the state order for military defense products and the potential of Severodvinsk shipyards and shipbuilding innovative cluster. The area has a number of successfully implemented projects in the region and development industry for diamond deposits. The project aimed at development of lead-zinc deposit

“Pavlovsk” on the Novaya Zemlya is done. Arkhangelsk region becomes a leader in the development of bioenergy on the principles of “green economy”, and it operates an innovative timber cluster “PomorInnoLes”. The real breakthrough is the establishment of the RAS Federal Research Center for the complex study of the Arctic in Arkhangelsk. In general, our region is not just the area occupied with generating new ideas and projects, but also preserving cultural and historical traditions.

Keywords: *Arkhangelsk region, projects, defense industry contracts, clusters, “Pavlovsk” deposit, bioenergy, Federal Research Center of the Arctic*

Arctic Zone of the Russian Federation (AZRF) undoubtably has geopolitical, mineral resource, defence, ecological and tourist potential for Russia. It is true that this potential has global significance especially geopolitical and mineral resource extraction ones. Today our country is returning back to the Arctic, restoring the Northern Sea Route, creating National Arctic transport chain and infrastructure of a double used and is solving other relevant issues. But if we will take into account the present financial and economic crisis, sanctions against Russia, reduced world demand for oil and gas, devaluation of the ruble, complicated geopolitical situation and the war against ISIS (a terrorist organization restricted on the territory of the Russian Federation), making large scale state investments, especially on the regional level, seems to be problematic.

Extremely uncomfortable living and economic conditions, absence of the modern infrastructure make the Arctic and North development projects more complicated and expensive. Making a hard choice on the regional level, it seems to be better to speak about local projects that

have local resources, creation of transport-habs, development of the territorial, innovative clusters, including the ship-building and forest ones, as well as the priority development territories. It is clear that no one takes away the responsibility for deciding the relevant social problems of the northern territories. These issues are controlled by the Government of the Arkhangelsk Region all the time, daily or online, as we say, in real time regime.

Regional Arctic projects

Project management has become a relevant issue in the Arctic where everything is so unpredictable and mobile. The representative forums we've held in Arkhangelsk made us sure in that. In October 2015 Arkhangelsk hosted the 3rd international forum "Arctic projects — today and tomorrow". The forum had become the greatest platform for discussing the Arctic projects and searching for best ways of their logistics and implementation. The forum was organized by the Government of the Arkhangelsk Region, the Association of oil industry suppliers "Sozvezdie" and NArFU named after M.V.Lomonosov. The forum was attended by more than 200 representatives of the leading oil, engineering, constructing and transport suppliers, shipyards, and engineering companies from Russia and abroad; representatives of the federal and local governments, experts, economists and researchers. The participants of the forum discussed the development of the Arctic and North areas of Russia, perspectives of the large projects — "Belkomur", "Severniy shirotniy hod", "Yamal SPG" and others. A special attention was paid to the establishment of the cargo base for the Northern Sea Route in Arkhangelsk.

The major result of the forums is *involvement of the regional companies in the project "Yamal SPG"*. Such companies as "Spetsfundamentstroy", "Northern Shipping Company", MRTS and Arkhangelsk sea and river trade ports and the others (more than 50 companies in general) are involved in constructing and implementation of this project. Greater participation of the competitive Russian suppliers in the Arctic resource extraction projects — a relevant question both for the regional Russian authorities and for the Government of the Russian Federation in times of sanction and replacement of import. Our regional Arctic projects contain real plans, mega-projects for the leading sectors of the Arkhangelsk regional economy. They are, first of all, military and defence projects.

Completing the state ***defence products order*** — the first and priority for the Severodvinsk shipyards. JS "PO Sevmash", "Centr sudoremonta "Zvezdochka", "SPO "Arktika" and "NIPTB "Onega" have facilities and well trained engineers and workers to implement *modern technological projects aimed at improving the defence capacity of the country*. Severodvinsk has a good geopolitical position: its shipyards are the only in Russia that have the access to the ocean. Now the nuclear submarines of

the 4th generation are constructed here. In 2012—2015 “Sevmash” company constructed or started to construct the NS-es type “Borey” and “Yasen”: “Uriy Dolgorukiy”, “Aleksandr Nevsky”, “Severodvinsk”, “Kyaz Oleg”, “Krasnoyarsk”, “Khabarovsk”, “Vladimir Monomah”, “Generalissimus Suvorov”, “Arkhangelsk”, “Kazan”, “Knyaz Vladimir” and “Novosibirsk”.

Shipbuilding and shippreparing companies are occupied by the NS of the 4th generation projects. In future they will be involved in constructing the NS of the 5th generation. Nevertheless, in order not to lose the competence it is necessary to keep the civil production as well.

Besides the defence products order, “Sevmash” ad “Zvezdochka” are involved in hi-tech civil production for oil extraction in the Arctic. It is the first marine ice-class oil extraction platform “Prirazlomnaya” for the Pechora sea continental shelf (ordered by Ltd “Gazprom neft shelf”). Oil and gas extraction has been done from the fixed platform on the Arctic shelf since December 2013. During the first year of work “Prirazlomnaya” had 2,2 mln barrels of oil and by December 2015 the platform got 1 mln tonnes of oil. Norwegian company “Moss Maritime AS” got two half-submersible oil platforms “Moss CS-50” constructed at “Sevmash”.

The other example of technically complicated innovative projects is AO “TSS “Zvezdochka”, leading Russian ship reparing and ship modernization company with braches on the shores of five seas (DG — N.Ya. Kalistratov). The largesr civil project for “Zvezdochka” is construction of the selflifting floating platform (SLFP) “Arkticheskaya” for PAO “Gasprom”. It is the first off-shore platform of such a class, constructed by the Russian shipbuilders and used since the spring 2015, that could drill 4 exploratory wells. “Zvezdochka” is among the first to construct selflifting floating drilling platforms of a heavy class for shelf oil deposits. For the 50 years of establishment “Zvezdochka” constructed more than 22,000 propellers made of bronze, titanium alloy and stainless steel for almost all the types of civil boats, military submarines and nuclear ice-breakers [1, p. 158]. New type of activity is the construction of modern engeens for the ice-lass boats — rudder propeller, propulsion systems — controllable-pitch propellers, ring and water jets, shafting lines, hybrid installations

Large scale development of the shipbuilding in the area lead not only to the technical development of the big shipyards, but also to the implementation of the projects ***Shipbuilding innovative territorial cluster***. Today the Arkhangelsk area has more than 10 private shipyards and engeneering companies with the general volume of produced metal constructions close to 5,000 tons per month and ability to construct the hulls of the support vessels, barges with the tonnage up to 2,000 tonnes that are extremely popular for use at the arctic deposits.

Some *common projects* are rather perspective withtin the Arkhangelsk cluster: development of the test stand and controllable-pitch propellers; construction of the the test stend for the

rudder-propellers; construction and development of the resource center for professional education of highly qualified specialists for engineering; development of the project and construction of the marine test complex in Arkhangelsk; project making and construction of the scientific vessel for Arctic research; development of technologies for construction of barges and tugboats for liquefied natural gas for the Arctic environment. Companies of the shipbuilding cluster have required facilities for constructions of the nuclear ice-breakers of the new generation.

One of the most perspective civil projects, that requires a certain degree of promotion and had federal significance is establishment of the ***distributed shipyard in Arkhangelsk- Severodvinsk urban agglomeration***. The project is aimed at development of cooperation and diversification of the production and at keeping the existing competences and technologies for the Arctic marine technics and vessels. This is extremely important for the import replacement policy [2]. There are a new perspective for high-tech production made by the Severodvinsk companies and some advantages for new compact assembly and installation platforms situated in the delta of the Northern Dvina, coasts of the White sea with a direct access to the arctic seas. The production of each shipyard is going to be focused on the high-tech projects, such as: fixed, semi submerget and selflifted platform, large equipped modules and other complicated objects (fixed and floating) situated along the Northern Sea route and various marine techniques (drilling, docking and crane ships; pipelayers and cablelayers).

In perspective there is a possibility to provide such services as: "Service for marine equipment in the Arctic conditions and supplying the functioning of the Northern Sea Route", "Development of underwater and under ice technologies", and integrating services of the "Center of the Arctic marine technology". A key "narrow space" that should be "widen" is the absence of a specialized assembly area where the final assembling could be done. Creation of such an area, equipped according to the modern standards is the priority technical issues of the project. Passing through such "narrow spaces", requires smart and creative decisions. Participants of the project are not able to provide all the necessary investments. The problem could be solved by the means of the state support, co-financing at the federal level, private investments and other forms of cooperation.

The Government of the Arkhangelsk region should pay attention, as it has been done before, to such projects as "***Belkomur" and deep water sea port in Arkhangelsk***". We clearly understand that "Belkomur" is not just an infrastructural project, but a complex program of development designed for the North-Western areas of Russia and is of interest for 4 subjects of the Russian Federation: Permsky Krai, Komi Republic, Arkhangelsk and Murmansk Regions. It is supposed to construct deficient objects and repair existing infrastructure for railway connection Arkhangelsk — Syktyvkar — Perm (Solikamsk) with the length of 1,161 km. Construction of the "Belkomur" will open an ac-

cess to natural resources (wood, oil, coal, minerals, metal and non metal ore), will provide the northern extension for Transsiberian railway and will make the cargo delivery from the largest industrial hub Bereznikovsky-Solikamsky possible.

A special significance the “Belkomur” project gets in case of construction of a deep water sea port in Arkhangelsk and establishment of a optimal transport and logistic scheme aimed at development of international transit from China to the EU and America. It is planed that the deep water port is going to be situated in the areas of 180 ha, 55 km North from Arkhangelsk, in the northeast part of the Sukhoe More Bay and on the western coast of the Mudug island. New port is going to be based on the 4 handling complexes: oil, universal, coal and container and it will provide services for multimodal traffic of coal, mineral fertilizers, wood and oil cargoes, general and container cargoes for import and export. Freight turnover of the new port could become 30 billion tonnes per year and the distance of delivery would reduce. The port would be able to have vessels with a deadweight of 75—100 thousand tonnes. But the “Belkomur” and “Arkhangelsk deep water sea port” still have the issues of financial support even when the negotiations with possible investors, including China, took place before and are still going on.

Sucsessful for the area are *the projects aimed at developing dimond deposits*. Natural resource potential of the Arctic areas of the Arkhangelsk region is equal to 20% of all Russia dimond deposits, lead and platinum deposits, bauxites, fish in coastal waters and millions of m³ of wood Arkhangelsk region has *the only diamond deposit in Europe*.

The government of the region is paying much attention to the dimind extraction sector. The income from taxes is 4.5 times more (compare to the years 2014 and 2015) — and it is one of the most significant events for the social sphere of the region. The reach this goal became possible due to the work of a new mining and processing plant. One of the biggest diamond extraction plants in Russia — JSC “Severalmaz” had high economic indexes. In 2014 the second module of the Lomonosov mining and processing plant was opened¹, it is supposed to process 3 mln tonnes of ore per year. If we will take into consideration new facilities of this plant, its total annual capacity could be 5 mln tonnes by the year 2021. Growth of dimond extraction by the same time could increase from 650 thousand carats to 4.3—5 mln carats.

One more important ivent is the constraction of the mining and processing plant by the JS “Arkhangelskgeoldobicha” NK “Lukoil” with a capacity of 4.5 mln tonnes of ore per year at the diamond deposit named after Vladimir Grib in the Mezen district of the Arkhangelsk region, 130 km north-east of Arkhangelsk. The deposit is the largest in Europe. Only proven ore reserves are 100 mln

¹ It is situated in the Arctic zone of the Russian Federation, in the Primorsky municipal district.

carats of the highest quality. Investments to the projects are around 1 billion dollars. The first million carats has been already extracted.

Development of the diamond deposits is of interest for the government of the Arkhangelsk Region because of their practical and social significance. New well paid jobs, additional income for the regional budget and strengthening of social and economic positions of the region. The staff of the diamond mining and processing plant is mostly from the Arkhangelsk area; these people got professional education or training; their amount together with the staff of contractors is about 2 thousand people.

Extraction sector of economy of the Arkhangelsk region got a new arctic project: "*Development of the lead and zinc deposit "Pavlovskoe" on the Novaya Zemlya island*". Construction of a lead and zinc mining and processing plant opens serious perspectives for the development of the Arkhangelsk logistic and transport hub. Speaking at the third international forum in Arkhangelsk (29–30 October 2015) A. Lukin, GD of the JS "Pervaya gorno-rudnaya kompaniya" — a part of the Uranus holding "Atomredmetzoloto", said that the project was unique for the Arkhangelsk region and for the Arctic zone of the Russian Federation; in general it is the only large scale project that is done in the region and is not related to the oil and gas extraction. Exploration at the "Pavlovskoe" deposit is completed and the results exceeded expectations. According to the exploration results lead and zinc reserves are about 46 mln tonnes with a metal content more than 3 mln. Proven earlier results — 37 mln tonnes with the metal content of 2.4 mln tonnes.

Direct deliveries of the zinc concentrate are planned for Russian processing plants and for the Swedish company Boliden, lead concentrate — for Russian, European and Chinese plants. In 2018 there is a plan to construct a mining and processing plant on the Novaya Zemlya island and in 2020 — to get commercial products. Planned capacity of the plant — 2.5 mln tonnes of ore per year².

Arkhangelsk region becomes a leader on the European North of Russia after *projects aimed at development of the bioenergy on the principles of "green economy"*. Arkhangelsk region historically has good conditions to develop bioenergy: forests — 77.7%, general reserves of wood 2.6 billion m³, annual allowable cut — 23.8 mln³ (2015). Annual turnover of wood is equal to 11–12 mln m³, production leaves up to 2 mln m³ of wooden waste (sawdust, bark).

² The First mining company presented the projects "Pavlovskoe" at the third international forum "Arctic projects — today and tomorrow". 3 November 2015. URL: <http://www.armz.ru/press/news/?id=818> (Accessed: 08 January 2016).

In November 2014 the Government of the Arkhangelsk region adopted the concept for the development of local heat supply up to 2030 that changes the fuel balance of the municipal energy system.

By the year 2030 the fuel balance of the region should look like: 54% — natural gas, 44% — biofuel (wooden wastes, splint, pellets), 2% — coal. Liquid fuel (fuel oil and diesel) should not be presented in the local energy system of the Arkhangelsk region by 2030 at all. Region authorities intend to establish biofuel market — sophisticated and efficient cutting, collecting and processing of the wooden wastes. Also these should be logistic chains in order to deliver the processed wooden wastes to customers.

Bioenergy project contributes to some achievements: efficient use of forests; diversification of the wooden production; new jobs; increasing the energy efficiency of the region; modernization of energy systems. Within the fuel replacement project, 45 boiler houses are using wooden fuel and 13 new built boilers use only biofuel.

By now the Arkhangelsk region is one of the largest Russian producer of pellets — granules made of wood wastes for bioenergy. They are produced by the CJSC "Lesozavod № 25". In October 2015 in Onega new factory stated to produce ecologically friendly fuel — black pellets made of hydrolysis lignin. It is the first innovative project of that kind in Russia. The company "Bionet" is the largest wood cut waste recycling plant not only in Russia but also in Europe. One more investment project is designed to produce wooden granules Ltd "Ustyanskaya lesopererabativaushaya kompaniya" with the general capacity of 50 thousand tonnes.

It seems to be relevant to establish a biofuel market at municipalities with 700 small wood cut companies. Usually these companies have low technological level and small volume of wood cut and that's why they are a reason for huge volumes of wood cut waste. Legal volume is about 700 thousand of wood waste, but more than 1 mln m³ of wood wastes is on the dump and therefore it will be burned. As I.A. Orlov mentioned, proceeding the wood cut waste is still the weakest link. "We have opened a number of boiler houses that use the biofuel only, but still about 1,5 mln m³ wood cut wastes are not in use for proceeding and recycling" [3].

A successfully implemented project is a new form of the timber industry — ***innovative timber cluster "PomorInnoLes"***, which includes 24 companies. The cluster united major business players, small and medium-sized businesses, suppliers of equipment, specialized production service and logistics service providers, research and educational organizations, related to territorial proximity and the functional dependence in production and the sale of goods and services in the forestry sector of the regional economy. Amount of annual tax payments for the main cluster companies: JSC "Arkhangelsk

PPM" PKP "Titan", CJSC "Leoszavod № 25" — is more than 2 billion rubles, a share in the regional logging is 15%, lumber production — more than 23% , pulp — over 40%, cardboard — 51%. Participants of the cluster are carrying out eight projects.

Large-scale modernization of the regional timber industry soon will enable a qualitative change in the structure of commodity output, providing high value-added production; also it will lead to a better use of forest resources. There are some reasons to believe that the forest resources could form new energy and environmental policies based on the principles of "green economy".

Fishing industry in the region is aimed at solving a whole range of tasks, such as the preservation of the diversity of living aquatic resources, the development of fishing technologies, deliver of fish to the port of Arkhangelsk and the creation of social comfort in our cities and villages. Arkhangelsk Oblast is one of the first places in the country for the consumption to per capita – 35 kilograms per person per year.

The oldest and the largest fishing enterprises in the region is JSC "Arkhangelsk Trawl Fleet" (ATF). At the end of 2013, the company was sold to Ltd "Virma" – a part of the Northwest fishing consortium. The Government of the Arkhangelsk region and the investing company have an agreement, which includes a package of social obligations, including those relating to port infrastructure development projects and revival of Maimaksanskiy cargo port area. In addition, it was possible to reach agreement and not to get additional fishing quota. The company has fulfilled all these commitments and in 2014 for the first time for many years, "ATF" got a profit. The volume of marine bio-resource delivery to the Arkhangelsk Sea Commercial Port has increased.

Increasing marine and rail freight traffic could make the Maimaksa cargo port a major transportation and logistics hub for the transhipment of fish and other types of cargoes as well. Existing port infrastructure allows receiving up to 80 thousand tons of fish annually. In the case of a successful negotiations with the Far East Fish Company, "Arkhangelsk Trawl Fleet" is ready to increase the handling capacity of up to 100-150 thousand tons per year.

Arkhangelsk region has all the necessary resources and potential to become one of the leaders in the **development of tourism in the Arctic and in the North of Russia**. The presence of the National Park "Russian Arctic", unique monuments and sites of natural and cultural heritage, as well as transport accessibility create prerequisites for the development of the region as a center of Arctic network of protected areas; as a platform for the development of new models of biodiversity conservation; as center for the development of environmental, ethnographic tourism in the western Arctic and European Russia. The development of tourism is an important and perspective sector of the regional economy. According to Arkhangelskstat, in 2014 102 companies and 43 hotel-type or-

ganizations, including 7 sanatoriums and 39 tourist centers, operated on the territory of Arkhangelsk region. The volume of accommodation services in the region increased from 1.7 billion in 2012 to 2,2 billion rubles in 2014. Amount of taxes and fees paid by the companies to the budget of the Arkhangelsk region are increasing significantly.

On the territory of the Arkhangelsk region there 22 tour operators sell more than 150 tour packages, vouchers for excursions, interactive and educational tour programs. "Seven Wonders" of the Arkhangelsk region include: Arkhangelsk, Solovetsky archipelago (included in the list of UNESCO), White Sea, "Malye Kareli", Pinega caves, a town musum in Kargopol, the village Lomonosovo. In order to facilitate the registration of foreign vessels and foreign tourists on board, who come to visit the state natural reserve of federal importance "Franz Josef Land", some changes to the boundaries of the Arkhangelsk sea port have been made and the water area of the Arkhangelsk sea port includes the Bay Severnaya, Bay Dezhneva, Island of Aleksandra and Franz Josef Land archipelago. Some other measures are taken to attract tourists who visit the National park "Russian Arctic".

A real scientific breakthrough in development of the Arctic is a federal project of Arkhangelsk **RAS Federal Research Center for the Complex Study of the Arctic**. November 24, 2014: Arkhangelsk hosted a meeting of discussion club "The Arctic as an element of socio-economic and innovative development of Russia". It was attended by the GPs, managers and employees of institutes and centers of the RAS from the Far East and North-West Russia, research organizations undet the FASO Russia, the Northern (Arctic) Federal University, as well as representatives of the Government of the Arkhangelsk region and business ("Gazprom", "Rosneft" and others). The result of the discussion was an offer to establish the Federal Center for Complex Research in the Arctic. Governor of the Arkhangelsk region I.A. Orlov spoke about the establishment of such a center in Arkhangelsk and his proposal was supported.

By the end of September 2015 the preparatory phase of the integration project was completed. The Order of the Federal Agency of Scientific Organizations (FASO Russia) № 494 issue on the 30th of September 2015 confirmed the reorganization of the Arkhangelsk Scientific Center of UB RAS in RAS Federal Research Centre for a Complex Study of the Arctic (FRCCSA) and its reunion with a number of scientific organizations of the Arkhangelsk Region and the Nenets Autonomous District. All the property inventory procedures and reorganization itself is controlled by a newly established Committee for reorganization.

There are also reports that the Kola Scientific Center RAS will become the Arctic Research Center³. The problem is seen in the fact that the two centers of the RAS in Arkhangelsk and Murmansk should become partners. After all, the main purpose of the project FRCCSA RAS is concentration of intellectual resources and research tools for the large-scale integrated solutions to ensure the public interest in Arctic, balanced social and economic development and improvement of the quality of life of the Arctic population in Russia [4].

Besides organizing FRCCSA RAS, Arkhangelsk authorities propose to establish ***Research Center for Complex Medical Research in the Arctic*** under the Northern State Medical University, which is going to be responsible for the assessment of health risks for indigenous people, explorers, soldiers, shift workers in the Arctic. NSMU is the only specialized medical institution in the Russian Arctic with an extensive clinical database and ongoing research in the field of polar medicine and health of indigenous population of the northern territories.

National and even international got the project “Arctic Floating University”. In 2012—2015 a network cooperation between NArFU, Moscow State University, St. Petersburg State University, Severnoe UGMS, AARI, Institute of Ecological Problems of the North UB RAS, the National Institute of Oceanology named after N.N. Zubov, Russian State Hydrometeorological University and All-Russian Scientific Research Institute of Fisheries and Oceanography organized seven expeditions of the Arctic Floating University. The expeditions were focused on the research on hydrological, meteorological, hydrochemical and bioresource issue of the White, Barents, Greenland and Kara Seas as well as glaciological and seismological research done on the Svalbard archipelago, Franz Josef Land and Novaya Zemlya and research on climate change. This is how the teachers, researchers, students, undergraduates and postgraduates from NArFU get research skills in the Arctic conditions.

NArFU students get internship at enterprises in Severodvinsk, oil and gas corporations, transport companies and emergency response service in the Arctic. The Center for Collective Use of Scientific Equipment “Arctic” has unique analytical and research equipment that is associated with the Russian network of federal universities. The Center carried out a series of research projects in the interest of scientific organizations and institutions related to the study of the western part of the Russian Arctic.

Industrial and resource potential of the region

The Arctic projects clearly meets all the available industrial resource potential of the Arkhangelsk region: port system, polar aviation, hydrographic base, a tank farm, oil terminal, north-

³ Kolskiy nauchniy centr sdelal Arkticheskim. 17.11.2015. URL: http://www.ras.ru/digest/showdnews.aspx?_language=ru&id=cc7d61c6-3bac-485a-a441506ef34d (Accessed: 08 January 2016).

ern hydrometeorological service, Arctic Directorate Maintenance Control at the sea, a branch of the GosMorspassluzhba, ice-class vessels, shallow-draft icebreakers, technical fleet and research vessels. An important advantage of Arkhangelsk is the availability of the Arctic Rescue Center EMERCOM of Russia. In Arkhangelsk we have the Polar Department of Hydrometeorology and Environmental Monitoring, responsible for Arkhangelsk and a part of the Murmansk region, the Komi Republic, Nenets and Yamalo-Nenets Autonomous District, Dixon, Khatanga, White Sea, Kara Sea, south-east Barents Sea, west of Laptev Sea, some areas of Ob River, Taz Bay and Yenisei Gulf. The Department provides hydrometeorological and logical support of various activities, transportation and life of the population [5, p.19]. Arkhangelsk hydrographic base — a branch of Hydrographical company of the Russian Ministry of Transport carries out hydrographic and topographic work to ensure the safety of navigation, provides marine research expeditions in the Arctic with the vessels. Shipping companies of the area transport cargoes with the use of vessels with a draft of 2,4 meters in the Barents, Pechora and Kara seas, and deliver cargoes to the shores without piers and to the ice covered areas.

Several regional oil and gas engineering and power construction companies are operating throughout the territory of Russia. *Regional company “Energoservis”* carries out the full range of activities associated with the compressor units — design, supply, installation of booster compressor stations, service, etc. *The company “Arkhangelskiy trest ingenernih stroitelnih isiskaniy”* pro-leads hydrographic work offshore and has already completed a number of activities for “Gazprom” on the Yamal Peninsula during the construction of the underwater gas pipeline under Baidaratskaya Bay, as well as during the installation of the offshore ice-resistant fixed platform “Prirazlomnaya”. *The company “Optimist”* has entered the market with an offshore manufacturing specialized containers and sludge container for using on the shelf. The company together with the transport company “Belfraht” removes the cuttings from the “Prirazlomnaja”. Containers have an international DNV standard certified for cargo delivery in the marine environment at a temperature below -40° C.

The company “Mezhregiontruboprovodstroy” (MRTS) has many years of experience in the constructing pipelines and underwater engineering works in the Far North areas; it is one of the largest contractors of the fuel and energy complex. JSC “MRTS” takes part in almost all the large scale projects aimed at developing deposits in the Far East and in the Arctic. For the past 15 years the total length of constructed underwater pipelines amounted to more than 1,000 kilometers. Among the customers of the “MRTS” are: “Gazprom”, “Transneft”, “Lukoil”, “ExxonNeftegas Ltd”, “Rosneft”, “Norilsk Nickel”, “NOVATEK” and many others. Almost all of the “MRTS” projects are done in the Arctic areas with extremely severe climatic conditions. The “MRTS” is the major sup-

plier and constructor of berths for “Yamal LNG” project. Company works on the Arkhangelsk production and logistics base for a half a million tons of general cargoes annually, as well as for manufacture and shipment of large modules.

Construction companies of the Arkhangelsk Region JSC “Spetsfundamentstroy”, JSC “GT North”, using the services of a dozen local subcontractors, constructed facilities in the village of Sabetta in Yamal-Nenets Autonomous District. Staff is deliver by aircraft and helicopters of Arkhangelsk aviation enterprises JSC “Nordavia — regional airlines” and JSC “2-oy Arkhangelskiy obedinenniy aviaotryad”.

Establishement of clusters, territories with special regime of economic activity, the National Arctic transport lines and the Arkhangelsk port hub will contribute to the development of the Northern Sea Route, greater engagement of available resources in the economy and social development of the northern territories. Of course, we understand that there should operate a *complex social infrastructure*, that creates the conditions for people in the northern regions of Russia, including our Arkhangelsk region. In order to make people stay in north, there is a need in serious motivating factors associated with the level of wages, housing, increased size of the mothers' capital, greater leisure activities and etc. The solution of social problems and accumulation of human capital is in the focus of Arkhangelsk Regional Government, but, unfortunately, not everything depends on us, especially in the context of the ongoing crisis and the devaluation of ruble.

Modernization of the Arctic management

The region has successfully implemented project of *modernization of the Arctic management*. Thus, an important project to improve governance is innovations in the management of a such well-known Arctic territory as the Solovetsky Islands. The Solovetsky archipelago Project Management Department of the Arkhangelsk regional administration developed a special control mechanism called “*Five Keys*”, in order to provide harmonic co-existence and development of the three main subjects of management: the Solovetsky Monastery, a federal museum and municipal administration. Patriarch of Moscow and All Russia Kirill, the head of the Presidential Administration of the Russian Federation Sergey Ivanov and Governor of Arkhangelsk Region Igor Orlov decided to establish a mechanism of “*five keys of Solovki*”. An agreement was reached between the Solovetsky men's monastery, Solovetskiy state museum, the Government of the Arkhangelsk region, Primorsky municipal area and rural settlement “Solovki” on general principles of life and management of the island.

In the area we observe the implementation of the “*Solovki development starategy*”, adopted in 2013 and amended in July 2015. The government of the region is to develop a *project man-*

agement program, which is planned to be used for the control over the restoration on the Solovki islands. This unique experience of interaction between church and secular authorities in the development of Arctic area was even approved by UNESCO.

Today there is one more ongoing interregional cooperation project means the establishment of the association of interregional urban districts and municipal areas of the Russian Arctic — “Arctic municipalities”. The initiative of the Government of the Arkhangelsk Region was supported by the Security Council of the Russian Federation. The Memorandum of Association was signed in Arkhangelsk on the 15th of December 2014; association members are Severodvinsk municipalities of the Polar area of the NAD and the Primorsky region [6]. Later, the decision to join the association was taken by six more municipalities of the Arkhangelsk region and the Komi Republic. In February 2015 it was officially registered. The association allows interaction of federal and regional authorities and will become a platform for the local positioning of the Arctic municipalities in the tourism sector, economic, scientific, technical and cultural cooperation, exchange of experience, study and promotion of the best practices, cultural exchange and cooperation in education, public health and sports.

The territories, islands and water areas of modern Arkhangelsk Region were included into the AZRF by not only the astronomical (Polar Circle), physical-geographical and bioclimatic approaches, but also by a long-standing historical and cultural traditions of our region, its geopolitical importance and by the social and economic approaches. The Russian Arctic consists of seven municipalities: “Town of Arkhangelsk”, “Mezensky municipal district”, “Novaya Zemlya”, “Town of Novodvinsk”, “Onega municipal district”, “Primorsky municipal district” and “Severodvinsk”. Towns of Arkhangelsk, Severodvinsk and Novodvinsk form Arkhangelsk—Severodvinsk metropolitan area, the so-called “Great Archangelsk”, where more than 576,000 people, or nearly one-fifth of the total population of the Russian Arctic, live.

The Russian Arctic also includes the islands of Novaya Zemlya archipelago (2 large islands and many small ones), 192 islands of the Franz Josef Land archipelago, more than 100 islands of the Solovetsky archipelago. Since the end of the XX century the Arkhangelsk region management structure has a municipal district “Novaya Zemlya”. It's *the most northern city district and the most populated island in the Russian Arctic*. In 2013 the population of the Novaya Zemlya was 2 623 people, 1736 of them were military men, 603 — civilians and 284 — children. Municipality “Rural area of Solovki” is a part of the Primorsky Municipal District and it is located on eight islands in the White Sea, the area of 28,829 hectares with 6 settlements, inhabited by 898 people (2014).

Since 2009—2010 the Arctic archipelagoes of Novaya Zemlya and Franz Josef Land are a part of a national park “Russian Arctic” in order to preserve cultural and natural heritage of the Western sector of the Russian Arctic. In addition to the development of the Arctic tourism and protection of cultural and natural heritage the national park “Russian Arctic” fulfills an important mission to minimize the environmental damage. Cleaning the area of the Novaya Zemlya and Franz Josef land is done under the leadership of the NP “Russian Arctic”. After five years of the Arctic “cleaning”, the most “hot” spots in terms of ecology at the Franz Josef Land have been removed. All the dangerous objects were removed or cleaned, including oil products stocks located in coastal zone and therefore prone to severe erosion that posed a threat of ecological disaster.

Russian North preserves the cultural and historical traditions

In general, the Arkhangelsk region is not only a region that generates new ideas and projects, but it also preserves the cultural and historical traditions of the Russian North. A special role of the region is traditionally caused by its geographical location of the seaports on the coast of the White Sea, justified by the inclusion of a number of municipalities in the Arctic Zone of the Russian Federation and past and the present industrial and cultural development of the area. It is uniquely positioned to implement the Arctic projects in many spheres of life, and seek for making the most of them.

Historically Arkhangelsk, founded in times of the Veliky Novgorod as a monastic settlement at the end of the 14th century, has transformed to the Arctic Sea port of the Russian centralized state, the All-Russian Centre for Trade and ship building and the home of the Naval Fleet of Russia. One and a half centuries, since the middle of the 16th century and until the founding of St. Petersburg in 1703 Arkhangelsk was the only Russian “window” to Western Europe, the main source of fees and the country's customs revenue. The Northern Sea Route from Europe through the Barents and White Seas went to Arkhangelsk and then to the Severnaya Dvina trade route to the central regions of the country and after that via the Volga River to the Caspian Sea, and then to Persia and other countries of the East, via so-called “The way from England to Persia” [7, p. 215]. Hundreds of Arctic expeditions sailed off from Arkhangelsk berths to the polar areas.

Historical traditions are preserved and are still ongoing. The shores of the White Sea that enters the Arctic Ocean are full of sea ports that today are officially included in the register of the Russian sea ports in the Western Arctic: Arkhangelsk, Mezen, Onega and Kandalaksha. Two more ports Varandey and Naryan-Mar are referred to the Nenets Autonomous District, historically and geographically constituting a unit with the Arkhangelsk region, and previously with the Arkhangelsk province. Thus among 12 seaports, included in the register of the Western Arctic, a half has a

direct relation to the Russian North. Even Murmansk Commercial Seaport was founded in 1915, when Alexander County had been a part of the Arkhangelsk province.

One of the oldest maritime transport enterprises in the Arctic is the Northern Shipping Company, dating back to the 1870 and the “Commodity society of the White Sea and Murmansk Shipping Company”. In 1940—1980s Arkhangelsk had a control over the Northern Sea Route. Since June 2013 in Arkhangelsk we have the FGKU branch “Administration of the Northern Sea Route”. The transportation and logistics attractiveness of the region is growing together with the caro growth, means the continued development of the Arctic traditions and new perspectives for Arkhangelsk, a town that opened Arctic to Russia and Europe and will once again occupy a worthy place in the Northern Sea Route development, Arctic National transportation line “Belkomur” and all the Arctic zone of the Russian Federation.

Economically, the Russian North has become one of the first industrial developed district of the Russian Arctic. For 170 years (1693—1862) the stocks of the Solombalskaya ship-building yard and Arkhangelsk Admiralty constructed 585 military vessels and military transport ships. Pomor shipbuilding was developed in the settlements on the shores of the White Sea; merchant ships were built on private shipyards owned by a merchant Bazhenov in Vavchuga on the Northern Dvina. The best traditions of Russian shipbuilding are being continued in 20th—21st centuries by the advanced domestic defense industry: “Sevmash”, “Zvezdochka” and “Arktika”. In 1939—2010 the “Sevmash” gave the Navy of the country 132 nuclear submarines, 36 diesel-electric submarines and 45 surface ships⁴. Some unique nuclear submarines and ships are among them [8].

Today, Arkhangelsk region, as it was in the past, played a significant role in the economic, political and cultural development of the country, in strengthening its defense capabilities and the development of cross-border cooperation. Here in the area there are: a Russian cosmodrome “Plesetsk”, the only diamond deposits in Europe, the largest Russian enterprises of timber processing and wood chemistry, the Russian shipbuilding industry, a unique complex of natural and historical-cultural heritage. The region has a developed infrastructure: airports of international and regional air service, sea and river ports, water, road and railway hubs.

Conclusion

In conclusion it should be noted that the constant search for and promotion of investment projects and their monitoring, informational partnership, establishment of the Arctic projects bank (business ideas, investment projects, business plans, master plans and etc.) will be continued. We

⁴ Sevmash: Osnovnye napravleniya deyatelnosti. URL: <http://www.sevmash.ru/rus/sevmash.html> (Accessed: 06 January 2016).

are talking about the Arctic project portfolio, not only federal one, but also regional and municipal. At the moment we have not yet worked out an open, understandable and accessible system of development, searching and selection of long-term, medium-term and short-term projects for the Arctic. If such a system is established for the selection of projects for inclusion in the federal program, the target state and regional programs, to some extent such a system is still closed to the taxpayers, Arctic stakeholders and media, which is not conducive to effective spending of budgetary funds.

Existence of problems in this field is proven by a great number of discussions at scientific conferences and by the assessment of the situation in the media and publicism. In particular, as it was noted by Y. V. Neyolov, V.A. Lamin, V.Y. Malov and other authors of the monograph "Trajektorii proektov v visokih shirokah" that there were no urgent need to study Arctic zone as a priority area for living and development, due to its doubtful boundaries that were causing heated debates. The authors of the monography emphasized that the project management approach had historically proven itself, even regional infrastructure projects of the past years had not lost their relevance until the present day [9, p. 263, 343].

We are ready and waiting for the most positive outcome of the discussions at the meetings of the Presidium of the State Commission on Arctic development in 2016 is and it is not only the new draft of State program "Social and economic development of the Russian Arctic for the period till 2020"; the "List of priority projects implemented on the territory of the Russian Arctic, and measures to ensure their implementation", but also "On the implementation of the project "Railway Belkomur" and "Arkhangelsk deep-water sea port"⁵. We consider it necessary to establish National arctic container line with support hubs not only in Murmansk and Petropavlovsk-Kamchatsky, but also in Arkhangelsk and Vladivostok.

The age-old experience of northerners in the industrial development and shipping in polar conditions is invaluable. That is why our region rightfully occupies a leading position in the realization of many significant Arctic projects. Arkhangelsk is the key to the Arctic and a town with the richest potential ready for the implementation of projects in the national interest of Russia. Arkhangelsk region is becoming one of the main "supporters" throughout this work.

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Analysis of pricing and budget normalization for construction projects on the territory of the Russian Arctic



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Abstract. According to the results of the building expertise of facilities that are constructed, operated and repaired in the Arctic zone of the North-West Russia the authors made a critical analysis of pricing and the estimated valuation. A number of shortcomings revealed and suggestions on improving the pricing were made. Implementation of the proposals could form an unbiased starting price of construction projects.

Keywords: *construction, Arctic zone, pricing, estimates, normalization, calculation*

Today the development of the Russian Arctic infrastructure requires approaches that take into account modern technology, national security, preserving the environment and sources of funding [1, p. 177]. In terms of the crisis and investment deficit it becomes especially important to save budget, to use the resources carefully at all stages of development in the Arctic and the North of Russia. The federal bodies of power and administration switched to an annual period of planning with a widely introduced saving mode and control functions. Currently, the Russian government is the largest customer of the construction and housing repair companies due to the state resettlement program for Russian citizens who are living in the dilapidated housing and therefore state is interested in the objective formation of the construction market. Not long ago, the state stopped the budget regulation and this was used by the interested construction market suppliers. Now the need of a more modern and accurate

methods of pricing and valuation emerges. This will form an objective starting price of construction projects, including housing and social infrastructure, which are vital for all northerners. On the 5th of October 2015 Presidium of the State Commission on the Development of the Arctic under the chair of Dmitry Rogozin made a number of conceptual solutions in the field of construction and repair of the Arctic infrastructure. The Ministry of Construction of Russia under the leadership of Mikhail Men promptly reorganized the structure and appointed Sergei Fokin new head of the Federal Pricing Center for Construction and Building Materials Industry. Other necessary measures are also implemented in the current conditions.

The purpose of the present paper is to use a critical analysis of the pricing practiced, the methods and the estimates for construction on the territory of the Russian Arctic in order to develop proposals for improving the current federal and regional legal acts and to improve the quality of construction services and elimination of corruption risks.

On the 1st of January 2001 the building complex of the Russian Federation was transferred from an outdated estimate regulation 1984 to the updated state building standards (GSN). According to GSN 81-05-02-2001 "Dividing the territory of Russia into temperature zones" the Arkhangelsk Region and Nenets Autonomous District (NAD) belonged to the sixth (cold) zone. In 2007 the Federal Pricing Center for Construction and Building Materials Industry (Moscow) developed an updated second edition of GSN 81-05-02-2007 that Rosstroy approved and recommended for use by letter dated by 28 March 2007, № SK – 1221/02. But the Arkhangelsk Region and Nenets Autonomous District were transferred to warmer 4th zone without a valid justification. The estimated rate of appreciation in the winter construction decreased by 1.8 times [2]. Since the 1st of April 2014 in accordance with the orders of the Ministry of Construction of Russia №31 /pr 30.01.2014 the new edition of the GSN was introduced. The update was a minor, modification has not reformed the concepts of valuation. It is not possible to improve the system of administrative planning dramatically, the management of investment and construction activities [3]. It should a fundamental improvement of the rules and prices in terms of use of modern materials and designs, as well as the types of repairs and the cost of operating the equipment and mechanisms [4].

Estimated rules allow to determine the amount of regulatory resources, minimally necessary and sufficient for the implementation of the relevant types of work, and use them to pass to the cost indicators. As part of the direct costs, the estimated standards take into account the totality of the resources: man-hours, time ekspluatation of construction equipment, the need for materials, products, and construction. The rules adopted are set on the construction, assembling or other works (person/hour, equipment/ hour; t; m², m³, etc.). Estimated norms are developed on the basis of averaging

and minimizing of costs of all the necessary resources. At the same standards as a part of the direct costs have not been adjusted in the direction of their reduction. For example, the ventilated curtain wall surface area of the outdoor walls of the building (m^2) does not change, but if we use more effective insulation with higher insulating properties, its volume (m^3) may be reduced.

According to expert estimates, in the Arctic zone four methods of determining the cost are used while preparing the estimates: 1) basic-index (used up to 50% of cases); 2) resource-index (40%); 3) resource (5%); 4) a method based on the estimated consolidated standards (5%). Different estimates for the same object are the outcome of the method that was used.

Method №1 is based on the use of the complex both current and projected indexes for the cost of the resources that have been defined in the base of price 2001. The method involves higher equality of the construction price and its average for a specific region as the cost of each kind of resources should be determined by the results of the monitoring of the current price level index. Regional centers of pricing in the construction (RCCS) should carry out systematic monitoring of prices and indexes relevant for each region and quarterly publish the results in printed collections construction prices.

Method №2 comprises a combination of the resource method and system of indexes for the resources used in construction. It should be used in case of monthly renewed information on resource costs based on monitoring done by RCCS (in the Arkhangelsk region — in the quarterly printed collections "ArhStroyTsena").

Method №3 most accurately reflects the estimated cost of construction or repair, but it is rather consuming. The costs of estimates are significantly higher than for the methods №1 and №2. According to the method №3, all cost resource indicators, their calculations are defined in real terms and in a current price on resources that developers have to find by themselves to prepare estimates based on the system monitoring of retail and wholesale prices of building materials and resources, including large surveys of a great number of suppliers.

Method №4 is based on data reflecting the value of the similar buildings previously built or projected to be built. It is used at the stage of pre-work for close-calculating the cost of construction or repairs of the property for the purpose of immediately providing investor with the information about the approximate cost of the total volume of financing, the investment project. Calculating the estimates for the medium and long-term perspective, the index-deflators for civil and industrial construction are used.

Such indicators of the estimated cost as the labor of workers, machinists and commissioning personnel compensation fund, material resources, the cost of operation of machines and mechanisms

we use a method of indexation of cost exponents of resources in relation to the previous quarter, without monitoring of the prices of all the resources mentioned above. In the long term perspective this might entail wrong resources costs estimated. If we consider the coefficients of indexation of the resource cost in the database 2001 related to the current prices in the 3rd quarter 2015, then, for example, for the objects of education we get: wages — 25.27; the cost of materials — 4.64; the cost of machinery — 10.40.

Let us analyze the “Arkhangelsk RCCS” data base, established in 2004, using a collection of “ArhStroyTsena”. The cost of one man-hour of a worker with category IV in the 3rd quarter of 2004 was 55.44 rubles, and in the 3rd quarter of 2015 — 243.44 rubles, ie. for 11 years, the wage cost of workers increased by 4.39 times, which is not comparable with the price index base 2001. It is significant that for the period 2004—2015, according to Rosstat data: the overall inflation index in Russia has changed by 2.74 times. In the building industry and building materials production the inflation index value is somewhat higher. In addition, it should be noted that the real inflation indexes are even higher.

Techniques for the estimated coefficients and other regulations are developed under the “Federal Center of Price Formation in Construction and Building Materials Production”. Legal acts directed to the RCCS are mostly advisory ones. The analysis has shown that in Moscow and St. Petersburg, Moscow, Leningrad, Nizhny Novgorod and Samara regions, the Republic of Tatarstan and other industrialized Russian regions with surplus economies the RCCS units are actively involved in updating and regional binding of the local estimate standards and coefficients. At the same time the participants of the construction market are the source of extra-budgetary income for the RCCS due to its commercial activity: the examination of estimates, consultations, issue of regulatory acts and methodical literature, courses and seminars. Subsidized Russian regions do not have such opportunities.

The analysis had shown that in the favorable period of high prices for hydrocarbons when calculating the estimated cost of work in the AZRF the method №1 had been dominating. It is less accurate than the method №2, because the knowledge implies significantly distortion (increase) of the estimated cost of the work, especially in terms of the cost of materials. However, the method №1 is profitable for commercial structures for the opportunity to get maximized profits. In the context of the successful budget formation at the expense of oil and gas exports, method №1 had often found support from many customers, who financed the geological engineering survey, design, construction and repair works with the use of the budget system.

Practiced method of salary costs

Since the 1st of January 2014 we have a minimum of the monthly wage (MRMTS) for workers of the category I, employed in the construction industry or building materials production. When oper-

ating in normal working condition with full working off the monthly standards, the MRMITS is set with indexation coefficient which is not lower than 1.2 of the living wage for the working population developed for a certain area of the Russian Federation. At the same time according to the "Federal tariff agreements for the construction and production of construction materials in the RF in 2014-2016", inflation in the area of the Russian Federation is taken into account, as well as the existing inter-sectoral relations (cross-sectoral index). In 2015 the average rate of working time in Russia amounted to 164.25 hours, regardless of profession.

The procedure for the calculations the salaries' fund in order to include them in estimates and contractual prices for construction products depends on the following factors: applied method of determining the estimated cost of construction and repair, installation and other works; the availability of background information in a particular contracting organization; availability of statistics in this area in order to get reliable results of statistical calculations. Any of the applicable methods means that a contractor and a customer, ie parties to a contract agreement must be guided by a single regulatory framework and common legal and regulatory acts: the provisions of the federal branch agreement in the construction; methodic documents for construction; and a pay scheme.

Methods for determining the amount of salaries funds, characteristic of systems and forms of paying, the principles of development and application of unified tariff for workers are defined in MDS 83-1.99 "Guidelines for the definition of salary funds at bargain prices and estimates for construction and wages for workers of construction, installation and repair organizations". The basis of all forms and systems of payment used by the repair and construction, installation and other contracting organizations is a tariff system that ensures the quantitative indicators of qualification and compensation for employees and takes into account the complexity of the work carried out by them. Results of the analysis has shown that when calculating the cost of one man-hour of a construction worker in RTCCS it is used as reference value of the subsistence minimum in accordance to the region, which is equivalent to the category I of the pay scheme in construction industry. It should be also noted that the average category for all types of works is the category IV.

The living wage per capita and per population groups in the whole of Russia and in the regions is determined on the basis of the consumer basket and the Rosstat data about the level of consumer prices for goods, services and the costs of mandatory fees and payments (№134-FZ 24.10.1997 "On the living wage in the Russian Federation"). The average figures are established by the Russian Government, and regional ones by local executive bodies of the Russian Federation. The value of the living wage on the basis of the consumer basket takes into account the average costs of living of a citizen and relevant socio-demographic groups in the Far North and equal areas with a regard to regional co-

efficients and northern allowances. The analysis of the methods used there for calculating the cost of one man-hour has shown that such an approach takes into account the regional coefficient and northern allowances twice. For example, Arkhangelsk area has regional coefficient that includes northern allowances and it is equal to 1.7. At the same time the decision of the Arkhangelsk Regional Government done on the 20th of October 2015, №419-pp approved living wage for working population in the amount of 13,128 rubles for the VI zone, which includes the city of Arkhangelsk (here graduation on this indicator is carried out only in two zones: II and VI).

When calculating the amount of salary funds as part of direct costs depending on types of repair, construction and other works, as well as structural elements and construction sites, the main indicator used is the living wage level established by the Arkhangelsk Regional Government. The "Arkhangelsk RCCS" accouts this figure (3) for the III quarter of 2015 using the following formula:

$$3 = \frac{BPM * K_{инд.} * K_{МРР} * K_T * (1 + \sum K_p + K_{СН})}{t_p * 0,9}$$

where BPM — living wage for the III quarter of 2015 and is equal to 13 128 rubles;

$K_{инд.}$ — index equal to 1,2 (according to § 3.1 "Federal branch agreement 2014-2016");

$K_{МРР}$ — index by Ministry of Regional Development equal to 1.003, that takes into account higher norms of costs in the areas of the Far North; the index is used for territorial single estimates for constcuction and building (TEP) in the Arkhangelsk region (the index is not used for the federal single costs and for state norms of estimates);

T_p — an average working hours for one worker per month; in 2015 $T_p = 164,25$;

K_T — tariff for an average category of work or equal average category of workers used in the applied tariff scheme in construction industry (for the category IV $K_T = 1,34$, table 2 "Federal branch agreement");

K_p — regional index, for Arkhangelsk region: 0.2;

$K_{СН}$ — northern allowance, for Arkhangelsk: 0.5;

0,9 — tariff value (regulating rate, used in a range 0.5—0.99). Federal Centre for pricing in construction recommends the use of the coefficient within that range due to the need to control the cost inflationary processes in the Russian Federation and market changes for construction services. The cost salaries, except for tariffs, includes the cost of payments for harmful working conditions, paid vacations (12%), bonuses, bonuses for length of work for the same enterprise.

Lets count the index for the Arkhangelsk Region (3) using the method applied for the Far North and equal areas:

$$3 = \frac{13128 * 1,2 * 1,003 * 1,34 * 1,7}{164,25 * 0,9} = 243,49 \text{ (py6).}$$

Let us analyze the calculations made. The calculation formulas apply the appropriate regional coefficient and northern allowance, which ultimately increases the wages. However, too large range of changes of the regulatory index (0,5 to 0,99) and the lack of clear procedures for the selection of its value in a particular case create the opportunity for arbitrary decisions. This leads to greater dependence of the calculation from subjective factors. Calculations of the estimated cost for the construction with the use of such a procedure will inevitably lead to significant errors, because it does not correspond to real conditions of the construction market. It brings a lot of confusion in the formation of the construction market and undermines the principles of objectivity, its price regulation. However, if there is a state order to perform monitoring of prices and direct costs based on such indicators as the increase in wages, changes in prices for materials and operation of machinery, the error in accounting the cost of construction products will be minimized. In III quarter 2015 "Arkhangel'sk RCCS" recommended to use the wage cost for workers of the category IV, who were employed in the construction and repair, equal to 243.44 rubles per hour (according to the respective "ArhStroyTsena" printed data collection), i.e. 0.5 ruble less, than it has been calculated above.

Living wages and its accounting in the construction industry of the Northern areas

For the upcoming three-year period, the cost of living in Russia had been calculated by 1 January 2013 on the basis of the new procedure for determining the consumer basket, which had been set by the Federal Law of December 3, 2012 №233-FZ "On minimum living wage in the Russian Federation". The new order replaced previously applied normative method for determining a living wage based on sets of foodstuff, non-food products and services. Calculations of the minimum living wage (see Table 1) was made on the basis of the regional consumer basket, which had been made taking into account the climatic conditions, national traditions and local features of consumption of food, nonfood goods and services by socio-demographic groups. Structure in consumer basket (including all taxes) includes foods with a specific list, and non-food goods and services without the lists, but with a set of prices correlated to food prices and expressed as a percentage. The size and structure of the consumer basket in the Russian Federation changed in 2006 for the last time and now it looks as follows: food products — 45.8%; non-food products — 20%; services — 34.2%.

Table 1

Living wage indicators in Russia in 2014—2015.

Period (quarter — year)	For working population	Indexation in relation to the previous period (quarter)	Legal act
Arkhangelsk Region			
II – 2014	11,491	1	No 295-pp 22.07.2014
III – 2014	11,471	0.99	No 433-pp 21.10.2014
IV – 2014	12,158	1.06	No 18-pp 27.01.2015
I – 2015	14,262	1.17	No 140-pp 21.04.2015
II – 2015	14,083	0.98	No 299-pp 21.07.2015
III – 2015	13,513	0.96	No 419-pp 20.10.2015
Quarter average rate	12,830	1.12	
Murmansk Region			
II – 2014	11,875	1	No 442-pp 27.08.2014
III – 2014	12,013	1.012	No 554-pp 31.10.2014
IV – 2014	12,164	1.013	No 20-pp 03.02.2015
I – 2015	14,298	1.175	No 167-pp 08.04.2015
II – 2015	14,566	1.019	No 321-pp 29.07.2015
III – 2015	14,166	0.972	No 486-pp 02.11.2015
Quarter average rate	13,180	1.11	
Vologda Region			
II – 2014	9,174	1	No 683 11.08.2014
III – 2014	9,000	0.98	No 950 27.10.2014
IV – 2014	9,260	1.029	No 104 16.02.2015
I – 2015	10,917	1.179	No 354 27.04.2015
II – 2015	11,145	1.021	No 626 27.07.2015
III – 2015	Not accepted	0	
Quarter average rate	9,899	1.079	
In general in Russia			
II – 2014	8,834	1	No 905 06.09.2014
III – 2014	8,731	0.99	No 1321 05.12.2014
IV – 2014	8,885	1.018	No 260 21.03.2015
I – 2015	10,404	1.171	No 545 04.06.2015
II – 2015	10,792	1.037	No 902 28.08.2015
III – 2015	Not accepted	0	
Quarter average rate	9,529	1.079	

When counting the salaries to tariff rates of construction workers in the Far North and equivalent areas we use regional coefficient and northern allowances. In the Arkhangelsk Region

the total coefficient is 1.7. In the Murmansk Region — 2.2, i.e. 29.4% more. The data in table 1 indicate that the cost of living in the Murmansk Region is only 4.8% higher.

Considering the energy tariffs, which are the main indicators of pricing in the cold climate regions. The electric power industry it is prohibited for one legal (physical) body to enjoy the right of ownership or rent power grid assets and property, directly used to purchase and sell the electric energy (this is the area for the marketing companies).

The analysis has shown that a decisive stages of tariff formation are:

1. The cost of the delivered energy. In the absence of transparent study of all the costs at this stage the supplier includes various real and “assigned” spending. Most often, they take the increased amount of work hidden or difficult to be checked (such as digging and backfilling of trenches and pits for laying cables, pipes or wires), as well as the simulation of technical re-equipment while using outdated, used or cheap equipment into accounting the cost [5, 6].
2. Checks of the calculations and approval of tariffs with the highest possible profitability factor are applicable to the concrete consumer market. At the stage of control and at the stage of approval of the profitability ratio the key role is played by the state. This is the stage of corruption risks.

Table 2

Tariffs for electricity for the second half of 2015

Region	Marketing company	One-part tariff, rub. With VAT	
		Population	Population with electric stoves
Murmansk	JSC “Kolskaya energosbytovaya kompaniya (Kolenergosbyt)”	2.53	1.78
Arkhangelsk	JSC “Arkhangelskaya sbytovaya kompaniya (Arkhenergosbyt)”	4.32	3.24
Vologda	JSC “Vologodskaya sbytovaya kompaniya”	3.83	3.06

Tariffs on the cost of electricity for the population in Arkhangelsk Region are 1.5 times higher than in the neighboring Vologda, and in Murmansk — by 1.7 times. Low tariffs in the Murmansk Region are formed by using a low-cost price of nuclear energy at the Kola nuclear power plant (it provides 60% of consumption in the Murmansk Region).

Table 3
Indexes for living wages in the Arkhangelsk and Murmansk Regions (III quarter 2015)

Index	Arkhangelsk Region		Murmansk Region	
	rubles	%	rubles	%
Living wage, incl:				
<i>Food</i>	13,513	100	14,166	100
<i>Non-food products</i>	5,962	44,1	5,468	38,6
<i>Services</i>	3,009	22,3	3,329	23,5
<i>compulsory fees and payments</i>	3,032	22,4	3,782	26,7
	1,510	11,2	1,587	11,2

Analysis of the data in Tables 2 and 3 shows that in the northern regions the greatest part of the spendings for such an index as "services" is influenced by the prices for energy.

Limit costs in the structure of the estimated cost and their use

Invoice costs as a part of the estimated cost are for reserve funds associated with the creation of the necessary conditions to carry out repair and construction, installation and commissioning, as well as their organization, management and service. The main document defining the procedure for determining the invoice costs in the North is MDS 81-34.2004 "Guidelines for the determination of the amount of invoice costs for construction, carried out in the Far North and the districts equal to it".

Bigger rates of the invoice costs by types of construction vary in the range from 100% to 130% of the wage construction workers are paid. Funds are reserved in the budget and intended for the payment of salaries for administrative and service personnel and taxes; for the maintenance and operation of buildings; for servicing the construction workers; for the organization of work on construction sites. During the production on a relatively large or medium-cost objects value of invoice costs can range from hundreds of thousands to millions of rubles. Analysis of experience in the Arctic zone of the Russian Federation shows that invoice costs are relatively used as intended by large repair, building and assembly organizations with developed material-technical and production base, as well as a full staff of administrative personnel with professional expertise relevant to such activities. In many cases, in the Far North the construction work is performed by small enterprises, which have only a director, an accountant and someone who does the work. Such organization work due to the rent of construction machinery and equipment and temporary employment of workers. Materials for contraction is usually bought only for a particular projects, due to the absence of current assets and warehouses.

Getting and using estimated profits. A similar situation exists with the means under "Esti-

imated Profit”, which as part of the estimated cost is adopted as limited costs in the range of 50% to 65% of the wage fund for construction workers and it is spent, primarily on payment of taxes (the cost of entering the construction into operation is accounted for and paid at the expense of earnings); modernization of equipment; reconstruction of objects that are part of its own capital stock; financial incentives for employees (financial aid). A company without its own technical and production bases do not spend these funds, except for the financial aid payments for employees that is currently rather rare case. In most cases, contracting organizations of such type consider finances that could be used for financial benefits of the workers, as their own “bonus” hidden inside the estimates, ie as the actual additional income for the owner or manager of a small business.

These “preferences” allow such organizations to dump prices and win the competitive bidding in case of budget financing. A “loophole” for such organizations were existing provisions of the law 94-FZ “On placement of orders for delivery of goods, works and services for state and municipal needs”. The basic requirements that applied to providers were expressed in the absence of tax debts, and the fact that a company had not been passing the liquidation procedure. Thus the main criterion for selection within the applicants accepted was the price of goods, works and services. The situation has changed for the better since the adoption of FZ-44 (Art. 32, §1) “About contract system in the procurement of goods, works and services for state and municipal needs”, where the criteria for selection of candidates for contracts consists requirements for the qualification of staff and the availability of financial and production resources.

Transportation costs

The estimated cost of the materials and equipment includes all the costs of its delivery to the on-site warehouse of the building that is under construction or installation to zone. The transport costs usually includes current tariffs for cargo transportation by different means of transport. The initial data for the definition of transport costs may include the following factors: type of franco, included in the purchased price of construction materials, equipment and products; destination (a railway station, a port, a dock, an airport); the shortest distance determined by reference data and existing logistic schemes of roads and railways, water routes (rivers and seas) from the departure station (ports, docks), taking into account the franco accepted in the selling price to the destination station (pier or port) of cargo, delivery of equipment, from the railway station (pier, port) or to on-site storage (type of vehicles, the price of transportation, the distance of transportation to railway and road transport); tariff description of equipment (tariff schedule number for carriage delivery, its class, variety and group for loading and unloading during transportation).

Currently, the NAD is using, for example, four transport schemes for building materials: railway or road transport to Pechora stations in the Republic of Komi and then along the Pechora River on a barge to Naryan-Mar (summer navigation in June — October); rail or road transport to the Arkhangelsk and then by sea to Naryan-Mar (during the summer season in June — October); rail or road transport to the Komi Republic, then via the temporary winter road to Naryan-Mar (in December — March); by air all year round (regular direct flights from Moscow and Arkhangelsk).

Absence of the necessary data to determine transportation costs could be defined by using enlarged figures, where transportation costs are usually given in rubles per 1 tonn of building materials, equipment, or as a percentage of the selling price of equipment for certain types of buildings or construction areas.

Let us consider it using the the example of Naryan-Mar. Taking into account the estimated cost of materials, which is not determined in a quarterly printed collections of "ArhStroyTsena", but it is determined by commercial offers of suppliers and customers who are financed from the budget system, very often offer (or make) contractors to use transport expenses equal to 13% of the cost of materials. Carrying out construction and technical expertise to veriify the estimated cost of one of the major social objects, controlled by Inspections from Gosstroyzhilnadzor of NAD, the following had been revealed: The customer was a budgetary organization that could formally explain the amount of transportation costs under Article 1.7 MDS 81-36.2004 "Guidelines on the application of the federal-tion unit prices for construction and special construction works", where it was stated that the estimated prices for construction materials, products and structures used for calculations with the help of data from "Federal collection of estimated costs for materials, products and con-structures", considered the transportation costs up to 13% of the selling price. This approach is applicable to participants of building industry, located in the middle or southern Russia where traffic flows are numerous and diverse. However, it is absolutely unacceptable for the AZRF, characterized by underdeveloped logistic schemes of delivery. The actual cost of transportation (i.e. for the full list of required materials purchased by a contractor) is between 25—30% of the cost.

Transportation costs for reinforced concrete in Naryan-Mar is 90-100% of the selling price of the plant in the summer (for sea and river transport), and up to 200% in the winter period (delivery via temporary winter road from the Republic of Komi). In winter, delivery is too expensive because of the car transportation from the town of Usinsk is approximately 14—15 thousand rubles per tonn, and it is only possible to transport a very limited number of building materials (14—16 tons) due to restrictions of the car carrying capacity on the ice roads. In addition, the supplied materials do not often have overall dimensions, for example, reinforced concrete piles over 9 meters. Therefore, we

get additional costs that involve more expensive building materials, and hence lead to the rise in construction costs.

Transportation costs and the logistics for transportation of bricks. As a result of the expert-term evaluation of the selling price of the plant in Nizhny Novgorod, it is 10–11 rubles per item. Taking into account the cost of rail transport to the Republic of Komi, its price rises to 14 rubles per item. As a result, taking into account the cost of the river transportation along the river Pechora to Naryan-Mar, the brick price is 26.50 rubles per item. Accordingly, the transportation costs of bricks goes up to 250% of its selling price. At the same time, the price of 26.50 rubles per item is considered to be an acceptable market price for the NAD. However, under certain circumstances (shortage of the required brick stocks at warehouses in NAD due to improper planning or due to the absence of funds to complete the construction in the summer) the cost of a brick can be up to 40 rubles per item. Sometimes companies have to import bricks in the winter to complete the construction. The average annual cost of a brick is 32 rubles per item and it is not the best value indicator for NAD.

Transportation costs for small packed building materials (paint, wallpaper, baseboards, electrical products, glue and etc.) make up approximately 10–15% of the cost of materials in summer and up to 40% in winter. Sea transportation of materials is usually made from Arkhangelsk port. However, if the price of a railway delivery of materials from the central Russia to Arkhangelsk or Usinsk is the same, then sending goods to Naryan-Mar by sea is more expensive due to unstable weather and climate (glaciology and storms) conditions. Transportation of any materials via winter roads is also more expensive than transportation of goods in summer. For these reasons, the average year transport costs of 30% will not solve all the problems associated with the delivery of construction materials. Therefore it is necessary to develop and apply the differentiation (gradation) of transportation costs, depending on the type of building materials.

Transport costs in other localities of the NAD. Quarterly territorial collections of estimated construction prices (TSSTS-2001) consider only the delivery of materials to the city of Naryan-Mar. So transportation to construction sites and other locations should be considered further. Estimates for the budget organizations do not always have such calculations. Often, they just have lowered costs of such estimated calculation. At the design stage the projec organizations just get their share and do not have any interest in its implementation, especially if the contract for supervision is absent. Customers are also more interested in the cheapest projects. The estimated cost of a brick is the same for Naryan-Mar and remote villages Karatayka or Indiga. But the transport scheme for remote and inaccessible locations in the NAD are very different. It is possible to deliver materials only via rivers in summer to some places, but, for example, to Indiga, it is best to deliver everything by

sea from Arkhangelsk. Even the closest town Telviska, which is located near Naryan-Mar, is separated from it by the river. Due to the risky logistic schemes, construction companies have to hire a barge to deliver metal constructions and other building products in summer and in winter the delivery is very simple: ice ways through bays provide non-stop traffic.

There are cases when contractors from other regions win the auctions for the right to sign the agreement and to perform construction or repairs of the property in the countryside, and after a while these companies realize that the NAD has no railways and no all year-round motoways that connect the NAD with the other regions. As a result, some constructions are still not completed. For these reasons, contractors need to plan the purchase and delivery of materials to the objects carefully. The NAO needs to carry out a complex of measures for the introduction of appropriate correction to the transport costs for all settlements.

Organizing construction works

Cost-informed decision about the replacement of concrete products for the manufacture of materials on site (delivery of cement, rebar, large and small aggregates) is taken at the design stage in the “Organization of construction”. If the development projects are not provided systematically improving organizational and technical level of construction, then it may decrease not only the quality of buildings, but also the competitiveness of the company and lead to a decline of its image. A pessimistic scenario might also mean bankruptcy .

A two-stage designed projects means that organization of building is solved as a part of the project of organizing the construction (POC), which is usually done by designers and then it is detailed in the project of works (POW) made by builders. A one-step designed project means only POW. Projects of organizing the construction take into account the specificity and complexity of the construction works. Developing the POC it is more efficient to use a variant design method, providing selection of decisions on the basis of technical and economic calculations. The main economic indicators are: total duration of construction; the complexity of work; maximum number of workers; planned wage fund for workers and administrative staff. Production efficiency is largely provided by choice of options for the development of the project with the least amount of costs, and also by accounting the economic effects of reducing the length of service for construction and speeding up its commissioning.

Resume

1. Intensive development of infrastructure has extreme importance for the AZRF and requires intensified work on improvement of the federal and regional legal acts with a regard to weather and climate conditions at the construction sites and their transport accessibility.

2. It is important to have monitoring of regional cost indexes for construction materials in order to make corrections of costs according to the market prices. Systematic monitoring of prices requires state funding.

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The index of happiness in the Arctic: index measurement and comparison of the dynamics of Arctic economies



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Abstract. The author presented a systematic comparison and author's interpretation of the level and dynamics of social and economic processes in the Arctic countries using statistical indexes of various international institutions, scientific and educational institutions of the Western countries. The article is also focused on the circumstances affecting the change of Russia's place in the world rankings. The article is aimed at contributing to the adjustment of management of the Russian Federation as an institutional background of acceleration of its economic and social development aimed at achieving a worthy place in the world rankings.

Keywords: Arctic countries, international indexes, country's ranking, leaders of the index, globalization, the place of Russia, dynamics of development, innovation, human development

Origins of the interest for statistical indexes reflecting the development of social institutes

There are many problems in the scientific explanation of the macroeconomic policy and development of Russia. In our opinion, there is something that is hidden in the shadow of social attention. It is the reluctance of the political elite to appeal to geo-economic and geopolitical potential of Russia to determine its actual place in the global world, role in the life of human mankind. This unwillingness (artificial or unconscious) is called here a *civilizational rock* of the offered national economy strategies, *disadvantage of outlook reflected in predictive models* of medium- and long-term perspectives of Russia as the subject of global competition, and one of the leaders of the world economy and socio-cultural progress.

Motivated motive for retouching the measurement systems of the international community (indices and indicators) for the quantitative and qualitative evaluation is a very complex process, in my opinion, a kind of utilitarian one. The less you know, the better you sleep. In this case, it is handy for the political elite to manipulate the public consciousness. When citizens are not

aware of other statistics than governmental one, declared policy and its results, the shortage of objective knowledge. The train of public support is not difficult to transfer to the desired path.

At the same time the topic is not pioneering for the author. The right to inclusion (equalization) of districts and towns of the Arkhangelsk region to the Far North of Russia was proven by the index methodology of ranking measuring the impact of socio-natural discomfort on population even in 1991—1993 [1, p. 164—183]. It is not new for the modern scientific and economic Russian practice. Politicians and leading specialists are increasingly turning to the indexation of the dynamics of socio-economic processes. In Russia dynamics of production, costs and retail prices are indexed. In order to assess the extravagance of the Russian authorities the technology of index comparison is also used.

This proves the pragmatic purpose and functional advantage of index for the quantitative measurement of the dynamics of the economy and almost any social process: the objectification of the comparative results of somebody's activity or even the development of a region. How is it achieved? Any index can fix changes in quantitative parameters of a process during selected period of time. The main requirements for such a measurement is its information "completeness" and the adequacy of representation of inter-related components of sustainable development triad. A great number of well known international organizations and numerous research teams from different countries work in this directions. In order to achieve a clear coordination of the international measurement system is still not possible due to methodological problems, and also the latent motive to build the proposed set of geopolitical reasons for countries (regions).

One more thing should be pointed out to specificity the epistemological interest in the index methods of measuring the socio-economic dynamics. This interest is not equivalent. The ordinary citizen, the employee of scientific institutions, active participants of political processes have a very weak spark of attention to the indexes used by the country's statistical services. It is more simple to operate the percentages, or other use other measures. They are clear, and they do not require breaking the "head", their meaning is easy to convey to the audience. Probably, the indices have one more "methodical" or "functional" defect. It is used to compare one process (subprocess) rather insignificant for most of the citizens. In addition, it has not been engaged politically and therefore does not affect the daily routine of a person and has no regard to his feelings.

The situation is different when the indices are a mirror of the perception of their country and its position in the world. Many citizens are nostalgic about the idea of Russia's geopolitical power status. And conscious curiosity about the information that outlines the present and the future of the country is greatly exacerbating the interest in technology, criteria and indicators for

international comparisons of Russia with other countries. Author considered it as an obligation to satisfy a portion of such interest. In particular, we defined a group of international indices that provide the most visible representation of the relationship between the ratings of Russia as a subject of global competition for a worthy place in the world. Also the information function of indexes is used, first of all, because it allows to compare the levels of development of the Arctic countries. So, this has become a fundamental scientific problem of this article that emphasize the status of the Arctic areas of Russia and some of their problems together with preventing potential possibilities of being the state with the significant economy for the rest of the world, and a community that critically inherited the world experience.

What Arctic countries are leading in the world economy?

Here a preface to the report about the possibility of international comparison should be. Comparison based on a single technology began after the transition to the use of SNA — system of national accounts. Today two SNA editions are in use. The United States, Canada, Ukraine and the 28 EU countries represent information in accordance with the new SNA-2008; Russia and other countries are working with the SNA-1993. It is also useful to know about the presence of at least three states-drafters of the rating, ie determination of their place in the world economy. These are the two international institutions — the World Bank and the International Monetary Fund, and the CIA. Consideration of quantitative and qualitative prerequisites for an answer to this geoeconomic question involves appeal to the size and dynamics of the GDP growth (Table 1), average GDP per capita in the Arctic countries (Table 2). Outside of these indicators their place in the global economy can not be clearly and precisely shown. It is also appropriate to emphasize involvement of the two largest Arctic countries — the US and Russia — in global contention. It was and it still remains a fixture of the principles (motives) of geopolitical strategies in the Arctic, as well as the motive of the desire to be a leader in the international community. Data of the subsequent tables scans potential for it.

First of all, according to the data shows the trends in the absolute volume of GDP in the Arctic states for the years 1900-2014. Secondly, the disproportion of the national economies of Russia and the United States is unambiguous. The potential of the Russian economy is almost five times less than the US and it is negligible (approximately 3%) for the global economy. US or China can produce about 15—17% of the world product.

Table 1

GDP in the Arctic countries according to the World Bank (bln. dollars. US PPP)

Year Country (place)	1900	1950	1970	1990	2000	2012	2013	2014
USA (2)	475	2,175	4,340	7,475	10,284,8	16,163	16,768	17,419
Canada (15)	34	140	350	680	908,1	1,469	1,513	1,565
Denmark (57)	11	36	79	120	11,4	244	246	-
Finnland (62)	6	25	55	109	141,7	218.	217	217
Norway (49)	6	29	65	92	209,2	333	333	333
Sweden (41)	20	56	123	180	259,9	418	429	437
Russia (5)	150	525	1555	2 010	1,530.6	3 446	3,592	3,745
Iceland				4.8	7.6	12.7	13.1	13.9
All the world	2,590	7,555	19,270	36,055	48,575	-	-	-

This circumstance is a system precondition to solve the problem and to keep Russia's fifth place in the global economics, which it has today. However, the passionate nature of Russian society stimulates the reasonable grounds for Russia to prove the possibility to enter the leading trio in the distant future and to become one of the most important centers of the multipolar world. In my opinion, futurological prospect of Russia to be on top is a historical obligation and prove of the inherited power of the USSR as the second leading nation in the world. More on that issue has been said earlier [2, p. 55—65]. Here I limit myself by the thought that the inability of the state to provide a high quality of life of Russians reduces humanitarian component of its economic ideas and Russian economic leadership.

However, the tale soon develops, and the case could be argued at the self-critical recognition of the objective impossibility of Russia to be the first in the world due to the fact that the structure of these centers is dramatically updated every 50—70 years. Moment of another tectonic shift of geo-economics and geo-politicy is witnessed by its contemporaries. In 2014 the first economy in the world was *China* (18 bln. USD) acknowledged by the World Bank, the IMF and the CIA. Some more places in this rating: 3rd — India (7,3 bln USD), 4th — Japan (4,6 bln USD), 5th or 6th — the Russian Federation. We should not bother with the historically low 3rd — 5th places of Russia in the GDP ratings. This objective law could not be eliminated even by the high-tech economy because of too contrasting demographic resources of China, India and the USA. The fundamental importance of the Russian Federation has a dynamic movement along the other way of the socio-economic development. I am referring to a course on leadership in GDP per capita. This macroeconomic indicators (*Table 2*) most accurately describe the level of economic development and the dynamics of economic growth of the Arctic states.

Table 2

Averal GDP of the Arctic countries and purchasing power per capita (ths. doll.)

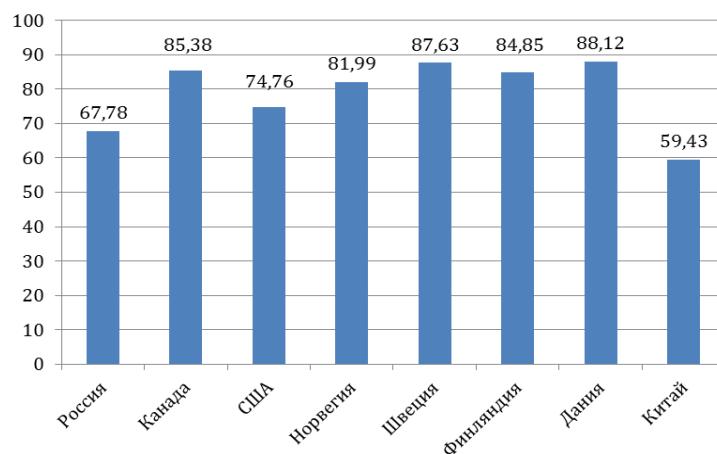
World Rating	Country	2012	2013	2014
6	Norway	66,363	65,640	64,893
?	USA	51,457	52,980	54,629
16	Sweden	43,869	45,144	45,144
17	Danmark	43,560	43,782	44,863
18	Cananda	42,281	43,033	44,089
21	Iceland	40,607	43,393	43,393
23	Finnland	40,209	39,869	39,754
32	Russia	24,063	25,033	25,636
174	All the world	14,021	14,517	15,048
175	OECD	37,122	37,834	38,817
176	EU	34,936	35,338	36,244

A look at this table creates optimism and scientific restraint. Not long ago the Russian Federation had a place in the fifth dozen of states and it was caused by the dramatic events that had happened earlier (1991–1998), degradation of the productive forces created during the Soviet period. Movement on the scale up and being a head of the world average, of course they please, but their dynamics is depressing. Russia's GDP per capita is the lowest among the Arctic states. This weight gap "binds" us to the thesis of impossibility of having the amouht bread on our and a patriotic pride for being the most advanced economy of the world in our soul. And noone takes away the right to become a contender for the best global trend for long-exponent of GDP per capita. *What is the probability of Russia's hegemony in this area?* It will be determined by the geopolitical model (schemes, targets) of cooperation between Russia and global economy. In my opinion, the existing two areas of the world economy the United States are the leaders: the core concentration of production and turnover of financial capital; China is leading in production. These two states are the leading actors of the world economy [3, pp. 126–128].

Yet it should not be a run into the history of the world beyond the actual potential of China's influence on the global economic workshop. There is another approach to comparison of the global aspects. This is an **Index of Globalization** (KOF Index of Globalization), created in 2002 by the Swiss Economic Institute, with the participation of the Swiss Federal Institute of Technology. This index represents the sum of the components with coefficient of 36%, 39% and 25%.

Index is positioned as a composite indicator to assess the extent of integration of any country in the world, the comparison of different countries on three components. *First of all*, for economic globalization (approx. 36%), concrete volume of international trade (about 19% of GDP), activity of the international business, the value of trade flows and international investments. *Secondly*, social globalization: the percentage of the foreign population, international tourism (about 26%), the vol-

ume of telephone traffic, mail, cross-border money transfers, the number of domains in the Internet, and etc. *Third*, the political globalization of the state: the level of representation in international organizations and participation in international missions; involvement in the international agreements (for example, 25% of the existing ones). All countries surveyed by KOF Swiss Economic Institute were put in the Index of Globalization rating, which indicates their place among the other countries studied. Each country after analysis on 24 indicators of the Index of Globalization is able to self assessment of its own degree of integration into the global order. The spread of this index for the Arctic countries (*Pic. 1*) is small, but China (index of 59.43 and 73rd place in the rating) has a lower level of globalization than the Russia with its index of 67.78 and 48th place in the world ranking.



Picture 1. Globalization dynamics in the Arctic states
(Russia, Canada, USA, Norway, Sweden, Finland, Denmark, China)

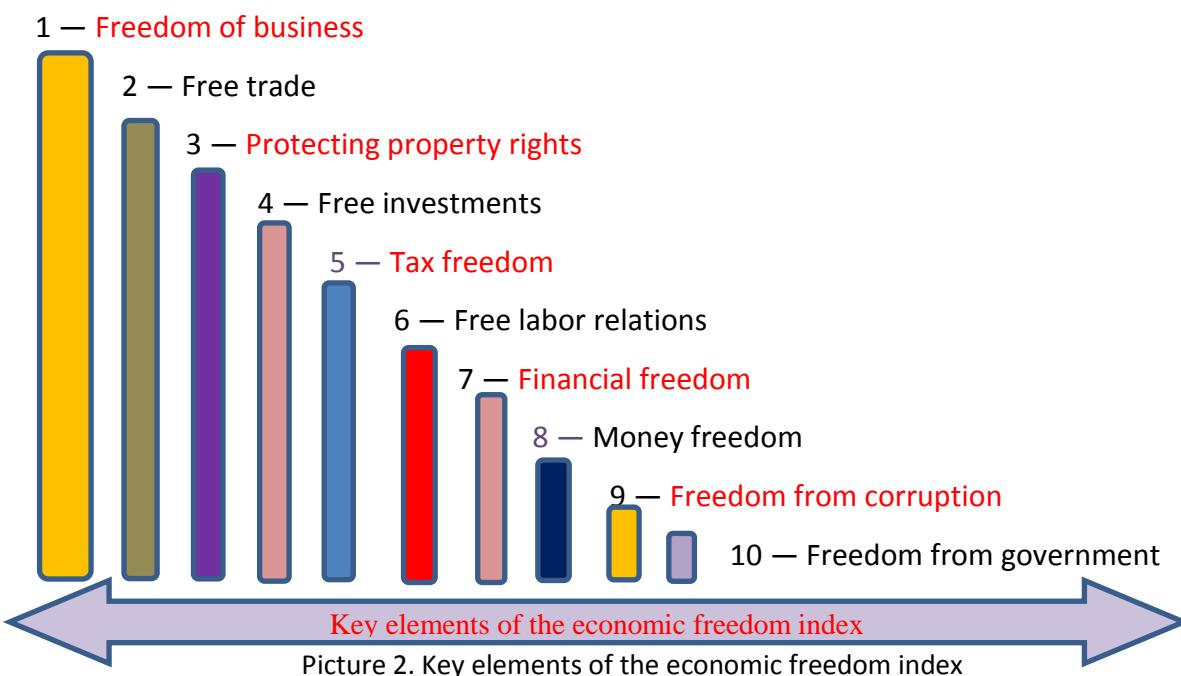
It is needless to say that the Arctic countries see both positive and negative effects of globalization. For example, the restriction of national sovereignty, integration of national economy, culture, technology and governance. It is important to focus on the scientific and practical interest of the international community to measure the economic, social, cultural and political dimensions of globalization. But Russia is not that unprepared. Russian society combines the ideas of civilizational destiny of Russia. They can be intelligent and become a constructive for creating social institutions, materializing the criteria and principles of a fair and harmonious organization of human life. Russia has the potential for such a mission in the world. It is necessary to prevent similar idealization among the public. Then we can give a creative answer to the demands of the Russian civilization, to the challenges of the global world, but there will be a dilemma in the global competition of civilizations. The past — that's what it was (for example, the historical Russian failures). The future — that it is necessary to create. Its path for Russia could not be felt, and perhaps it is illusory, but the world often needs even an illusion now, so as not to regret it in the distant future. We value a paradigm that the geopolitical role of Russia is not to search for loyal allies, but the ability to create Russian society, an example of which forms its geopolitical and socio-cultural authority and national respect. This goal is

not ordered and if the Russian reformers actually released the public mood of the “pink” representations of the results of their activity. After all, the rhetorical repetition of a strong social policy of the state is unlikely to prevent the destruction of human potential, optimize conditions for comprehensive development [4, pp. 298–299], not to mention the construction of a reliable barrier to the country's process of slipping technological backwater. Below, revealing the nature of the international index of economic freedom and global innovation, the author will look at such a distance from various types of threats for Russia and the Arctic countries.

Economic freedom and innovation — fundamental prerequisites for technological modernization of the economies of the Arctic

Just to emphasize, in terms of business comparisons models a special role is devoted to the economic freedom index (EFI). It was founded by the intellectual center of the Heritage Foundation [5]. In essence, this index is equivalent to a sign of quality of the market systems. Such certification is supported for synthesizing of the following ten indicators (pic. 2).

This index is annually printed in the Wall Street Journal. When ranking states are placed in groups, taking into account the following criteria of economic freedom: free states with index of 80–100; mostly free states with the index of 70–79.9; moderately free states with index of 60–69.9; mostly unfree states with index of 50–59.9; heavy-handed states with the index of 0–49.9. This basic set of elements of index characterizes the quality of conditions for business activities in the market of the country. If they are favorable for informal activity of market agents and the institution of private property and state regulation policy do not hinder economic growth and development of nations. Naturally, our attention is directed to the comparison of Russia's position regarding the other Arctic countries.



It is the most important for us to get the truth, and arguments for the adequate conclusions: Russia is not brilliant in case of institutions of economic freedom in a group of Arctic states or in a group of industrialized nations. Its 139th place (2010–2011) let 10 former USSR countries be ahead: the former Soviet republics (for example, Armenia, Kyrgyzstan and Kazakhstan). In 2015 the rating fell to 142nd place (index of 52.1), lower than even Mongolia and all the BRICS countries. In Russia, compared with Canada (6th place), Denmark (11th place) and the United States (12th place), property rights indicators, freedom from corruption and freedom of investment and financial freedom are three times worse. These countries with EFI more than 76 are in a group of economically free (mostly) countries. The group also includes Sweden and Finland and Russia is positioned in the group of “mostly unfree” countries [5].

No coincidence that Russian President Vladimir Putin visited interregional public forum in Stavropol (January 2016) and stressed the urgency of efforts to expand economic freedom in the country as an essential condition to optimize business and investment climate. Positive issue is that: Russian Federation seeks to study the practice of Hong Kong and Singapore — recognized leaders in economic freedom in 2009–2015. This makes us sure that we'll get the implementation of the necessary institutional steps, expanding the corridors of economic freedom for the subjects of business activities. In Russia, there are, in comparison to its neighbors Norway and Sweden, the leadership in *the index for the freedom of labor* (almost 60). It is better than in Canada, the United States and other Arctic countries, Russia's rating (57.8) on *the participation of the government in the economy* is also high.

We are now turning to ***the Global Innovation Index*** (GII) of the North and the Arctic. The project for the creation and use of GII Implemented Cornell University (USA), a business school Insead (France) and the World Organization of Intellectual Property (WIPO). The French school has proposed a methodology for calculating the composite index of innovations. It reflects the full range of indicators of innovative development of all countries of the world, including 80 different variables. They are differentiated into two groups. One of them describes the resources and conditions for innovation (including institutions, human capital and research, infrastructure, development on the internal market; business development, and others). The second group captures achieved practical results of the innovation. First of all, the development of technology and economic knowledge, the results of creative activity for innovative renewal of economic countries.

Innovation is the basis of economic development, a source of productivity growth of modern economy of the Arctic countries and the entire world economy. Global Innovation Index, published annually since 2007, is the statistical basis for an objective assessment of the effectiveness

of the efforts of any country for the development of innovation cluster of economy, as it shows the ratio of national expenses on innovation and macroeconomic impact of their use. The rating of 2014 (Table 3) shows the existence of a direct dynamics of the GDP of these countries to scale-diffusion of innovative technologies. The more economic freedom of business activity, the higher is the national innovation index and the faster growing is the competitiveness of the country in the global market.

Table 3

Rating of the Northern countries by the innovation index, 2014.

Rating	Country	INDEX
3	Sweden	62.3
4	Finnland	60.7
6	USA	60.1
8	Danmark	57.5
12	Canada	56.1
14	Norway	55.6
19	Iceland	54.1
49	Russia	39.1

The world leader in innovative potential are the Nordic countries (in this case, Sweden), where the value of spendings on research and development is more than 3% of GDP. Others, including "Big Eight", except for the US and UK, are losing in innovations and the commercialization of science, volume of research funding in the sphere of high technologies, and they also have relatively outdated and less flexible tax legislation and development of high-tech industries. In Russia there is an innovative progress, and now Russia is on the 49th position in the international ranking, which is significantly higher than in 2013 (62nd place). However, Russia is not only outside the compact similarities with its neighbors in the Arctic, but it is also behind the post-socialist and post-Soviet states, including Ukraine.

This is the historical consequence of the delayed transformation of the national economic, science and education, the transition to the innovative business model of market economics. A forum of small business has been recently held in Moscow (January 2016). Its participants outlined the main barriers to the expansion of the freedom of economy, which is required for borrowing of technological innovations in case of a limited access to external investment. But this process goes on more slowly than the reduction of historical time required for the formation of the sustainable competitive positioning of Russia in the global economy.

The presence of **a Competitiveness Index** (in the version of World Economic Forum), published annually in the form of "Global report on competitiveness" for 117 economies in the world; it is a signal to the diagnosis of the systems failures in national economic strategy. Moreover, that

analysis could be done on indicators of technological development of the country or state of civil society and macroeconomic environment.

Global Competitiveness Index (GCI) for 2013—2014 indicates a shift-up national achievements in all Arctic countries, except for Russia. So, third place is kept by Finland (5.54). United States (5.48) and Sweden (5.48) do not come out of the leading dozen, and even Americans moved from the 7th to the 5th place. Norway with an index of 5.33 is on the 11th place, Canada (5.20) — 14th place and Denmark (5.18) — 15th place.

Large emerging BRICS economies are also showing a high-performance. China (index of 4.84 and the 29th place) continues to lead the group. Although Russia has strengthened its position (moved from the 67th place to the 64th), but it still shows up the least competitiveness among the countries of the BRICS group (Brazil — 56th place, India — 60th place). Its neighbors — Hungary (63th place) and Sri Lanka (65th).

What could hinder the rise of Russia's to the top ten leaders of the GCI? It has always been a problem: low efficiency of state institutions. In one phrase: army of officials, which is “fed” by the taxpayers. This army has no or it has too insufficient practice to stimulate the growth of the innovation potential and the development of markets; plus weak antitrust policy tools employed to enhance competition in goods and services markets, it lacks of trust among investors.

Stagnation phase for Russia enters the 2017—2018. If there is no GDP growth at least 1—1.5%, this will confirm the inability of the existing state managers to hold the innovative modernization of the Russian economy. In the shade of this social irresponsibility of large and medium-sized businesses is covered. It still tends to be unproductive self-investment (buying yachts, planes, foreign estates, and other marginal queries). Initiation of investing in the real economy, innovation and technology comes with a large scratch.

Probably, the imposed and reproducible functioning liberal model of the national economy is not that orbit, according to which Russia should fly to its economic future. Getting off it, in my opinion, interfere with two stereotype conceptual errors. *First one* is the thoughtless incorporation of Western way of transforming the economy, while ignoring the fact that the Western partners in the economic globalization will retain European values: the right to apply double standards towards Russia. Sanctions regime is a “long-playing” record for derogatory unification of Russia under US and EU criteria.

Second one is the fact that the Russian political elite admires Western estimates and teachings, some semblance of public prosecutor mentoring, that, following A.Toynebee idea, is striking narrowing of the historical outlook of Russian citizens to the automatic worship for one model of

historical perspective — the western economic system. Apparently, a decisive move over the “in-difference to the spontaneous market” model to the social model of “welfare for all” is inevitably on the agenda.

This policy is evident when observing the dynamics of the fall in real income of households in 2015—2016, that excessed the figures the 1998 default. Instead of creating an economy for the elite Russia needs socially justifiable differentiation of incomes to maintain a decent quality of life. There should be no splitting of political morality, when the tops are trying to improve the real incomes of people and employers (including those in the public sector) reduce the total payments to staff while increasing the intensity of labor.

I am convinced that overcoming the defects of governance will expand mental motivation to convert internal moral consciousness of the Russian people in the intellectual engine of innovation, historically significant, breakthrough for the economy of Russia to the big leagues on most of international indices. Precondition for it is lowering the degree of social tension in Russian society, diagnosable by indices, which are discussed below.

Indices that help to understand internal spring (problems) of economic growth

Among these functional indeces is a group of social indices of measurement, namely the sustainability and stability of the society, the social index, based on knowledge. As it is known, in 2016 it was proclaimed the Year of the Environment. For reference, we note that the international community also has a corresponding ESI index — ***Environmental Sustainability Index***. The index measures the state of the environment and management of natural resources on the basis of 22 indicators in 10 categories. Information for this index has been calculated since 2006 by the Center for Environmental Law and Policy of the University of Yale (USA) for 146 countries. In 2014, the review included 178 countries.

Using the ESI index let us define the position of the Arctic countries on the organization of complex environmental measures as safety factors of their socio-economic development. Sweden (78.09), Norway (78.04), Denmark (76.92) and Iceland (76.50) are on top of the list of Arctic countries as the most advanced, taking the 9th, the 10th, 13th and 14th place in the world rating. Finland (75.72) and Canada (73.14) with their 18th and 24th places are separated from the 33rd place of the US (67.52). Russia's 73rd place, not far from Moldova, an outsider by the ESI. As you can see, the “Big Eight” country's also did not belong to the world leaders in the protection of environment and have a fairly mediocre ESI-value index, although a few years ago Canada was in the top ten of environmentally advanced countries. Taking into account that the ESI index ESI is symbolizing the ability of countries to protect the environment, social and institutional capacity of the country to

respond the environmental challenges, we can be objectively constative of other priorities in the strategies of economic development and growth. This dominance for increased GDP through intensive enough, sometimes means exploitation of natural resources with a condescending attitude to environmental protection.

Valuable and very useful information for the reader is accumulated by the *Sustainable Society Index*. It helps to assess the stability of the social development of countries and regions. Methodology for the calculation was proposed by Sustainable Society Foundation after the initiative of the Dutch researchers Geurt van de Kerk and Arthur Manuel in 2006. The Foundation publishes a report every two years. The essence of the concept of “sustainability of society” (Sustainable Society) consists of three basic components: *economic; social and ecological*. The only problem is that the indicators measure them harmoniously tie in the one integral index. The index measures a country's achievements on sustainability of social development in a scale from 0 (the lowest degree) to 10 (the highest degree) on the basis of 24 indicators in the context of the three components. In 2012, the study covered 151 countries¹. Result for the Arctic countires look as follows (*Table 4*):

Table 4

<u>World Sustainability Rating</u>					
Sustainable Society Foundation. The 2012 Sustainable Society Index					
rating	country	wefare of a man	ecological welfare	economic welfare	index
	Averal	6.59	4.57	3.96	4.8
1	Switzerland	9.08	5.36	8.63	7.36
2	Sweden	9.41	4.2	8.26	6.73
5	Norway	9.44	3.7	8.05	6.38
8	Finnland	9.4	3.43	7.53	6.09
106	Russia	7.05	2.64	4.39	4.33
111	Canada	8.93	2.21	3.92	4.31
116	USA	8.22	2.71	3.05	4.23

¹ Rejting stran mira po urovnyu ustojchivosti obshhestva. Gumanitarnaya enciklopediya / Centr gumanitarnykh tehnologij. 10.12.2010 (Updated: 10 April 2015). URL: <http://gtmarket.ru/ratings/sustainable-society-index/info> (Accessed: 30 January 2016).

Paradoxically, this index shows that Russia and the United States are more similar to each other because the two contenders for global leadership do not have too much propaganda gunpowder to prove God's chosen role of its people in parts of the proposal (sometimes imposing) a social model to other nations. Here it should be noted a the specifics of the scatter for indicators of economic and environmental well-being. Unfortunately, low well-being indicator confirms absence of harmony in Russian society, tension and aggressiveness of individuals. We call these phenomena are an example of the deficit of funds for adequate social development of our country. In order to enhance the tone of this statement is evidence that *Russia is on the 136th place among 191 countries — members of the UN on the index of the uneven distribution of social and material goods* (GINI Index 45.62).

Such a high index of inequality is an indicator of high internal tension between different social groups and strata of society. *On the one hand*, it shows "when the intellect and moral motivation of ordinary citizens have already been above the intellect and moral cynicism of those who metes out their subsistence minimum"². The continued presence of this imbalance creates sociocultural oncology of the society — enhanced motivation for people's indifference to the innovative solutions of social and economic problems of Russia. *On the other*, it comes in a confrontation to the criteria of social progress. Lowing their role during the preceding stages of the history of the country is a shadow defect of economic policies as a communist one, and contemporary elite.

The historical paradox of the United States, Russia, its northern and Arctic neighbors confirms this argument: in the XX century and the beginning of the XXI century northern neighbors took the leading position, even in case of the dynamic development of the rest of the world; The United States were continuously opening its reserves and retained economic dominance in the world; Japan tripled its economy; China has become the first economy in the world. Only Russia doubled the reduction of the share in world production. In order to improve the situation with the GDP the per capita and be closer to the not that developed European countries (Portugal, Spain) it is needed to change the paradigm of social relationship to the reserves of society, human capita and itsl accumulation. Without the moral health of the Russian people it is umpossible to sublimate motivational potential of millions of Russians in an innovative breakthrough to the historical success of the Russian economy in the global competition.

Leading countries (Sweden, Norway, Finland) as it is shown in Table 4, are not superstates with the dominant ideologies and economies. But the data clearly indicates that the basic industries of these countries produce at the expense of a considerable part of the intellectual and high technologi-

² Zalyvskij N.P. Novaya etika otnosheniya k cheloveku (rabitniku) neobhodima kak vozduh dlya innovacionnoj modernizacii severo-arkticheskoy ekonomiki i socialnogo optimizma naseleniya / Nashe glavnoe namerenie zdes prostiraetsya. M.V. Lomonosov i Arktika: sb. nauch. st. Arkhangelsk, 2012. 196 p.

cal work. These countries are the world leaders in environmental measurement indices, the index of competitiveness and society index based on knowledge. They are very active in innovation. Consequently, they are successful in sustaining the model of “*ecological economics*” and “*knowledge economy*”. Now, it is subject not only to the mass production of new knowledge, but also the “*ecosystem*” of goods and services. Their strategic approach to the choice of the productive factor of development is social capital. Three groups of indicators convincing approximation of these countries to a higher form of society based on knowledge (*smart models — smart society*).

This is appropriate to disclose the nature of the ***society index, based on a knowledge*** (knowledge-based society), or K-society. It was developed by the United Nations Department of Economic and Social Development — UNDESA. This index includes three indicators: *the intellectual assets of the company; prospects of development of the society; quality of the development of society*. Each indicator is generated using 15 sets of data about the youth education and information, the investment climate in the country, the level of corruption, inequality of the distribution of material and social benefits (GINI-index), the level of infant mortality, etc. These indicators are, of course, measured in different units, therefore they lead to a uniform range of changes from 0 to 1. The worst values are closer to 0, the best — to 1. In 2005 the UN identified 45 best countries of the world on index of K-society among 191 of UN members. The top five countries with the highest rating, except for Switzerland, were the Arctic countries: *Sweden, Denmark, Norway and Finland*.

It remains for us to conclude that *the possession of significant natural resources that Russia has*, loses its priority *during the construction of a society based on knowledge*. The accumulated wealth of the country, measured volumes of GDP per capita, by contrast, are positively correlated with the ability to develop K-society. However, let us turn to the first two tables, which will return us to pessimism, because: a) on these criteria the Russian Federation is too seriously left behind the leaders of knowledge-based societies; b) Russia and China are not even among the top 45 countries in terms of development of the K-Society. For your information we mention the rest of the countries. According to the index of K-society, the United States has 12th place and Canada had 14th. In other words, the accumulated wealth of the leading states widens the distance between the knowledge of the “how to act” and “how to co-exist”.

On the national achievements of the Arctic states in the implementation of human development policies

It is measured by the ***Human Development Index*** (HDI) proposed by Pakistani economist Mahbub ul-Haq in 1990. This index is an alternative indicator of social progress. Why? A new concept of assessment for states appeared. Part of it was the lack of recognition of economic indicators (such

as the national income, as it was practiced for a long time) and the possibility of measuring the dynamics of social processes. According to annual estimates of the UN experts and independent international governmental experts, the world was ranked in four categories: countries with a very high HDI; countries with a high HDI; countries with a medium HDI; countries with a low HDI. Every year, the UN presented reports on human development. According to them, a few years ago a vector of dynamics and tendency of socio-economic development of the states had been built; innovators identified as well as the losers of social progress. The need for international comparison of data from national statistical offices (over 180 countries) lead to the delay of the UN report on human development for two years. In this regard, the report prepared by the UN Programme «Human Development Report» came out in 2014 and the HDI covered the results for 2012—2013. It presented information on 187 countries and territories. The report also has some more information on 8 countries that are not included in the rating due to doubts about the reliability of statistical data [6].

In the context of this article we are interested in indicators of the HDI for Arctic countries in 2014 (*Table 5*). The result of cross-country analysis of the HDI is unequivocal on the conclusion: Norway firmly holds the rating of national achievements. It was on top of it in 2001—2006. Then, it gave the leadership away to Iceland and in 2008 returned the position back and it continues to lead so far. Norway's HDI is 0,944. Other Arctic countries have settled on the next steps of the world ranking [6].

Table 5

Hunam development index in the Arctic states

Rating	Country	Human development index
1	Norway	0.944
5	USA	0.914
8	Canada	0.902
10	Danmark	0.900
12	Sweden	0.898
13	Iceland	0.895
24	Finnland	0.879
57	Russia	0.778

The HDI is not accidentally called a synonymous to some very important definitions, such as “living standart” and “quality of life”. This is largely determined by the fact that the component of the numerical values of the index are in the range from 0 to 1 and it is also a the GDP value per capita in US dollars at purchasing power parity (PPP). This is one of the criteria of differentiation of levels of living in the Arctic. *What does the HDI relevant to a country reflects?* Integral achievement in health promotion and development of education, increase the actual income of its citizens. The higher is the HDI, the more favorable are the conditions for the economic growth of the Arctic regions, the greater is the po-

tential of their national economies. The longevity (life expectancy) perceived a sign of health, and level of literacy in conjunction with the coverage ration — with the access to education.

Now briefly about the vector of socio-economic transformation in the Arctic world. The HDI 2014 shows progress and the specifics of development trends in individual states. For example, in 2005 and 2014 data confirmed the rating leader of the Norway as the most prosperous country in the world and the smallest HDI among Arctic states was Russian (57th place in the ranking). Sustained high position was occupied by Denmark, Sweden and Iceland. These countries are in the top-category, they are characterized by a high level of socialization of market economy. Since 2005 the US rose to the 10th position, surpassing Canada at this point. A bit worse position was taken by Finland. This is the average level of development. The level of human development continues to grow, but the pace of increase is reduced in all regions of the world, and the progress of individual countries is rather unstable.

However, this particular piece of Russian practice of the HDI, which values in the Arctic regions are indicators of the UNDP old methodology due to lack of statistical measurements and the average expectancy of studies, take into account the macroeconomic situation in 2010. In the regions of the Far North (Magadan and Murmansk Regions, the Republic of Komi) better HDI dynamics associated with a statistical reason is observed. In cross-country comparison of GDP per capita, as well as inter-regional GDP in Russia, the dynamics of population growth or reduce is essential. The reduction of the population – this tendency is almost dominant in the Arctic regions of Russia. In one way or another, this process distorts the HDI in the Arctic areas of Russia (*Table 6*).

Table 6
Human Development Index in the 7 Arctic and Northern areas of Russia in 2013

Area	1 GDP	2 income	3 years	4 Living rate index	5 %	6 %	7 Educa- tional index	HDI	Rating
Russia	19,674	0.882	68.83	0.731	99.7	0.755	0.916	0.843	
1.Tumen Region	60,363	1.000	69.72	0.745	99.7	0.755	0.916	0.887	3
2. Krasnoyarsky Kray	27,100	0.935	67.76	0.713	99.6	0.754	0.915	0.854	7
3.Komi Republic	24,836	0.920	67.20	0.703	99.7	0.813	0.936	0.853	8
4.Republic of Sakha (Yakutia)	23,570	0.912	66.78	0.696	99.6	0.780	0.924	0.844	10
5.Arkhangelsk Region	19,243	0.878	67.86	0.714	99.8	0.756	0.917	0.836	16
6.Murmansk Region	17,413	0.861	68.42	0.724	99.8	0.728	0.908	0.831	21

7. Republic of Karelia	14,464	0.830	66.87	0.698	99.7	0.793	0.929	0.819	36
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Note: Legend of columns: 1. Real GDP per capita (*per capita in US dollars at purchasing power parity*). 2. Income Index. 3. Life expectancy, years. 4. Longevity Index. 5. Literacy, as a percentage. 6. The proportion of students aged 7-24 years, as a percentage. 7. The index of education. Reflects the dynamics of the seven socio-economic processes, which have become the basis for calculating the HDI, for the 71 subjects of the Russian Federation. Moscow (HDI = 0,984) and St. Petersburg (HDI = 0,969), of course, they lead in the national ranking of the HDI.

Happiness is created by states able to love humans, who are working hard for their wellbeing

It's time to move on to issues of concern to all of humanity and every individual (family) in particular. Conceptually, the understanding and solution of this problem requires an answer to two questions. *What is happiness? Who lives well or happily in the Arctic world (in Russia)?* Appeal to the index of happiness in the Arctic countries opens the way to answering the questions or to the knowledge of the old truth that happiness is run all over the world by those who do not like the charter of their house, that is, the mental freedom or creative self-realization in their own country.

The methodology of calculation of the index was proposed by the research center of the New Economic Foundation (UK) in collaboration with the environmental organization Friends of the Earth, the humanitarian organization World Development Movement. The definition of the index involves independent international experts as well. The first rating of happiness was measured in 2006, then in 2009 and in 2012 by the UN order and on behalf of the national statistical governmental institutions and international organizations.

There is also an international project "Network solutions for sustainable development" (Columbia University, USA), which analysts make the world ranking by happiness. The authors of the project are keen to show potentials and ways the world and individual regions use to provide its residents a happy life. The first similar rating (April 2012) was confined to the United Nations Conference on Happiness. The table 7 shows figures for both comparison methods. In 2015, Switzerland was named the happiest country in the world out of 158 countries by Americans (in 2013 — Denmark) [7].

Table 7
Arctic states and the index of happiness

Country	Index of happiness	Rating
Norway	51.429 / 7.522	29 /4
Sweden	46.172/ 7.364	52 /8
Canada	43.560 / 7.427	65 /5
Finland	42.687 / 7.406	70 /6
Iceland	40.155 / 7.561	88 /2
USA	37.340 / 7.119	105 /15
Denmark	36.612 / 7.527	110 /3
Russia	34.518 / 5.716	122 /64

What do the indices and ratings of the happiest countries reflect? First of all, it is the dynamics and feelings of happy life among the residents of different countries of the world. For scientists it

is an opportunity to identify the relationship between economic growth and the degree of satisfaction from the welfare and living conditions of the countries. The uindex is a combined rate, comprising measuring the level of employment, the quality of the social services, life expectancy, the environment, freedom of decision, the generosity of people and the extent of corruption (over 3 years).

Happiness index is not only an indicator of the national economies, but also the effectiveness, efficiency of the political elite of the states and social policy. The more accurate it is identical to the mental basis of the people, the higher is the level of happiness of the population. This fully applies to the Arctic countries. Thus, Norway with its highest position among the Arctic countries in the ranking on happiness, life satisfaction and ecology has the following indicators: 7.6 and 4.8 and the life expectancy is expected to reach 81.1 years. Among the highest indicators of the HI are: Sweden, Canada, Finland, Iceland, where the score is calculated at the level of 40—46%. Other countries and regions of the Arctic have lower HI and places in the global rankings (*Table 7*). Therefore, the instead of one wise man about accidental nature of happiness is doubtful. The guests of the Pomor land got a wooden bird of happiness as a sign that happiness they asked will knock at the door of their fate. Perhaps, a gift is not that precious, but precious is the belief in the generation of mood people desire.

It's interesting, none of the major economic powers was not included in the top ten leaders on happiness neither in the first nor in the second measuring procedure. In the "Colombian" version the United States have the 15th place, Brazil — 16th, the UK — 21st, France and Germany — the 29th and the 26th respectively, Japan and Italy occupy the 46th and the 50th place, while China and India — the 84th and the 117th [7].

Russia has a level of happiness at 5.716 points and the 64th place, just above middle of the rating. Ahead of Russia are Uzbekistan (44th place), Moldova (52nd), Kazakhstan (54th), Lithuania (56th) and Belarus (59th).

Happiness indices give the signal for the diagnosis of fundamentals of living in the Arctic countries. Quantitative evaluation of happiness in Russia shows a low level of satisfaction with the quality of life of the population. It is useful here to use the hypothesis of a certain reasons why the Russian Federation is behind the former republics of the USSR. One of them is non-critical borrowing the Chicago model of liberal capitalism for the Russian market reforms. An explicit focus on the maximization of profits in favor of a limited social group of "masters of life" is foreign factor, annoying citizens of the country and it does not add any social optimism. In addition, concentration of income and property in hands of these "owners" restricts welfare and humanitarian development of the honest people. Such sentiments, of course, are uncomfortable for feeling of happy-

ness. But now one can enjoy the fact of progressive movement to improve the welfare of the population. Russia has risen to 122nd place in 2012 from the 172nd place in 2006. Russia will not get the leading position in the social progress without the ability to perceive the dignity of life of other people, without the desire to multiply the best practices of displacement of things that overshadow the joy of life of citizens.



Picture 3. Yakutia / E. Syamin, 2012. URL: <http://www.taday.ru/text/1913793.html>

Conclusion

This analytical review is an attempt to go beyond the limits dictated by attention to scenarios of economic development of Russia, because it limits our political and economic views on the Arctic as submagnet of geo-political interests of all participants of its economic development. We are not alone in the world, so real scientific outlook on development challenges of the Arctic countries cannot be the objective comparison of their position or their economic potentials. Now we know the ratio of Russian and other Arctic countries.

Article focused on two theoretical statements: a) there we are not the leaders, as it was in 1930s—1990s; b) in 2000-2015 other Arctic countries demonstrate better economic and political dynamics. This is not a reason to sprinkle ashes on our head. In my opinion, the displacement of “rose-colored glasses” from social science is important for realization of the objectives of Russia's place in the global economy. Index matching of Russian and Arctic countries has purely pragma-

particle meaning. In particular, we see the inefficient functioning of the agricultural system, confirmed significant differences in the system of international ratings.

We underlined these aspects not only to have a look at the reasons for gap between Russian and others in socio-economic development, even though it may be a down payment made by the author to the theoretical development of the future approaches to overcome the current Russian imperfections. The article includes judgments, sometimes unexpected, aimed at updating the geopolitical configuration of the world, where Russia is an Arctic nation with qualified and best-time Arctic outpost of civilization and the world economy. Therefore, it is time to work in the correct mode for the creation of innovative and investment conditions for overcoming the stagnation trend of the Russian economy. And only then the green traffic light of the Russian history will open the way to the prize steps of the world ratings.

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Innovative development vector of the coastal areas of the Russian Arctic



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Abstract. The article examines the opportunities for further development of the Arctic zone of the Russian Federation on the basis of innovative standards and technology, as the whole system of state management of innovation processes should be based on innovative strategy of the state in general and the region in particular, without which it is impossible to imagine a real, deep and lasting renewal of the economy and entire society.

Keywords: *Russia, Arctic, innovation, strategic management, spatial development*

Innovation policy is crucial in the strategic planning system in economically developed countries, which confirms the effectiveness of the transition to an innovative model of economic growth [1]. Developed countries transfer from traditional science and technology policy to the innovation that is stimulated not only the process of creating new knowledge and its use in order to obtain the greatest economic benefits. More and more Russian scientists are trying to find modern priorities for Russia or to justify the new ways to overcome the lag from developed countries but also from developing countries in the economy, the level of technological development, the effectiveness of public research and innovation policies, not only.

Innovation policy of the majority of regions of Russia, including the Russian Arctic is complicated to be assessed as positive because the poor innovative infrastructure development of the region. For example, a regional strategy and innovation development program, as well as the profile section designed to support innovation in the development strategy of region do not exist for 40 subjects of the Russian Federation. Priority development areas of innovation are not allocated in the scheme of territorial planning in 63 subjects. Special legislation acts defining the basic principles of innovative activity in the region are absent in 18 subjects of Russia; 27 areas do not have specialized programs of development and innovations, 36 have no functioning advisory bodies on innovational policy, 29 — have no development institutions with functionality to support the subjects of innovation activity. 64 areas do not get subsidy from the federal budget for the develop-

ment of innovation infrastructure for small and medium-sized business. However, some elements of the innovation infrastructure appeared: industrial parks, innovation and technology centers (ITC), innovative-industrial-complexes (IEC), some old-established science cities are kept and new ones have been created.

Many specialists see the salvation of Russia in the sustainable development of the northern territories of the Arctic macro-region, in the high latitudes or in the Far North. Therefore, logical question arises: what component of the northern resources will become another dominat and what principles of sustainable development of coastal zones can alter the structure and dynamics of the northern potential?

Coastal areas of the Arctic and the Far North of Russia

Arctic coastal areas are not only the concentration of all branches of marine economic activities, which are considered for the entire coastal zone of the Arctic and the Far North of Russia, including the Far East. This is the territory of the complex structural organization with a combination of territorial disparities in industry and production and resource potential [2]. Each subject of the Russian Federation here has its own internal, inter-regional, and global economic factors of development. That's natural resources and the territory of the Arctic and the Far North, which have always been the subject of economic and geopolitical interests of the polar states, as well as a subject of the world economic and geo-strategic interest of the world community. In the Arctic inter-regional destination includes: 1) *part of the land* — the Murmansk region, the three municipalities the Republic of Karelia on coast of the White Sea, the Arctic Islands, 7 municipalities of the Arkhangelsk region, Nenets Autonomous District, Yamalo-Nenets Autonomous District, part of the Siberian Federal District (Taimyr Dolgan-Nenets municipal district, the Krasnoyarsk Krai), the northern regions of the Far Eastern Federal District (Republic of Sakha — Yakutia, Chukotka Autonomous district); 2) *a large part* of the Barents, White, Kara, Laptev, East Siberian, Chukchi, Bering and Okhotsk seas on the basis of wasps international maritime law (UNCLOS 1982 and etc.). Based on the concept of geostrategic development it must be recognized that for the sustainable socio-economic development and utilization of resources of coastal areas, it is necessary to find solutions and implement two main tasks. *Firstly*, it is redefining the innovative vector of Russian policy in these areas of a strong and direct economic cooperation. *Secondly*, it is fixed population due to the formation of a developed economy and a comfortable environment. That is necessary to find a balance between development and conservation of resources in the Arctic due to its unique ecosystem and to do it in the interest of people living there.

Today resource stocks of the Far North, which includes the subjects of the Russian Arctic and, give about 11% of national income of Russia and almost a quarter of the volume of Russian exports. Coastal areas are the place where, on the one hand, a clearly manifested territorial geopolitical and economic strategic knowledge exists, as well as the relevance and potential of Russia, and on the other hand, this is the area where the strongest contradictions of socio-economic development are found, environmental issues are important and quality of life of the population is a problem.

Improvement of the territorial structure of the economy of the northern coastal areas and strengthening their competitive position are strongly correlated with the innovative scenario of development. But innovations require the fullest utilization of the competitive advantages of the region, its natural resources and transit potential, as well as the modernization of transport and energy infrastructure. Strategic priorities of development of the Russian Arctic up to 2020, as we know, are the complex socio-economic development programm of the Russian Arctic; the development of science and technology; rebuilding of modern information and telecommunication infrastructure; ecological safety; and international cooperation in the Arctic. I would also like to emphasize that the achievement of sustainable and balanced development depends on the formation of the so-called "right" of the economy, where comprehensive regional economic system presupposes the existence of such sectors and activities that do not only service and meet the needs of basic industries and population, but also fit the level of innovation through the support systems, and the operation of facilities, market and social infrastructure. In this context, due to the old northern infrastructure, modernization of the transport system, communications and defense infrastructure of a dual use are urgent.

Modernization becomes an innovative way to overcome the heterogeneity of economic space through the sustainability of the northern coastal areas. At the heart of the main strategic directions are concepts of "green" innovation economy, energy efficiency and sustainable development. This will allow the implementation of planned measures aimed at leveling the socio-economic differences in the subjects of the Arctic and the Far North of Russia and concentrating the federal aid for regional development, which should become a "locomotive of growth"¹. Such regions have all the prospects to start the process of innovative development, which requires the creation of the entire production complex for *processing of natural and marine resources*, the introduction of a number of innovative technologies throughout the supply chain of added value. Under natural resources we mean not only hydrocarbons of the Arctic shelf and the adjacent land,

¹ In order to do so, there is a series of governmental documents: Basics of the state policy in the Arctic, Strategy for development of maritime activities, Concept for development of fisheries, Energy strategy, and etc. In addition, each subject of the Federation has a long-term Strategy of socio-economic development.

but also other minerals, biological resources of the Arctic and the Far North of Russia and they are one of the fundamental conditions for sustainable development of the area.

However, at widening the extraction of resources and, above all, mineral and energy ones, the old economic and social methods are no longer suitable. More acceptable is a compromise, which, along with the main objectives of economic development of the Far North (meeting the country's needs and export the resource), some other projects should become important priorities of innovation. It is to ensure environmental safety in practice and not just in words; conservation of Arctic ecosystems and protected areas (PAs); use of tourism potential and attractions of tourists from abroad and from Russia. Although domestic experience of economic development of the northern coastal areas can not be considered as rich in terms of economic efficiency, it is a long one and it is rather traditional. Existing production, transport and infrastructure requires reconstruction and further development based on new technology, which has the possibility of implementing an alternative light industry, agriculture, food industry, including coastal fish processing. Development of fishery will help to ensure access for indigenous peoples to marine bioresources and the realization of their legitimate rights to preserve their lifestyle.

At the same time, "northern" development opens opportunities to join purposes of realizing the potential of the mineral complex with the rate of modernization and "green" economy, the development of information technology, building lines and satellites to provide telecommunications in the Russian Arctic and their integration to the networks of the Russian Federation. It is important to ensure the provision of state standards of general education, telemedicine, state and municipal on-line services. It is important to note that, along with the modernization of traditional crafts and agriculture, it is urgent to create new industries: the medical and bio industry, fur and leather industries. Solving these problems requires a deep economic transformation of the socio-economic environment in order to overcome the crisis, to ensure stability in conditions of innovative development of the advanced sectors of the economy and, ultimately, to ensure the transition from the industrial development of the North to the sustainable development model. The principal basis for reforms should be a number of megaprojects, which accelerate the solution of the whole complex of problems of coastal territories along with mobilization of the Russian scientific and technical potential.

Natural and production potential of the *European North of Russia* can be attributed to the industrialized regions of the country, and it is defined by the rich and in some cases unique reserves of mineral and energy resources (Barents and Kara Seas, New Land), advanced land and maritime transport networks with a large ice-free seaport of Murmansk and Arkhangelsk sea port,

beneficial in terms of development of economic relations and complement to each other. Prospective development of carbohydrate offshore fields, introducing elements of diversification will contribute to the future development of economic activity in the regions. Economic processes and strategic priorities for the development of the Russian Arctic are associated with innovation and technological developments in the energy sector, including renewable energy sources (Mezenskaya hydroelectric plant and other projects). However, without state and active support the introduction of innovative technologies in the development of the northern areas and the Arctic waters will be very difficult. After all, their "pain" points are the higher risks and costs, including those due to the objective conditions of production and transportation of raw materials. Therefore, the state should become the general coordinator of the development of the mineral resource, energy security and the regulation of the coastal natural resource use.

The development of resources in the Arctic and the North of Russia started a complex development of hydrocarbon deposits on the continental shelf of the Kara Sea and the Sea of Okhotsk, on the Yamal Peninsula, Eastern Siberia. In this regard, it should be borne in mind that in future the world energy is accompanied by the restructuring of the energy balance, the change in the role and importance of individual energy. Decline in oil prices in 2015 had shown the global overproduction of oil and reduced demand on it. Obviously, it is needed to make corrections to previously-stated plans and Russian hydrocarbon production program. Plans and projects of modernization of energy infrastructure should provide a balanced development. This task updates the analysis of the various segments of the national energy sector, in order to efficiently focus the efforts and resources on the "weak" objects and relationships. For example, the possibility of creating energy corridors between neighboring energy surplus and energy deficit regions.

Along with this, the development of the resource potential of the coastal areas will be a base for their integrated development, where provided transport is the only economically realistic way to natural pantries of North East Siberia and the Far East. Considering *the Northern Sea Route* as a set of shipping routes and all elements of the marine Arctic transport system, including the coastal infrastructure, combining all the major river arteries of Siberia in a single transport network, we emphasize that the Northern Sea Route plays more geopolitical role than economic. No wonder the Northern Sea Route is sometimes called "BAM on the water". This transport and industrial backbone is of industrial and social importance, and a defense infrastructure across the coastal areas of the Russian Arctic. It is the protection of the Russian fleet, and strengthening the security of Russia in the Arctic and military-political and financial-economic position of the country. World events suggest that a key challenge of innovative development of the Northern Sea

Route is an integrated geographic information system of the Arctic, where the main component will be modernization of navigation, including the military and border infrastructure of dual use.

The Northern Sea Route is a link between the Russian Far East and the western parts of the country, at the same time is the only thing to revive the economy of the Russian Arctic and to increase volumes of domestic and regional traffic during the northern importation of goods for livelihood. For this reason, the implementation of large-scale marine cargo operations in inland waters is aimed the “north” vector of governmental policy of innovative development, where production potential in the most promising centers creates pockets of economic and social efficiency. Stressing that the sea transport in the northern latitudes and sub-Arctic areas has practically no alternatives and it is the most effective way of delivery of machinery and technological equipment, energy and industrial goods necessary for the functioning of clusters located in the coastal zone of the Arctic seas and livelihoods of people living in the area, and we should not forget about the effective use of NSR as the international transport corridor. Modernization and reconstruction of the NSR as the main latitudinal transport route linking northern Russian areas, able to implement effective intercontinental transport links between Europe, Asia and America becomes a priority object of the sovereign transport policy in Northern Russia.

The strategic direction of environmental policy in the Arctic and the North is the formation of the legal and economic relationships that promote the search and implementation of environmentally friendly **“green” technologies**. In this situation, it is needed to develop and implement the laws and regulations for protection of environmental and economic interests of the indigenous peoples from the negative actions of the extraction industry; high-performance of environmental measures, guides for the development of clean technologies and the use of high technological ways of organization and conducting the proceedings, where the information banks of environmentally friendly “green” technologies would constitute the basis for the use of ecologically safe systems in the production, protection of water resources, the elimination of environmental damage.

The balance between restructuring the economy with huge infrastructure costs of users to preserve the natural environment of coastal areas and the use of renewable natural resources will ensure the complementarity of economic activity, where the recreational resources (including balneological) ensure the development of tourism in the Arctic and have the potential to become an export oriented and leading in some regions of the Arctic and the North of Russia.

To ensure *the sustainable development* of coastal regions of the Arctic in the long-term and the medium term perspective, it is advisable to solve the following problems: restructuring the regional economy, increasing the use of renewable natural resources through the creation of an

expanded system of protected areas, creation of favorable conditions of life and work of the indigenous population meeting the specific human living conditions in the extreme climate of the North at the expense of creation and improvement of traditional forms of economic activity on the basis of effective use of available natural resources of tundra and forest tundra (medical plants, berries, furs and etc.).

Conclusion

Thus, accounting the complexity of the processes in the Arctic and in the Far North of Russia, where economic complexes were formed on the basis of nature use industries, sustainable economic development involves improving the spatial structure of the economy with the development of regional industrial and economic clusters and complex modernization throughout the transport infrastructure, which will provide, in particular, and the export of strategic goods [3]. Innovative vector of development of coastal territories of the Russian Arctic will be: integrated development of mineral resource base along the formation of a large-scale infrastructure project - the international Euro-Asian transport corridor - the Northern Sea Route. Only joined efforts, resources of federal and regional executive authorities and economic entities in the Arctic region will solve the problem of infrastructure of the coastal areas and improve the efficiency of economic activity that will recover all the Arctic region.

Strategic competitiveness of Russia in general, and the Arctic zone of the Russian Federation, in particular, depends on innovation activity and ability of regional economies and industries. After all, both external and internal development needs of the country are determined by the importance of innovative development. Differentiation of regions of Russia in terms of socio-economic development dictates the need for taking into account the characteristics and capabilities of the regions to the innovation, which is a determining factor in the allocation of budget funds intended for the development of innovation.

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On the development of the main research areas of the Arctic zone of the Russian Federation¹



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Abstract. The article is focused on the current research trends in the field of environmental protection and security in the Arctic. This means the development of Arctic environmental safety strategies for the period until 2030, pollution and the environmental situation in the Russian Arctic, use of strategic environmental assessment (SEA) for the major infrastructure projects in terms of their impact on the Arctic environment and the possible damage, an environmental atlas of the Arctic zone of the Russian Federation within the project of the National Atlas of the Arctic. An assessment of the dumping impact (waste disposal in the sea) on the environment of the Arctic and indigenous peoples, taking into account the transboundary transfer of pollutants. All the tasks of the environmental damage elimination could be solved by special programs. The authors also formulated the possible outcomes of the proposed research in the Arctic.

Keywords: *Arctic zone of the Russian Federation, environment, ecological safety, strategy, strategic environmental assessment, environmental atlas, dumping, accumulated environmental damage*

Arctic Environmental Security Strategy until 2030

Assessment of anthropogenic pollution and analysis of the environmental situation within the Russian Arctic reveals the most significant problems, solution of which determines the strategic directions for the Arctic environmental protection. These include:

¹ The article is a part of a project carried out under the RSSF (grant agreement №15-02-00395/15 14.04.2015)

a) The unsatisfactory condition of a number of areas outside the industrial zones on the Kola Peninsula and Taimyr, water objects, including sources of drinking water and poor quality of drinking water.

b) Threatened species diversity of flora and fauna, and especially the preservation of rare and endangered species, hunted species of animals, socially significant flora areas and berries.

c) Land degradation, including natural grasslands.

d) Cross-border pollution of the atmosphere and ocean.

e) Radioactive pollution of the environment.

Production and transportation of hydrocarbons in the Arctic regions of Russia and the basins of the major Siberian rivers create powerful anthropo-technological impact not only on terrestrial ecosystems, but also begin to exert significant pressure on the Arctic marine ecosystems through a system of river flow. Some inland areas of the Russian Arctic are characterized by strong transformation of the natural geochemical background, atmospheric pollution, degradation of vegetation cover, soil and ground, inclusion of pollutants in the food chains, increased morbidity of population.

There are four major areas of the environmental stress: Murmansk region (10% of the total emission of pollutants), Norilsk agglomeration (more than 30% of the total emission of pollutants), oil and gas fields in Western Siberia (30%) and the Arkhangelsk region (a high degree of pollution with so-called specific substances). Cities in Arctic zone are always present in the list of cities with significant air pollution. Among the industries related to pollution, the first place is occupied by steel and mining in Norilsk, Monchegorsk, Pechenga, Zapolyarny, Olenegorsk, Kandalaksha, Talnakh, Kovdor, Deputatskoe, and others [1]. Despite the economic downturn of the 1990s, the area of pollution is growing slowly due to the disproportionate reduce of production and inertness of natural processes. Centers of mining and metallurgical industry are characterized by elevated levels of toxic accumulation in ecosystems, increased morbidity, cancer and skin diseases. Mining and primary processing of raw materials in the Arctic leads to mechanical disturbance of soils mainly in the permafrost areas, as well as the pollution of underground and surface-waters with the air strontium compounds, heavy metals (especially mercury) and oil.

A particularly high load is observed in the tundra landscapes, forest tundra and northern taiga in Western Siberia and Bolshezemelskaya tundra. The number of accidents at the individual fields is not the same, but it is directly related to the size of deposits and consequently the overall of industrial facilities in its territory, duration of operation, the technical density loads on the territory. Each of them is a potential source of negative effects on the environment.

Annual number of leaks of oil carbohydrate is extremely high. Consequently, in the oil-producing regions accumulate a significant amount of petroleum hydrocarbons and their contents in soil during the extraction and operation of pipeline systems. The volume of possible concentrations of the bituminous substances in soils of the northern Russia ranges from several g/kg to several hundred g/kg. The total load on the environment of the oil-producing companies, concentrated in the Arctic regions, determines the seriously threatening chronic pollution of the Arctic Ocean, which over time, with a high degree of probability, can lead to destabilization of the ice cover of the Arctic and the severe global consequences.

In order to resolve issues of environmental security in the Arctic, we need the efforts of not only of the Russian organizations but also countries interested in the development of the Arctic. Cooperation of the eight Arctic states officially began in 1989 when in Finland in Rovaniemi the Environmental Protection Conference took place and it was attended by ministers from Canada, Norway, the Soviet Union, the US, Denmark, Sweden and Iceland. The conference adopted environmental strategy for the Arctic and the founded an integrated approach to ecological cooperation in the region for the eight Arctic states².

Currently in the Arctic zone of the Russian Federation it is planned to perform a large-scale infrastructure projects, as well as raising the level of hydrocarbon and bio-resource use, strengthening the national security. In this regard, it is relevant to unite the efforts of the authorities in the environmental protection of the Arctic. But the analysis of strategic documents issued by a number of Russian ministries and departments shows that the issues of environmental protection, ecological safety in the Arctic are poor reflected or do not visible at all [2].

Development of "Environmental Security Strategy of the work on the development of the Arctic for the period till 2030" will coordinate the activities of federal and regional authorities, sectoral ministries and organizations on the basis of the relevant program (subprogramm), modern trends aimed at stabilization and rehabilitation of the Arctic environment, including the possibility of "green" economy, adaptation of people and industries to climate changes and attraction of business to address the elimination of accumulated environmental damage. At the same time it should be noted that in the northern regions we already have similar types of documents³.

Strategic ecological assessment, making the National Atlas of the Arctic

The world practice aimed at ensuring the environmental safety of infrastructure projects and programs is related to the Strategic Environmental Assessment Tool (SEAT). SEAT application

² Strategy of environmental protection in the Arctic. Rovaniemi, Finland, June 1991

³ O konceptii ekologicheskoy bezopasnosti HMAO na period do 2020 goda. Khanty-Mansijsk, rasporyazhenie Pravitelstva HMAO № 110-rp ot 10.04.2007.

is regulated by a number of EU Directives. In Russia the use of SEAT is very modest. JSC "Gazprom" and a number of other corporations have used it for some projects. Overall, however, the effective tool to prevent the possible negative consequences for the environment is still not used at the earliest stages of projects.

In accordance with the request of the Government of the Russian Federation issued on 23.10.2013, № AD-P9-7566, Russian Ministry of Natural Resources prepared, agreed with the federal executive bodies and approved by order 28.04.2014 №10-p, the "Work plan for the preparation of regulatory legal acts providing realization of the Protocol on strategic environmental assessment to the Convention on the Assessment of the Environmental Impact in transboundary context at the national level". The plan means amendments to the legislative acts of the Russian Federation on environment, environmental assessment, the continental shelf of the Russian Federation, the exclusive economic zone of the Russian Federation, internal sea waters and the adjacent Russian area, as well as adoption of a number of other act⁴. In this regard, the introduction of the SEAT is very relevant for considering the infrastructure projects and programs planned for implementation in the Arctic.

National Atlas of the Arctic (the Atlas) is the official publication, made in accordance with the list of the orders of the President V.V. Putin № Pr-1530, 29.06.2014 and the order of the Government of the Russian Federation № AX-P9-5271, 07.15.2014. The Atlas is a fundamental integrated cartographic printed product of information, scientific and applied nature, containing a set of mutually agreed information about the geographic, environmental, economic, historical, ethnographic, cultural and social specialty of the Russian Arctic designed for a wide range of academic, administrative, economic, defense, scientific, educational, cultural and social activities. Environmental atlas section should reflect the current state of the environment, to give an idea of the dynamic characteristics of objects and phenomena in the Arctic region. The main problems lie in the environmental section and they are of interdisciplinary and cross-border nature. The complexity of systematisation of information, that is diverse and often difficult to spot and compare. This section should give a comprehensive description of natural resources, environmental conditions, factors and results of human impact on the local environment.

Complex solution for Environmental section will help to overcome the disconnect between the main areas of environmental challenges, to provide initial information for decision-making, to

⁴ O proekte struktury Strategii ekologicheskoy bezopasnosti Rossijskoj Federacii na period do 2025 goda // Zapiska Departamenta mezhdunarodnogo sotrudnichestva Minprirody Rossii № 10/0341 ot 16.06.2014.

create an information and analytical framework for addressing environmental challenges of the Arctic region.

It is advisable to ensure the preparation of maps on the following topics:

1. Environmental problems.
2. The accumulated environmental damage. "Hot" points of AED.
3. Problems and forecasts of climate change.
4. Dumping (dumping of waste at sea).
5. Wrecks.
6. Flooded solid radioactive waste.
7. Flooded nuclear submarines and other radioactive objects.
8. Disposal of explosives and ammunition.
9. Cross-border transfers of radioactive waste in oceans and rivers.
10. Disposal of waste in the sea.
11. Waste water discharges.
12. Dumping of soils.
13. Peaceful underground nuclear explosions.
14. The role of demilitarization in the pollution of the Russian Arctic.
15. The central polygon of the Russian Federation.
16. Impact of transport and energy on the environment in the Arctic.
17. Areas of natural and man-made environmental problems (Arkhangelsk, Iultin, Norilsk, Talnakh, Murmansk, Kola Bay, Monchegorsk, Pechenga, Nickel, Varandey, Deputatsky, Kuzomenie, Shoyna and etc.)
18. The sources of pollution affecting the Arctic outside of the Russian Arctic.
19. Environmental problems of defense potential recovery.
20. Economic problems of environmental management.
21. Specially protected areas.
22. Effect of abandoned industrial sites and settlements in the Arctic
23. The sustainability of the territory and waters in case of oil spills.
24. The problem of gas hydrates, forecasts for the impact of climate change.
25. The role of environmental NGOs in the Arctic zone of the Russian Federation.

According to the results of own work in the Russian Arctic during the expeditions in 2011–2013, SOPS offered analytical and photographic materials that could be used for the National Atlas of the Arctic.

Assessing the impact of dumping on the Arctic environment

All countries that have access to the sea, did or still do the dumping of various materials, in particular soil, excavated during enforcement work; industrial waste; solid waste; construction waste; sleep-sled ships; explosives and chemical substances; radioactive waste in the waters of their internal seas. [3] Marine environment enables dumping, being able to process large quantities of organic and inorganic substances without great damage to water. However, it should be noted that this ability is not unlimited and therefore dumping is seen as a necessary measure.

In varying degrees, the effects of dumped materials are visible for all organisms that live in the ocean, and are included in the trophic chain. Organizing the waste control at sea makes it crucial to choose the areas of dumping, to define the dynamics of pollution of water and sediments. In order to identify possible volume of pollution at sea, calculations of all polluting substances in dumped materials should be made. The main international act to regulate and limit the dumping is the Convention on Marine Pollution by Dumping of Wastes and Other Matterials 1972 with its 3 annexes (the London Convention). The London Convention has been ratified by the Soviet Union on the 15th of December 1975, and in accordance with paragraph 2 of the Article XIX the Convention was entered into force in the USSR on the 29th of January 1976.

In 1996, the Protocol to the London Convention was agreed upon (The Protocol 1996) to give a modern character to the Convention and eventually replace it. Within the framework of the London Convention and the Protocol 1996, the Contracting Parties should provide following activities:

- a) improve the compliance of the London Convention, with the emphasis on collaboration and cooperation and following the sanction regime for non-compliance;
- b) further improvement of scientific assessment of the environmental acceptability of wastes proposed for dumping, including monitoring, evaluation options and removal;
- c) development of a guide for the construction of artificial reefs and use of best available technologies for the implementation of this Protocol;
- d) activities in the field of technical cooperation and assistance are a priority issue on the agenda and if possible it should be carried out in cooperation with similar programs under other agreements;
- e) regular review of the long-term program of work and strategies in the field of technical cooperation and assistance;
- f) assistance in the removal of the threat of ocean acidification and permanent storage of carbon dioxide in geological formations under the seabed are expressed in caution against broad--

scale pollution of oceans as well as the idea of storages for carbon dioxide, since the current level of knowledge in the field of efficiency and potential of the environmental impact of such a process is not sufficient⁵.

An important aspect of the implementation of Convention obligations is: the account of the burial places; check-in; dumping operations at sea; submission of annual reports on all permits issued for disposal of waste and other materials at sea, along with their type and quantity; providing an annual report on the monitoring and its major results. All damping with the aim of disposal can be devided by the following:

- a) soils — a result of dredging or other mining engineering;
- b) petroleum hydrocarbons — a result of the activities of oil production and transportation, fleet activities;
- c) organochlorine compounds;
- d) heavy metals — a result of human activities;
- e) explosives — a result of direct disposal of ammunition, flood combat and transport vehicles, mining of the Arctic seas during the Great Patriotic War from Pechenga to the mouth of the Yenisei River by the German fleet;
- f) radioactive substances, the disposal of liquid and solid radioactive wastes, flooding emergency reactors and submarines, large-sized elements, cops construction of nuclear facilities, nuclear weapons, etc .;
- g) for the coastal zones of heavy traffic: a separate group of wastes is wrecks and vessels written-off from the Register as emergency wrecks are disosed in the area from the Kola Peninsula to Chukotka, including the Pacific Coast [3, 4].

An important role in the pollution of sea water is played by rivers. Russian Arctic seas – receivers of the runoff waters from the major rivers of Eurasia and they contain the mass suspensions and water pollutants. Some of them are radioactive and they are collected in the vast water catchment areas.

For the purposes of the safe use of resources in the Arctic zone of the Russian Federation, it necessary to fully explore and keep up to date the information on resources and pollution dynamics for all elements of the ocean environment — water, sediment, aquatic vegetation, marine life and beaches.

⁵ Konvenciya po predotvratsheniyu zagryazneniya morya sbrosami othodov i drugih materialov 1972 g. s popravkami 1993 g. Moskva, Vashington, London, Mexiko, 29 dekabrya 1972.

It is necessary to assess the ways and reasons of pollution of the Arctic seas of Russia and the complex sources of pollution, the concentration of pollutants, their distribution, the mass of pollutants, seasonal changes and the dynamics, the composition of materials' flows. The overall assessment of the factors affecting the state of the Arctic seas should note that the territory of Russia is the main but not the only source of pollutants. Transfer of pollutants is not only a result of the river water flows or underground flows, but also it is a result of transboundary air and water transfer, including the one from the Atlantic Ocean [5]. In the past 25 years, this issue has not been given sufficient attention. The main source of information on the pollution of the Arctic, results of the dumping were made by the foreign organizations "Bellona" and "Greenpeace", but their report are rather doubtful due to the objectivity and representativeness of the information.

According to the Development Strategy of the Russian Arctic and needs to ensure national security for the period up to 2020, the priority direction of development of the Arctic is to ensure the environmental safety. The past years of works on inventory and elimination of environmental damage in the Russian Arctic had shown the need to organize the coordination of activities of Rosprirodnadzor, Rosatom, Roshydromet, the Russian Defense Ministry, the Northern Fleet of the Russian Navy, EMERCOM, the Russian Space Agency and non-governmental environmental organizations to create an integrated database of objects and dumping areas and their effect on environmental safety in the Russian Arctic and the Arctic ocean.

The Arctic development program for the elimination of accumulated environmental damage

Regarding AED it is important to have an assessment of human impact on the environment in the Russian Arctic, based on an inventory of sources and facilities of such an impact; to collect information about the pollution of environmental components and violation of the ecosystems. In 2013, the Council for the Study of Productive Forces, under the Russian Ministry of Natural Resources carried out a project "Assessment of accumulated environmental damage in the Arctic zone of Russia and threats to the environment caused by the expansion of economic activities in the Arctic, including the continental shelf and the regions of the Russian presence on the archipelago of Svalbard" [5]. Because of the tight deadlines the research had a largely cameral character with a travel of specialist to the particular regions (Murmansk and Arkhangelsk Region, Yamalo-Nenets Autonomous Okrug, Nenets Autonomous Okrug, Chukotka Autonomous District). A part of the research was a study of the priority environmental projects and investments in effectiveness done by both Russian and foreign investors (including preliminary technical, economic and environmental ones); a study of reasonable measures, technical and eco-

nomic assessment of rehabilitation of the areas in order to minimize human impact on the environment during the Russian presence on the archipelago of Svalbard.

The solution of these tasks could be performed on the basis of an analysis of previously accumulated knowledge of the anthropogenic impact on the environment in the Russian Arctic and extending this knowledge by linking the quality of the characteristics of the environment with the sources of pollution, and polluted areas ("hot spots") with the past and current activities. The most complete information base of "hot spots" in the AZRF and objects of accumulated environmental damage has been done and now it is the basis for strategic planning of environmental activities in the Russian Arctic.

Tasks to eliminate AED could be solved within the framework of a special task-term program. Relevant work in this area was conducted by the Ministry of Natural Resources, which allowed to start the formation of the Federal Target Program (FTP) " Elimination of the accumulated environmental damage 2014—2025". The purpose of the program is to improve the quality of life of citizens, to reduce the amount of accumulated waste, to eliminate the objects of the past environmental damage, as well as to engage and reclaim tens of thousands of hectares of contaminated land in the economic turnover. The federal target program included more than 100 regional projects, the total cost of the program is 218 billion rubles. Co-financing of the projects comes from the budgets of regions and it is provided with regard to their budgetary security⁶. Due to various reasons the work on the harmonization of the federal target program has stopped at the stage of agreement and no practical measures for the elimination of AED had been taken in the whole country, including in the Arctic regions. Ministry of Natural Resources of Russia continues to work in this direction through the implementation of the approved set of priority issues incorporated to eliminate negative impacts on the environment as a result of the past economic and other activities which included activities on the territory of the Russian Arctic, Far North and the locations of a number of protected areas⁷.

It should be noted that in the period 2011—2015 there was a work carried out to assess the AED and to clean some areas in the Arctic: archipelago of Franz Josef Land, Vrangel Island, settlement of Amderma and Svalbard. This important mission was carried out by various organizations under the Russian Ministry of Natural Resources. Of interest is an initiative of the Govern-

⁶ Proekt Federalnoj tselevoj programmy «Likvidaciya nakoplenного экологического ущерба» na 2014—2025 gody. M.: Minprirody Rossii, 2013.

⁷ Kompleks pervoочередных мероприятий, направленных на ликвидацию негативных воздействий на окружение в результате прошлой экономической и иной деятельности (утверждён распоряжением Правительства Российской Федерации от 4 декабря 2014 г. № 2462-р).

ment of the Yamalo-Nenets Autonomous District: in 2012 it organized a geo-environmental survey Bely Island and in 2013 it began to clean up the island. At the same time, the experts, who were responsible for the organization of the survey, used methodological approaches and materials of COPS for geoecological survey on pollution of the Franz Josef Land and for working out the appropriate program for their cleaning [6].

Conclusion

Summarizing all said above, it is relevant to underline the following directions for research and environmental security measures in the Arctic:

1. Development of Environmental Security Strategy for the development of the Arctic until 2030.
2. Carrying out a strategic environmental assessment of policies and programs, large infrastructure projects in terms of their impact on the Arctic environment and possible damage.
3. Creating environmental unit within the National Atlas of the Arctic taking into account the areas of environmental sensitivity to oil spills and other negative impacts on the environment.
4. Evaluation of the impact of dumping on the Arctic environment, social and living conditions of indigenous peoples, taking into account the transboundary transport of pollutants.
5. Development of a program (subprogram) for elimination of accumulated environmental damage in the Arctic.

Implementation of the proposed research will contribute to:

- a) improvement of the ecological status of the Russian Arctic and North;
- b) the conservation of biological diversity;
- c) the implementation of international commitments, improvement of the country's environmental image;
- d) the creation of conditions for replication of experience on cleaning the Arctic territories in other regions;
- e) the effectiveness of the state property use (functioning of the Northern Sea Route, fisheries and eco-tourism).

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PROBLEMS OF THE NORTHERN SEA ROUTE DEVELOPMENT

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Driving forces and development problems of cargo flows along the Northern Sea Route¹



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Abstract. The author analyzed the trends and prospects of the Northern Sea Route. The main problem is that this rather complex system is influenced by many factors, often contradictory and poorly predictable. Thus, the increase in demand for energy and resources determines the overall need for the development of the Arctic shelf. However, the possible cooling and worsening of the ice conditions may adjust to the possibility of transporting of the resources to the Asia-Pacific market, for instance. In this regard, along with the methods of factor and economic analysis the expert approach was used for the study. Its main result is a package of proposals aimed at supporting the Arctic marine cargo flow.

Keywords: *Arctic, marine freight traffic, economy, resources, shelf, factors, icebreakers, climate, program*

Introduction

The main objective of the study is to analyze the trends and to assess the prospects of development of sea lanes of the Russian sector of the Arctic. Scientific novelty and relevance are determined by the undertaken factor analysis and the model of scenarios. The functioning of Arctic communications and their fundamental element — the Northern Sea Route is a subject for research made by Yevdokimov G., Kozmenco S., Mikhailichenko V., A. Pilyasov and some other Russian authors, but recently no attempts to integrate the assessments had been made. Serious foreign research in this area could hardly be distinguished.

¹ The article is a part of the project carried out under the RSSF grant № 15-02-00540 “Teoreticheskie osnovy i mehanizm soglasovaniya gosudarstvennoj, regionalnoj i korporativnoj innovacionnoj politiki v Arktike” and the RSSF grant № 15-02-00009a “Modernizaciya sistemy transportirovki arkticheskogo prirodnogo gaza v usloviyah geoekonomicheskoy i politicheskoy nestabilnosti stran-tranziterov”.

Analysis of the traffic flow along the Northern Sea Route

At the end of the XX century in the country's economy showed a radical change associated with its transition from a management target criterion to the criterion of economic efficiency. This shift affected the Arctic marine transport dramatically: its peak was in 1987 (around 6.5 million tonnes), in 1999 it decreased to 1.6 million tonnes (4 times less), while in the east part it decreased in 40 times (to 30 thousand tons). In recent years there has been a gradual increase in freight traffic, including transit, but it clearly does not meet the geo-economic challenges and opportunities in the Russian Arctic.

In the Barents Sea, due to the development of Varandey field in 2010, there was 7,5 million tons of oil transferred. The sharp decline (to 3.9 million) occurred in 2011 due to reduced production in the Ugnzo-Hilchuyusskoe field. However, this sector did not enter the waters of the Northern Sea Route, but it is a basic element of all traffic. Until 2010, freight traffic via the NSR did not exceed 2 million tons, over 80% of them were in the Kara Sea due to the activity of JSC "Norilsk Nickel" and export of oil and gas condensate from the Gulf of Ob.

Volume of transportation along the Northern Sea Route in 2011 was 3,1 million tonnes according to the NSR administration, including the export of 806 thousand tons — 26% of all traffic; delivery of 1471 tonnes — 47.2%, taking into account the international traffic on the Northern Sea Route; transit of 834 tons — 26.8% of traffic [1]. in the areas adjacent to the NSR, the flow of cargoes in 2011 was mostly done via the ice covered areas (in accordance with Article 234 of the UN Convention on the Law of the Sea with respect to the waters of special regulatory conditions) in the Pechora Sea (south-east of the Barents Sea) — 3,9 million tons and the northern part of the Bering Sea — 415 thousand tons. In the Arctic the total flow of cargoes, taking into account the transportation within the borders of the NSR (3 111 thousand tons) and the adjacent regions (4 315 thousand tons), was nearly 7.5 mln. tons. It should be noted that the transit along the Northern Sea Route is not transportation between foreign ports. In 2011, there was no such type of transportation at all and in 2012 — just one. The main traffic flows run between the port of Murmansk and the ports of Southeast Asia, 14 time the carriage of good had been done by the vessels with a deadweight of over 20 thousand tons, 10 — with a deadweight of more than 70 tons: Murmansk — Chinese ports: 492.7 thousand tons; Murmansk — ports of South Korea: 231 thousand tons. Murmansk — Bangkok (Thailand): 90.3 thousands tons.

In 2012, traffic grew to almost 4 million tons, including the transit: from 0.8 to 1.2 mln. tons; the trend of the traffic is growth. In 2011 we had only 34 transit flights with 834 thousand tons of goods, the next year it was more than 1.27 million tons and 46 flights. Basic goods were

sent from the port of Murmansk to the Asia-Pacific market with the following characteristics: 1) China: imports of gas condensate — 181 thousand tons; imports of iron ore — 262 thousand tons; export of general cargos — 30 tons 2) South Korea: imports of gas condensate — 303 thousand tons; export of aviation fuel — 198 thousand tons 3) Singapore: fuel oil import — 45 thousand tons [1]. In 2012, due to changes in the situation on the European and, especially, on the Northern-American markets it has been carried out the first (in the full sense of the word) transit voyage from the port of Hammerfest (Norway) to Hangzhou (China) port. It was made by the only gas carrier in the world of ice-class "Ribera Del Duero Knutsen" with a tonnage of 173.4 thousand m³. However, in 2012, the highest level of so-called second transit along the Northern Sea Route was reached. In 2012, as it has already been mentioned, we had flights (1,270 thous. tons), in 2013 — only 33 flights (1,160 thous. tons) and in 2014 — 24 flights (240 thous. tonnes)². It should be noted that they were significantly higher in the waters of the North Sea Route — in 2012, about 4 million tons, including the export of oil from the Gulf of Ob — 1.5 million tons, to ensure the functioning of the Norilsk industrial area (to ensure the Kola MMK with the fineshteik) — about 0.6 million tonnes, plus the export of wood and short sea shipping. Only the icebreaker "Krasin" (Far Eastern shipping company) provided the assistance in the eastern sector of the NSR for 37 ships which brought 125 thousand tones of cargoes, and took away about 105 thousand tons, including the garbage collected during the cleaning program in the Arctic. Wood is widely exported to many countries and the geography of export is constantly expanding. The main importing countries are Belgium, Germany, Great Britain, Hungary, the Netherlands, France and other EU countries. Deliveries are carried out to Turkey, Iran and some Asia-Pacific countries. Although the total amount of cargoes is not more than 500 thous. tons and it is not comparable, of course, to hydrocarbons, but wo transportation along the NSR amounts to hundreds thousands of tons.

Separately we consider the transport in the Barents Sea, related to the Arctic water areas, but not within the NSR area. Thus, the company "Lukoil" built offshore ice-resistant loading terminal (IRLT) with a capacity up to 12 mln. tons per year. Marine terminal is for shipment of oil produced in the Timan-Pechora province, and it is located in the village of Varandey in the Nenets Autonomous District. The oil is transported from Varandey oil in small shuttle tankers to the port of Murmansk to raid collector "Belokamenka" for further export. IRLT was put into operation in 2008. The terminal is operating all the year round, in winter they use icebreaking vessels. Established Arctic marine oil transportation system has no analogues in the world, in addition to the

² Severnyj morskoy put v 2014 godu. URL: http://www.arctic_info.ru/tag/severayj_morskoy_put (Accessed: 10 February 2015).

Varandey oil terminal, it includes inter-field pipeline with the length of 158 km, the shore tank farm with capacity of 325 thousand m³, pump station, energy-supply of the objects, and supplying fleet of three shuttle tankers with a deadweight of 70 thousand tons, an icebreaker, tug and raid transshipment complex with a capacity of 250 thousand tons, as well as a village for workers. The shipment of oil from the terminal started in 2008 and in 2009 reached a peak of 7.7 million tons. After that, production volumes began to decline and in 2012 they amounted to 3.9 mln. tons, in 2013 — 2.9 million tons. In 2014, the level shipment was about 3 million tons. Shipment was carried out by shuttle tankers to the Kola Bay and then the oil was sent to European customers³.

In 2005, we began to implement the project for Prirazlomnaya in the Pechora Sea. The "Sevmash" company (Severodvinsk) reconstructed the first offshore ice-resistant platform in the country (OIRP). Its installation had been repeatedly postponed and was completed only in 2014. The maximum production of the project is 9-10 mln. tons during the next three years. The transport system had been ensured and transportation of oil has been listed in the previous section.

The main Russian maritime transport company in the Arctic is "Sovremenniy komerchesky flot". Today, a third of the fleet of the company has the ice class — it is the largest, youngest and technically advanced tanker fleet in the world. It is not surprising that the company has already developed a long-term cooperation with the leading oil and gas companies such as Gazprom and its units, Exxon Mobil, Vitol, Glencore and etc⁴. Currently, "Sovkomflot" is the leading company providing transit navigation along the Northern Sea Route — the perspective offshore route that shortens the route from Europe to the Asia-Pacific region. Thus, in the period from 2010 to 2013, the ships of the company made seven voyages between ports of the European continent and South-East Asia and transported 360 thousand tons of hydrocarbons and 67 thousand tonnes of iron ore concentrate.

In August 2010, a large-capacity Aframax size and Arc5 (ICE-1A Super) ice class tanker "Bal-tica" passed along the route Murmansk (Russia) — Ningbo (Cina). The tanker with a deadweight of 117 thousand tons was the largest ship ever worked in the Arctic region and it proved the possibility of large-scale ship-navigational operations along the Northern Sea Route. The duration of flight was 22 days, 8.4 days the tanker had been moving along the Northern Sea Route. Time saving, in comparison with the path through the Suez Canal, was 18 days. In 2011, an even larger Suezmax size and ice class Ags4 (1se-1A) tanker "Vladimir Tikhonov" with a deadweight of 163 tons passed through the route: to the north of the New Siberian Islands, breaking through the ice for more

³ Varandejskij terminal. URL: http://www.arctic_info.ru/ProjectsPage/varandeiskji-project (Accessed: 21 February 2015).

⁴ Arktika pokoryaetsya umelym // Port-news: portovyj servis. Otchet 2014. S. 22—25.

than 2 thousand miles along the Northern Sea Route for 7 days. The duration of the flight along the route Murmansk (Russia) — Maptaphut (Thailand) was 28 days. Saved time — 8 days. So, a new deep-water route applicable to navigation of vessels with a deep draft has been approved. Thus, the relevance of the commercial shipping along the Northern Sea Route has been approved as well⁵. In November 2013 the tanker of the ice class Ice-2 (1C) "Viktor Bakaev" passed along the Northern Sea Route to the West during the period of intensive ice formation. The possibility of a large tanker navigation of a lower ice class was proved by using the tactical ice navigation: improved interaction with icebreakers escort and the correct choice of route.

In 2013—2014 Russian "Sovkomflot" built four gas tankers of Arc6 class for the project "Sakhalin SPG", and in the future (2016) — for the "Yamal SPG". At the same time, the company "NOVATEK" plans to place an order for the construction of 10 gas carriers at the Japanese and South Korean shipyards, the company intends to use them for the transportation of liquefied natural gas from the Yamal Peninsula.

In accordance with the Strategy of development of the Russian Arctic and national security until 2020, one of the most important tasks is improvement of transport infrastructure in the Arctic continental shelf development areas in order to diversify the main supply routes of Russian hydrocarbons to the world markets. It may be noted that the turnover of goods along the northern routes is taken as one of the main characteristics of social and economic development of the Russian Arctic.

Factor analysis of the cargo flow along the Northern Sea Route shows that the action of various forces is rather contradictory. Especially in terms of forecasts, both the near and long-term perspective. Thus, climate change, as the experts say, and warming may cause "icebreaker free shipping" in the Kara Sea for the Arc7 class vessels with ice passability up to 1.5 m. by 2020. Some conflicting forecasts exist as well. Some experts predict cooling in the next 5 years, which was typical for the end of the last century, when in the Kara Sea icebreaker assistance was needed from December to May. Accordingly, in the eastern sector of the NSR the thickness of the ice cover could range from 2 to 3 meters, and the ice class requirements for icebreakers could be changed [2].

Experts note that Arctic navigation of recent years have shown that climatic conditions make the passage of cargo ships along the Northern Sea Route to the various ports of Southeast Asia 7—22 days shorter, compared to the use of the Suez Channel, and it is an important pre-economic assets. The fee for icebreaking vessels along the NSR and a new flexible fare could be equated to payments for the passage via the channel. Increased insurance when sailing on the Northern Sea Route in view of risk of ice damage can be compared with in elevated insurance at

⁵ Ibid.

Aden strait passage (meeting with the pirates). Additional expenses while passing the NSR are the cost of ice pilot, but it is not very high, about 10 thousand USD per flight. On this basis, we can assume that the time-saving voyage is equivalent to a reduction of the shipowner's cost of 250—900 thousand USD per flight, depending on the volume and type of goods [1, 3, 4].

The “failure” in the transport system of the Northern Sea Route in the 1990s was caused by the transfer of the national economic system from the principle of state expediency to the principle of economic efficiency. Accordingly, the state support of the NSR was sharply reduced. And the development of the transport system is on the principles of efficiency requires a large-scale increase in freight traffic.

It could be ensured *by transportation of hydrocarbons*. Currently, they make up more than half of all traffic along the NSR, and taking into account the Barents Sea (not included in the waters of the NSR, but it is the Arctic sea) it is up to 70%. However, the world's energy demand is reduced, but hydrocarbon prices have different volatility. According to the US Department of Energy Information (EIA), the global oil production, including gas condensate, grew by 15.7% in 1996—2005. Over the past 9 years (2005—2014), despite high oil prices and investments, the production grew up by only 5.3%⁶.

The situation with the hydrocarbons could be considered with the use of liquefied natural gas. Traditionally, natural gas is considered an energy raw materials and local consumption was provided exclusively on pipes-enforcement until 1990. The breakthrough came in the early 1990s, when they technology of mass production and delivery of liquefied natural gas (LNG) was invented. Production of liquefied natural gas in 1995 was less than 10 million tons. In 2012, LNG trade had amounted to 236,3 million tonnes [5]. Commercial liquefied natural gas (LNG) had been increasingly taking the global market. Goldman Sachs Experts accounted that in 2015 the global LNG trade volume exceeded \$ 120 billion, passed ore and had become the second after oil. [6]

The Russian Federation is currently producing approximately 12% of global oil and 18% of natural gas. According to leading experts in the near future, Russia's oil production will begin to decline, even taking into account the entry into active phase of development of Arctic fields in the Nenets Autonomous District and the Pechora Sea. Russia's share in the global LNG market today is less than 5%, the target task for the next 20 years is to reach 12% of the total market volume⁷. If at the end of 2012 the share of our country global gas production amounted to 17.6%, in the global LNG trade — only 4,5% [5]. It is known that Gazprom has postponed the Shtokman project and the

⁶ Manukov S. Pyat syurprizov dlya energeticheskogo rynka. 3 yanvarya 2016. URL: <http://expert.ru/2016/01/3/pyat-syurprizov-kotoryie-mogut-zhdat-energeticheskij-ryinok/?ny> (accessed: 05 January 2016).

⁷ SPG 2015. URL: <http://www.creoneenergy.ru/consulting/detailConf.php?ID=115315> (Accessed: 05 January 2016)

construction of LNG plants on Yamal (Kharasaveyskoye deposit). But there was an innovation project “Yamal SPG” by OJSC “NOVATEK”, the largest independent and second on volumes of natural gas producer in Russia. The project is planned to develop the Ugzno-Tambeyskoye condensate field on the Yamal Peninsula and build a LNG plant. Under construction is Sabetta port in the Gulf of Ob on the Yamal Peninsula.

Arctic sea transportation of oil are going to be done in the western sector of NSR in the foreseeable future (Barents and Kara Seas) and unlikely will not exceed 40 million tons. More attractive in terms of growth and the state of relations with the Asia-Pacific market, and even in terms of warming variant means (optimistic variant) that the eastern sector of NSR will be available for shipping without icebreakers during 5–6 months. Asia-Pacific LNG market is poorly accessible due to high transport costs and general economic risks of the delivery from Western Siberia and from the Barents Sea. Pacific market is far away, and icebreaker support in the Arctic transport system is necessary almost all year round. North American market is Russia's most preferred because at European market we are actively strengthen “pipe” communication. However, the CAP will be at least “insensitive” to exports in connection with own resources until 2030. In addition, the closest neighbor and ally of the US is Canada and it has oil reserves that are three times superior the reserves of Russia. Heavy oil, mostly asphalt, but technological progress rapidly improves the development of such deposits. Finally, we must not forget the traditional “no confidence” in the Russian production, a specially strong in times of crisis and cooling of relations.

Selected strategic issues for Arctic freight traffic is *the state of the icebreaker fleet*. It consists of (federal ownership) six atomic and five diesel-electric icebreakers. However, by 2022, the period of active development of the Arctic shelf, only half of them will remain. The newest nuclear powered icebreaker “50 Years of Victory” had been building for almost 20 years in conditions of constant shortage of funds, we can understand the seriousness of the problem. It should be borne in mind that the cost of an icebreaker can reach 1 billion US dollars, and the linear icebreaker — 1–2 billion US dollars. Currently, the Transport Strategy of the Russian Federation for the period till 2030 envisages the construction of three universal atom icebreakers of LA-60YA class able to operate on the ice of 2.8 meters thick, and in the shallow waters of the mouth of the Yenisei, the Ob Bay and other coastal areas of the Arctic seas. They will replace icebreakers type “Arctic” and “Taimyr” in ice pilotage. Obviously, this is not enough for all year-round exports in the Arctic zone of the Russian Federation, if its volumes will be millions and tens of millions of tons. Advertised transit scheme are now calculated for the summer period (July-September) and are unsuitable for mass-production of LNG requiring the 100% availability of the NSR [7].

Another problem is connected with the ice assistance and the width of the channel. Ice-breakers of the "Arctic" type make an ice channel of 33—34 meters, while the width of the "Panamax" class tanker reaches 40 m (deadweight up to 80 thousand tons), "Snesmax" — 50 m. (deadweight up to 200 thousand tons). By the way, this same class include modern LNG carriers, tonnage of which reaches 170 thousand tons. Already mentioned icebreakers LC-60YA class will create a channel width of 37—38 meters, so the question is about the new icebreakers type LK-110YA able to overcome the ice up to 3.5 meters thick and assist the «Panamax» class ships in any ice conditions (channel 43—44 m). Theoretical and experimental studies allowed to offer new innovative technical means (RF patent) for routing wide channels (50 and more) in the ice. Such channels could be used by almost all large vessels,in all conditions, including ice compression. Creating traditional icebreaker of 50 m wide leads to a significant increase in resistance of the ice and therefore larger power consumption. Therefore, when creating a new one, the most important task is to reduce ice resistance [7].

This task was accomplished by creating a new icebreaker as multiply structure on a single platform. The proposed icebreaker has three or four bodies, relatively small ones, so the total area of the ship is considerably less than the width of the channel created by the icebreaker. The proposed construction individual parts of the body do not overlap. This arrangement allows to create favorable conditions for breaking the ice. Each of the airborne corps operates on the "cleavage" in the channel, made by the head of the icebreaker. As it has been shown in research, assisting the large vessels in the channel can reduce the ice resistance by up to 40% compared to the previous version of the icebreakers' construction. Thus, due to the special onboard accommodation buildings managed to achieve a further reduction of the ice resistance and therefore energyl costs for laying a broad channel. The proposed technical solution passed comprehensive testing in the laboratories of the Krylovsky state scientific center. The research focused on the indicators of the ice propulsion and control of new icebreakers and its ice resistance. Currently preliminary design of a new icebreaker is almost ready. [7]

The shelf development, especially in view of possible climate changes, can lead to quite optimistic scenario. It may be noted that the transportation in the eastern part of the NSR and transit won't achieve considerable size in the next 10 years. With regard to 2025 and a more distant perspective, there may be a positive trend, especially if expert opinion on the warming and changing the ice conditions in the Arctic will be true. The optimistic scenario means warming the ice cover in the Arctic and the ice could become smaller and thinner. Navigation would be improved not only along the sea routes, but also along the coastal zone and the main rivers strengthening the ca-

pacity for the development of water transport, trade and tourism. The Northern Sea Route may become one of the major freight routes on the globe, and the reduction of the ice cover could be conducive to the development of oil and gas offshore. However, experts warn about new risks. Under the influence of combined factors such as rising sea level, melting of permafrost, and strengthen impact of the waves as a result of increase in the area covered by water, could increase the erosion of coastlines in the Arctic. All this creates a very dangerous impact on the entire infrastructure, especially ports [2].

Expert survey on the problems of NSR

Taking into account all these circumstances, quite conflicting results we get from the expert survey, which was conducted in the course of the scientific-practical conference "Economic research in the North: From the Past to the Future", held at the Institute of Economic Problems (2011). We offered conference participants the questionnaire devoted to the state policy in the North. The survey was filled by the 34 participants, including 9 doctors of sciences, 18 candidates of sciences and 7 specialists without a degree. The most representative part came from research organizations (17 pers.), ten specialists were working in higher education, 4 — in the bodies of regional and municipal authoritiesl and 3 — in production plants.

A large group of questions was devoted to the perspectives of the Arctic shelf and the NSR development, which were important for the forecasts. In general, the possibility of gas production at the offshore fields in the Arctic was estimated quite positive: over 70% of respondents in 2011 believed that on the shelf there will be produced from 100 to 200 billion m³ of natural gas by 2025. Development of the fields of the unique Kara Sea was most likely to start in 2025 or beyond (68% of respondents), the earlier periods noted 32% of the participants. With regard to the construction of a liquefied natural gas (LNG) plant on the Kola Peninsula, the firm confidence was expressed by 59% of the experts, but the timing (2020 or 2025) and possible power (more than 25 or more than 35 million tons) were different. 40% of respondents believed that it was possible to build an LNG plant on the Yamal Peninsula (Kharasavey settlement), and more than 50% did not give any answer. 55% preferred the export to the Asia-Pacific region (APR), and 40% — to North America.

The survey raised a question about the possibility of transportation along the NSR by the 2020. Rather, we asked for the most sophisticated NSR sector (from Vilkitsky Strait to the Bering Strait), where in 2011 the total volume of cargos amounted to only 1,0 million tons. The answers showed that the total cargo traffic in 2020: for 60% of the experts would not exceed 3 million tonnes and for 30% of experts — 3 to 10 million tons. The volume of transit traffic in Western and

Eastern sectors were evaluated as 1 million tons (by 85% of experts). It should be mentioned that as a transit we examined all transportation of goods to foreign ports.

Thus, a sufficiently high volatility of factors did not allow us to identify certain statistical correlations and forced to take some extreme expert scenarios. So, in *the worst case scenario*, we get the following:

- a) in the next five years cooling begins and ice condition worsen to the levels of 1980s—1990s;
- b) the world market is not experiencing a high demand in oil, demand is growing insignificantly, but the prices are not conducive to large-scale development of the Arctic shelf;
- c) as a result of the project “Yamal LNG” was completed at the first stage (16,5 million tons); Novoportovskoye deposit is being developed by the minimum variant; Stockmann project is not working (no output);
- d) transit traffic grow slightly (no more than 2—3 times with respect to 2014); home traffic (including cabotage)and the “northern delivery” are slowly growing;
- e) the development of the nuclear fleet is limited to the construction of three icebreakers of LK-60YA type by 2025 and then 2—3 same vessels by 2030, so the NSR has 4—5 icebreakers along the route at the same time.

Accordingly, in the *optimistic scenario* the climate and ice conditions are extremely favorable, the global markets are growing, and a rapid development of the shelf begins. “Yamal LNG” in 2025 will reach the capacity of 30 million tons. Correspondingly, icebreaker fleet and the whole structure of the NSR develops. Obviously, these two versions have a number of variant in between and, consequently, the same does the NSR dynamics. We do not consider it necessary, given the stochastic nature of the dependencies, to carry out some “average” calculations and have “realistic” scenario — although it can really be obtained by “averaging”. However, specific changes and any surprises are possible, so it is more practical to make changes to the options.

The significance of the study is an attempt to justify the impact of the separate macroeconomic processes, the situation in the global markets in particular, on the development of the Arctic Sea routes. From the methodological point of view, a certain novelty factor may be a compound of approaches and expertise, providing an organic analysis and forecasting. Regarding the application of the results, they should include the construction of scenarios and considerations on the development of the Northern Sea Route.

Conclusion

In conclusion, the provision of positive dynamics of cargo flows along the Northern Sea Route and the protection of national interests in the Arctic waters should be ensured by a set of measures:

- 1) Assessment of climate change and a system of maps for different ice conditions in the Arctic for the long-term perspective.
- 2) Development of integrated traffic forecast scenario for the Northern Sea Route for the period up to 2030, depending on changing conditions in major world energy markets.
- 3) Creating a favorable regime for international shipping, including the use of the port special economic zones; the establishment of the sea transit corridor “Europe – Asia”.
- 4) The adoption of the federal target program “Development of transport system in the water area of the North Sea Route”, which should include the following:
 - a) rehabilitation of meteorological and hydrographic support (control) throughout the NSR route;
 - b) improvement of the Arctic communications, especially in current ports (Khatanga, Dixon, Tiksi, Pevek, etc.) and the newly established (Indiga, Sabetta, Harasovey) in accordance with the prospective increase in freight traffic and transit;
 - c) the maintenance of the icebreaker fleet (including new construction) at the level of optional for transportation and assistance in changing ice conditions;
 - d) creation of attractive conditions for carriers along the Northern Sea Route (tariff regulation, insurance, security system, etc.).
- 5) Normative legal support of the “economy” of the sea communication, including the adoption of a system law “On ensuring the national priorities in the waters of the Northern Sea Route”.

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CALL OF THE HIGH LATITUDES

*Fridtjof Nansen: "The greatest value is the ability to wait".
We'll be alive if we can...*



Salted splashes of the sea / foto A.P.Oboimov, 2014 Arctic Expedition 2014 on the yacht "Apostol Andrey "

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Priorities of the strategic management and planning of the Northern Sea Route



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Annotation. The article is devoted to the analysis of the main socio-economic indicators of 10 subjects of the Russian Federation, with the coastal areas adjacent to the water area of the Northern Sea Route.

The author studied the strategy of socio-economic development of the North and Far East Russia. The planned development of the NSR provides alignment of a unified system of public-private management of transportation artery and the implementation of other strategic activities. It is necessary to establish a single governing body, modernization of the Arctic transport system, production of high-tech products and marine technology for the home market, building a rear port infrastructure, container terminals, customs warehouses and logistics centers.

Keywords: *Northern Sea Route, regions, development strategies*

The Northern Sea Route (NSR) is one of the determining factors of sustainable socio-economic development of the Arctic zone of the Russian Federation. At the same time NSR not only provides national security and strengthens Russia's geopolitical presence in the Arctic, but it is also an important transport corridor, a key element of the entire infrastructure. In this connection, not by chance, on the 8th of December 2015 at the session of the Commission on the development of the Arctic Marine Board at the Government of the Russian Federation, Dmitry Rogozin said that without a serious modernization of infrastructure of seaports, including checkpoints, providing them with modern logistic, energy facilities, the creation of modern systems of communication, navigation, maritime safety, the Northern sea Route and its competitiveness would not have any perspective [1]. Processing the updated integrated development strategy for the Northern Sea Route it is very important to consider the existing policy, its priorities and development of the transport corridor founded by the federal and regional documents.

Northern Sea Route in the strategic management and planning

Analysis of the main socio-economic indicators in 10 subjects of the Russian Federation¹, a part of the NSR, shows that a high proportion of regions in the total area of the territory of Russia

¹ NAO, Arkhangelskaya oblast, Murmanskaya oblast, YaNAO, Krasnoyarskij kraj, Respublika Sakha (Yakutiya), Kamchatskij kraj, Chukotskij avtonomnyj okrug, Primorskij kraj, Sakhalinskaya oblast.

(almost 49%) and a significant share in the total volume of extraction of mineral resources (almost 30%), these regions are characterized by low rates of population, employment and retail turnover, as well as the low rates of housing and agricultural production (*pic. 1*).



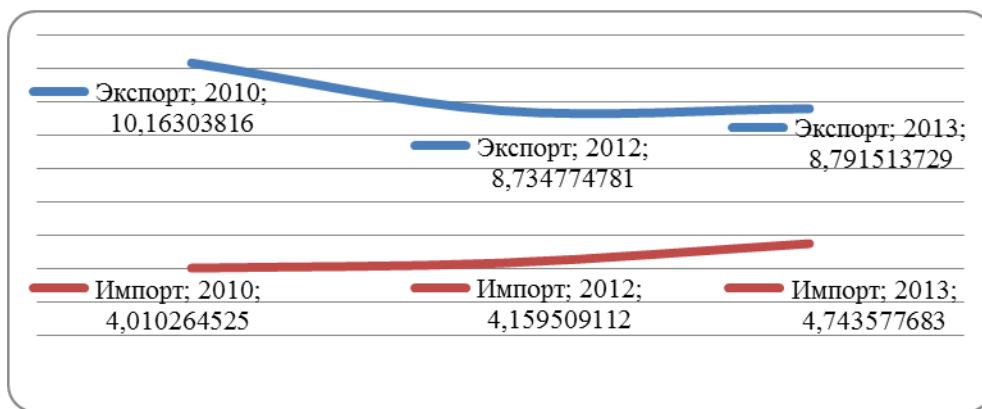
Picture 1. The share of 10 researched areas in the index of social and economic development 2013 , %²

Three biggest positions are: territory(49% of the RF), resource extraction (29%), investments in main capital (13.2%)

Similarly, not a high proportion of the studied regions and the total volume of foreign trade turnover with foreign countries (Table 2). For example, the proportion of the Nenets, Yamalo-Nenets, Chukotka Autonomous District, the Arkhangelsk and Murmansk regions, Kamchatsky Krai in the total volume of the Russian exports, according to Rosstat, does not exceed 0.5%. The volume of transit traffic through the NSR grew from 110 ths. tons in 2010 by more than 10 times in 2013 (1.16 million tonnes), a decrease took place due to a number of economic reasons in 2014 and the turnover was 274 thousand tons. The mining company, transporting bulk cargoes of the Kovdor from Murmansk could not reach an agreement on prices and transported 200 thousand tons less than in previous years. A gas company Novatek moved its business from Vitino port on the Kola Peninsula in the port of Ust-Luga near St. Petersburg — the enterprise sees no reason to use the NSR to transport gas condensate, as it was in previous years³.

² Regiony Rossii. Socialno-ekonomicheskie pokazateli. 2014, R32. Stat. sb. / Rosstat. M., 2014. 900 s.

³ Sohranit li Rossiya Severnyj morskoj put? URL: <http://www.rosbalt.ru/business/2015/03/01/1372205.html> (Accessed: 01 February 2016)



Picture 2. The share of 10 areas in foreign trade index, %. Blue line is export, red line is import

Targeted and integrated development of the NSR is capable of providing a wide diversification of the economy of the northern areas, it creates new jobs, stimulates the development of Russian oil and gas extraction on the Arctic shelf and maintains the pace of growth of the productive forces of the Far North.

The planned development of the NSR can not be achieved without building a single public-private management of transportation, determining organizational, legal, administrative, institutional and economic approaches. First, we should talk about the formation of a single governing body that would deal with the control and coordination of the activities carried out by the sovereign agencies and commercial organizations for the development of the NSR. According to the law adopted in 2012 № 132-FZ "On Amendments to the legislative acts of the Russian Federation regarding the state control of merchant shipping in the waters of the Northern Sea Route"⁴, it has been a number of measures for the development of the NSR, including the establishment of the administration in the form of a federal state fiscal institution (FSFI). Decree of the Russian Government dated by the 15th of March 2013 № 358-p: such administration has been established for the organization of sailing along the NSR. The main objectives of its activities are to ensure the safety of navigation and protection of the marine environment from pollution from ships in the waters of the NSR. You may notice that the powers reserved for the institutions that do not allow it to become the only operator on the development of the NSR.

For comparison, it is worth paying attention to the management model of the Panama Channel. Thus, the powers of the Administration of the Panama Channel are to ensure work, administration, management, maintenance and modernization of the Channel, as well as the implementation of related services, permitted by the legislation. The Panama Channel Authority is responsible for

⁴ № 132-FZ от 28.07.2012. "О внесении изменений в отдельные законодательные акты Российской Федерации в части государственного регулирования тарговогомореплавания в акватории Северного морского пути".

the management, maintenance, use and conservation of water resources of the channel in full coordination with the relevant governmental and non-governmental organizations⁵.

The existing system of public administration of the NSR is presented in the relevant documents on strategic and program-oriented federal and regional planning and looks like that (pic. 3):



Picture 3. NSR strategic management today

The main priorities of the NSR development are incorporated in strategic planning documents: "Strategy of development of the Russian Arctic and national security until 2020" ("Strategy 2020"); strategies of social and economic development of the RF subjects, in terms of improving the management and realization of specific projects in the social, economic and other spheres.

One of the complex socio-economic targets of the Russian Arctic listed in the "Strategy 2020" is the modernization and development of *infrastructure and the Arctic transport system*, which provides: excellence, availability of transport infrastructure in the areas of the Arctic continental shelf development, the restructuring and growth of cargo volumes for the NSR, improving the legal framework of the Russian Federation and the state regulation of navigation along the NSR, improving the management and safety of navigation in the Russian Arctic, the modernization of Arctic ports and the creation of new industrial complexes, governmental support of the "northern delivery", export of goods and products, establishment of modern information and telecommunication infrastructure. The development of infrastructure of the NSR and navy, including the icebreakers will solve the problems of transport maintenance in the Arctic and the Eurasian transit during the second phase (until 2020) of the "Strategy 2020".

⁵ Organic law Panama Canal Authority, Panama Legislative Assembly, Law no. 19 (of June 11, 1997). URL: <http://www.pancanal.com/eng/legal/law/index.html> (Accessed: 16 December 2015).

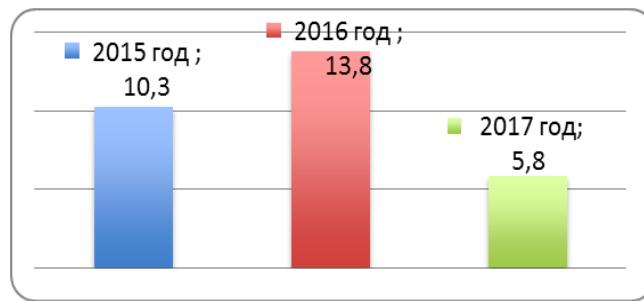
A key tool for the implementation of the "Strategy 2020" is the "State program of socio-economic development of the Russian Arctic for the period until 2020"⁶, real investment which, unfortunately, has been postponed by now. Priorities of state policy in the "Strategy 2020" directly related to the development of the NSR are: the active interaction among the Arctic States on maritime delimitation, increased efforts of Arctic states in the creation of a single regional System for Search and Rescue and to prevent man-made disasters and elimination of their consequences, including the coordination of rescue forces, Business Plan for the organization and effective use of transit and cross-polar air routes in the Arctic, as well as in the use of the NSR for the international navigation, the improvement of social and public administration of economy, the development of the resource base of the Russian Arctic, modernization and development of infrastructure, the Arctic transport system and the fisheries in the Russian Arctic.

As part of the Russian state program "Environmental protection" for 2012-2020 provides for measures to ensure comprehensive data on the marine environment, the oceans and seas for the implementation of various kinds of sea activities in Russia (navigation along the Northern Sea Route, fishing, navy and National defense).

State program of the Russian Federation "*Development of shipbuilding for the 2013-2030 years*" means state support measures aimed at support of the high-tech production in Russia, high-tech products of civilian marine technology for the Russian market. Construction and modernization of icebreakers, creation of new ports, modernization of port infrastructure, the development of the basic production and port infrastructure are one of the priorities of the "Transport Strategy of the Russian Federation for the period until 2030". The subprogram "Sea and river transport" includes measures to ensure the waterways and hydro facilities, search and rescue, maintenance of navigation, hydrographic support of shipping along the NSR.

According to the federal targeted investment program for 2015 and the plan of 2016-2017, (Ref. Ministry of Economic Development of Russia, December 25, 2014 № 32639-EE/D17i) it was scheduled more than 20 activities related to work on reconstruction and construction of infrastructure facilities of seaports and airport complexes along the NSR with the total volume of financing for more than 30 billion rubles (pic. 4).

⁶ Postanovlenie Pravitelstva RF ot 21 aprelya 2014 g. N 366 g. Moskva "Ob utverzhdenii gosudarstvennoj programmy Rossijskoj Federacii "Socialno-ekonomicheskoe razvitiye Arkticheskoy zony Rossijskoj Federacii na period do 2020 goda". URL: <http://www.base.garant.ru/70644267> (Accessed: 03 February 2016).



Picture 4. Budget for the NSR development projects 2015–2017, billions of rubles⁷.

The increase in the volume of cargo transportation by sea route is planned to 63,7 million tons by 2020, and an increase in technical equipment – up to 40.5% in 2020. The Federal Target Program “Development of Transport System of Russia (2010-2020)” provided measures for navigation and hydrographic support of navigation along the NSR and the development of the largest seaports, including Arkhangelsk, Murmansk and Sabetta.

Regional strategies of the NSR development

The Strategy of socio-economic development of the **North-West Federal District** until 2020 has one of the priority directions and it is the development of transport and notes the need for articulating the development of all types of transport, terminals and warehouse infrastructure that makes the complex of major hubs like St. Petersburg, Murmansk, Vologda, Arkhangelsk and Kaliningrad. Here, the main events are marked: modernization and construction of port terminals for coal, container, oil and petroleum products in the framework of the project “Integrated development of the Murmansk transport hub”; design and construction of passenger terminal for cruise ships in the port of Murmansk; construction of a seaport in Belomorsk, which will include two cargo areas - specialized coal complex and universal complex; development of the Northern Sea Route and the Arctic port infrastructure; reconstruction and construction of facilities in the seaport of Arkhangelsk; building ports, including container terminals, customs, warehouses and logistics centers.

Prospects for the development of water transport **in Siberia** were identified in the Strategy of socio-economic development of Siberia until 2020, linked to the further development of the Northern Sea Route in terms of infrastructure development of the Arctic ports. Strategy and aims of the NSR development were identified in the Strategy of socio-economic development of **the Far East and the Baikal region** for the period up to 2025: transport support of the development of Arctic oil and gas fields, providing northern delivery of socially important goods, the development of large-scale regional and transit traffic.

⁷ Federal'naya adresnaya investicionnaya programma na 2015 god i na planovyj period 2016 i 2017 godov. URL: http://faip.economy.gov.ru/npd/FAIP_plan_2015-2017_161214.pdf

The Strategy of Social and Economic Development of the Russian Federation and its subjects has designated priorities for the development of the transport corridor. Strategy for Socio-Economic Development of *the Murmansk region* until 2020 and up to 2025 clearly captures the role of the NSR as a strategic driver of the region and an important element in the system of international transport corridors. Intensification of navigation along the NSR will open up regional markets of the most dynamically developing Asia-Pacific region in addition to the traditional European and North American markets. In this context, a key challenge is the development of the Murmansk transport service to provide navigation along the Northern Sea Route. Meeting the challenge will increase cargo handling at ports of the Murmansk region from 28,160,000 tons in 2012 to 70,0 mln tons in 2025. There is a priority investment projects until 2020, aimed at the development of infrastructure of the NSR and initiated by the Ministry of Transport of Russia, FSUE "Rosmorport", the sovereign-governmental Atomic energy Corporation "Rosatom" with a financing of more than 280 billion rubles⁸. At the same time, the use of targeted program planning in the field of infrastructure development is not provided in the Murmansk region.

The Strategy of socio-economic development of *the Arkhangelsk region* until 2030 pointed out the geographical position of the Arkhangelsk region and the access to the northern seas was celebrated as an important competitive advantage of the Arkhangelsk sea port - a strategic transport hub that could allow export to foreign markets and transit of goods. Priority projects in the region for the transport infrastructure development are: the construction of deep water port in Arkhangelsk, reconstruction of terminals and the sea approach channel (the projects included in the Strategy of the transport complex development of the Northwestern Federal District). Government programs have been designed in order to implement these plans for the development and reconstruction of the ports and the NSR but have not been approved.

The Strategy for socio-economic development of *the Nenets Autonomous District* until 2030 has clearly defined the place of the region as an integral part of the Russian Arctic, the goals and objectives of the state policy for this period: introduction of new techniques and technologies for use of marine minerals and water biological resources, as well as providing the necessary infrastructure to operate the extraction industry in the Arctic; to ensure cargo delivery along the Northern Sea Route; use of the state support for building new icebreakers, safety and rescue vessels, coastal safety infrastructure; safety control for navigation and traffic control in areas of heavy traffic. The NAD priority mineral extraction projects are also associated with the active development of the NSR capacity, namely: construction of a large (capacity of 12 million tons) plant for oil

⁸ Kompleksnoe razvitiye Murmanskogo transportnogo uzla, rekonstrukciya zdaniya morskogo vokzala, stroitelstvo sistemy upravleniya dvizheniem sudov Kandalakshskogo zaliva, rossijskogo segmenta Barents VTMIS s integracijey v regionalnuyu SUDS Kolskogo zaliva, universalnyh atomnyh ledokolov proekta 22220 (3 sht.).

processing in Indigirka; building a gas chemical complex on the Barents Sea coast (also in Indigirka). The territory of the NAD is considered as a convenient “jumping zone” for offshore platforms and communications center for vessels along the NSR. Application of any tools to enable the development of the NSR infrastructure has not been provided in the document.

Priorities of the NSR in *the Yamalo-Nenets Autonomous District* could be defined according to Strategy of social and economic development until 2020 and they are mainly related to the role of the transport path in the operation of the Russia's largest center for the LNG – Uzhno-Tambeyskoye gas field near the village of Sabetta and construction of a port terminal there. At the same time, the Strategy does not fix any strategic activities in the field of the NSR development.

The draft Strategy for socio-economic development of *the Krasnoyarsky Krai* up to 2020 is focused on the development and preservation of the NSR and “Yenisei-NSR” transport system. It is done to ensure the active extraction of oil and gas and future extraction of mineral resources on the Arctic continental shelf. A special role is devoted to the Port of Dikson that is seen “as the security guarantor of the ships along the Northern Sea Route and the support base for its development” and, in the long-term perspective, the Strategy mentions building new oil terminal and port in Khatanga. The use of any targeted tools for the NSR development is not provided in the draft.

Development of the NSR infrastructure is done according to the Development schemes for productivity of transport and energy of *the Republic of Sakha (Yakutia)* until 2020 and it is, primarily, related to the river and sea ports' capacity, river and sea routes and the Northern Sea Route, the modernization of the fleet of the Lena, Yana and Kolyma shipping companies; their completion with the ships for mixed “river-sea” navigation; safety of navigation along the NSR and the restoration of navigation and hydrographic infrastructure serving the shipping in the Western and Eastern sectors of the Arctic. Investments in water transport for the period of 2007–2020 are going to be around 10 billion rubles for water transport, new vessels of the “river-sea” class with a total deadweight of 52–64 thousand tons, construction, improvement and renewal of the passenger vessels, and etc. The Strategy is supported by the subprogram “Water transport” of the state program “Development of transport complex of the Republic of Sakha (Yakutia) for 2012–2016” with the funding more than 6 billion rubles.

In the Strategy for socio-economic development of *the Kamchatsky Krai* until 2025 marine economic activity stands as one of four priority directions of regional development that directly affect the NSR infrastructure, development of transport and port infrastructure, carrying out primary processing of the freight traffic, the development of regional programs for the ship repair complex. The Strategy is the subprogram “Development of Water Transport” of the State Program “Development of

transport system in the Kamchatsky Krai in 2014-2025", which aims to create a modern cargo and passenger fleet, renew water transport and etc. The total volume of financing is about 700 million rubles.

The Strategy for Socio-Economic Development of *Primorsky Krai* until 2025 focuses on the transport and logistics cluster in the region, port-hub on the basis of the port complex Vostochny — Nakhodka, complex development of Vladivostok and Nakhodka transport hub, that ends the NSR in the east of the country and will serve the transnational distribution, providing cargo transportation to/from South-East Asian countries. The total volume of the planned investments for the development of the cluster is 62 billion rubles. But unfortunately all these has no planned funding.

The strategic the federal and the regional planning documents, objectives and actions for the development of particular elements of the NSR should be reviewed in terms of their interlinkages, the redistribution of financing and prioritization. At the same time, only two areas (the Kamchatsky Krai and the Republic of Sakha (Yakutia) among the 9 regions are carrying out (partly) the renewal and development of the NSR infrastructure with the help of targeted programs.

Conclusion

The analysis of the existing strategic development management system allows SMEs to make the following conclusions. First of all, necessary to form a unified governing body SMP (Development Institute), which would be engaged in the control and coordination of the activities carried out by state agencies and commercial organizations-mi (or empowering the existing SME Administration).

There is a need to develop a comprehensive strategy of development of SMEs and corresponding her state program defining long-term objectives, targets, deadlines (stages) before the implementation of 2025-2030. Taking into account the interests of coastal regions and business, the priority areas (elements) of development funding responsible executors.

One of the prerequisites for SMEs active work in the medium term become approved in June 2015. The Chairman of the Russian Government Dmitry Medvedev approved "Comprehensive Development Project of the Northern Sea Route", aimed at co-building the conditions for implementation of investment projects, the increase in transit cargo-flow [2].

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МИГРАЦИОННЫЕ ПРОЦЕССЫ MIGRATION PROCESSES

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The social composition of the population and migration on Arkhangelsk North according to the census materials



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Abstract. The article investigates the social composition of the population and migration in the Arkhangelsk North — in the Arkhangelsk region. The background for the research is a comparative analysis of the census held in the area since 1926. The author focuses of the transformation and changes that had occurred in the migratory behavior of the population and composition of the population by occupation, place of birth and residence in the following decades.

Keywords: *Arkhangelsk North, region, census, social structure, migration, changes, employment, place of residence*

Relevance of the topic is not doubtable due to the sharp surge in global migration activity at the moment. The results of the census, starting from the first population census (1926), represent a rich source for the study of socio-economic life of the country under the conditions of the New Economic Policy (NEP), collectivization, industrialization and subsequent development. Analysis of census materials allows us to recreate the social, demographic and ethnographic portrait of the population in the whole country and its territorial units and to analyze the level of literacy and other indicators. Archival documents of the censuses are stored in the State archive of the Arkhangelsk region and have been used in the present study of transformations and changes in the territorial structure of the northern settlements between censuses 1920 and 2010 [12]. However, great research interest to the social composition of the population is caused by the results of the population census, characterizing migratory population movements within Arkhangelsk North, and regional exchange of population with the other areas of our country. This article contains comparative analysis of the impact of migration in Soviet and post-Soviet period on the migratory behavior of the population of the studied northern region.

Territorial changes in the Arkhangelsk North

The study of the social composition of the population and migration processes in the Arkhangelsk North, in Arkhangelsk County and in the Arkhangelsk Region takes into account the

transformational changes in the territorial organization of the northern region in the first third of the 20th century. We are talking about the formation of a new administrative boundaries in the European North of the country and the changes in administrative territorial devision within the region itself. After the transfer of Finland in 1918, a part of the Alexander County and the remaining territory of the Murmansk County in 1921, the total area of the Arkhangelsk County decreased by 159,725 km² [3]. In 1920-1923 the territory of the Karelian Autonomous Soviet Socialist Republic got some areas of the Arkhangelsk County — Kem area with its total area of 40,600.2 km²¹. In 1921 — the Komi Autonomous Region got a total area of 207 453.7 km² from Arkhangelsk County². According to the General Staff, Lieutenant-General I.A. Strelbitsky, on the 1st of January 1914 the territory of the Arkhangelsk County was 742,050 square versts³. In total the County lost 407,779 km² or 47.5% of its total area in 1917, and according to the Central Statistical Office, on the 15th of May 1923 its areas was 450,781 km². Resolution of the USSR Central Executive Committee issues on the 23rd of September 1937 led to the establishment of the Arkhangelsk Region. In 1939 its area amounted to 498 thousand km² (with the islands of the Arctic Ocean — 609,800 km²). On the 1st of January 1984 the Arkhangelsk region had an area of 587,4 thousand km² [3, p. 128]. However, in the 21st century modern Arkhangelsk region is noticeably inferior in size compared to the Arkhangelsk County of the early 20th century.

In the first third of the 20th century there have been significant changes in the structure administration in the Arkhangelsk North. On the 1st of January 1917 the Arkhangelsk County consisted nine areas: Alexander, Kem, Onega, Arkhangelsk, Kholmogory, Pinega, Mezen, Pechora and Shenkursk. Two of them, Alexander Kem, had been ealier transferred to the other territories. Two more, mentioned above, have been included in the Arkhangelsk County. In 1920, a part of Mezensky area had become Ustvashsky area and a year later it became a municipality of the Mezensky County. In 1926, the Arkhangelsk County was part of the Northern Region. Its total area was 450,775 km².

Table 1

Territory of Arkhangelsk Country districts

Districts	01.05.1922	Km ²	VPN-1926 ⁴
Arkhangelsk	26,350		85,628
Mezensky	111,332		124,491

¹ Gosudarstvennyj arhiv Arkhangelskoj oblasti (hereinafter GAAO). F. 187. Op.1. D. 843, l.18

² GAAO. F. 187. Op.1. D. 843, ll.18—19

³ 1 square versta = 1,13804 km²; 1 km² = 0,88 square versta. URL: <http://dic.academic.ru/dic.nsf/ruwiki/1338258>

⁴Vsesoyuznaya perepis naseleniya 1926 URL: http://wiki.laser.ru/index.php/Всесоюзная_перепись_населения_1926_г. (Accessed: 14 September 2012)

Onegzsky	28,909	23,651
Pechorsky	No data	94,456
Pinegzsky	48,210	-
Kholmogorsky	16,674	-
Shenkursky	24,923	22,544
Islands in the White Sean and the Arctic Ocean	98,816	100,005

The White Sea and the Arctic Ocean islands accounted for 22.2% territory of the Arkhangelsk County in 1926. It took nearly a fifth of Mezen County — 27.6% of the total area of the County. Area of the Onega County decreased by 18.2%, while its share in the total area of the region amounted to 5.2%. The same figure had the Shenkursky districts, which also "lost" almost a tenth of its territory. Pechersky district occupied the fifth part of the Arkhangelsk County in 1926. [4]

In 1926, in the County, there were 13 urban settlements, including the ones in the Arkhangelsk district — 9, in other districts — one in each. Among 3022 rural settlements, the Arkhangelsk district had 1,341 or 44.4% of the total, the Shenkursk district — 1126 (37.3%), the Onega district — 215 (7.1%), Mezen district — 180 (6.0%), the Pechora district — 145 (4.0%). The island territory had 15 rural settlements (0.1%).

Table 2
*Territory and settlements of the Arkhangelsk County*⁵

Territory	Amount of settlements			
	01.05.1922		VPN-1926	
	Urban	Rural	Urban	Rural
Total	6	2,897	13	3,022
Arkhangelsky	1	382	9	1,341
Emetsky	2	535	-	-
Mezensky	1	182	1	180
Onegzsky	1	329	1	215
Pechorsky	-	147	1	145
Pinegzsky	1	263		
Shenkursky	1	1,037	1	1,126
Islands in the White Sea nad the Arctic ocean	-	22	-	15

As a result of the administrative-territorial transformations in the Arkhangelsk North, initially the number of population decreased. According to the Regional Statistics Committee, on the 1st of January 1917 the population was 441,886 people of both sexes. According to specified data of the Central Statistical Office (CSO) in 1917 in the Arkhangelsk County there were 465,547 people. As a result of the administrative reformations in 1918—1921, the population decreased by 88,194 people. In 1921, there were 377,353 people in the Arkhangelsk Region. So, the population

⁵ Список населенных мест Архангельской губернии на 1 мая 1922 года. Архангельск: Типография Аргубсюза кооперативов, 1922. С.3—4; Всесоюзная перепись населения 1926 г. URL: http://wiki.laser.ru/index.php/Всесоюзная_перепись_населения_1926_г. (Accessed: 14 September 2015)

decreased by 19%⁶. As it can be seen, *every fifth of its former resident, after allocation of certain areas of the Arkhangelsk Region of the country had actually turned out to be a forced migrant*, as lived in on his place of permanent residence but on the territory of another administrative-territorial formation in Soviet Russia. However, in the period between census 1926 and 1989 the population of the Arkhangelsk Region had increased by 3.7 times, as a result of the industrial development of the region and due to external migration.

The average density of the total population in 1926 was 1.0 person per 1 km². This rate was 5.1 times lower than the nationwide and 2.1 times less than in the Northern Region. If we look at the figure for the rural population, it amounted to 0.7 people per 1 km² on the Arkhangelsk County, in the RSFSR — 4.2 people per 1 km², in the Northern District — 1.9 people per 1 km². In terms of districts of the Arkhangelsk County the lowest density, the total population and the rural population was observed in the Pechora district — 0.2 people per 1 km². The Mezen district had rural population density was 7.4 people per 1 km², Shenkursk district — 4.7 people, Arkhangelsk and Onega districts had 1.7 and 1.4 people per 1 km² respectively. If we consider the total population density per 1 km², in the Shenkursk district it exceeded the County level by 4.4 times, in the Archangel district — 2.7 times, in the Onega district — 1.6 times. In other counties, the figure was lower than the average for the Arkhangelsk County and ranged from 0.2 people per 1 km² (Pechora) and 0.3 people per 1 km² (Mezensky)⁷.

Social composition of the population on the regional level by employment, place of birth and residence

Analysis of census allows us to trace the quantitative and qualitative changes in the social composition of the population at the regional level. In 1926 The branches of the national economy 18,508 workers were employed, or only 4.3% of the population Arkhangelsk County; 7.1% of all employees. In the manufacturing industry 59.4% of workers were employed, in the transport — 13.7%, in agriculture — 12.8%, in handicraft industry — 4.5%, in construction — 1.6%, in other sectors of the economy — 8.0%. 12,415 (68,2%) of workers lived in urban areas; 5,775 (31.8%) — in the countryside. Among the workers employed in the enterprises, 80.3% were residents of urban settlements. At the same time, three quarters of them have indicated their place of birth the other rural areas. This tendency is typical for workers in other sectors of the economy of the Arkhangelsk County. Census 1926 also recorded 18,345 employees, 31% of which were born in the urban areas of the Arkhangelsk County.

⁶ GAAO. F. 187. Op.1. D.843, ll.18,19

⁷ Vsesoyuznaya perepis naseleniya 1926 goda. URL: http://wiki.laser.ru/index.php/Всесоюзная_перепись_населения_1926_г. (Accessed: 14 September 2015)

However, the Census 1926 recorded an unique situation when among the people employed in the local economy the bigger share was represented by the single householders who were helped by the members of their families. According to the Census 1926 group of self-employed people was 261,779 people or 61% of the total population living in the Arkhangelsk Region, not self-employed — 167,405 people (31.0%). This part of the active population has been the most numerous group, which included the hosts, singles, helpers or family members. This group accounted for 48.0% of the County population and 78.0% of all employed in the economy. Among 206,098 people, 201,421 people (or 98% members of this group) worked in agriculture, in the handicraft industry — 2,637 people (1.3%), in trade — 927 employees (0.4%), in transport — 525 people (0.2%).

The structure of households involved in the various sectors of industrial activity in the County is presented in Table 3⁸. It should be noted that the data of the table does not contain the number of households and people employed in agriculture.

*Table 3
Prevalence of commercial and craft establishments and their income in 1924—1925*

Establishment	Households	People	Household income	County		
				Gross profit of a household	Total income (rubles)	Total gross income
Forestry	18,695	25,722	169	182	3,160,176	3,416,519
Hunting	6,815	7,793	81	89	575,218	611,499
Fishing	6,986	13,522	144	202	1,007,993	1,412,356
Mammal hunting from boats	659	867	97	109	65,711	73,264
mammal hunting from icebreakers	400	400	366	366	177,342	177,342
Tar extraction	2,155	4,254	82	101	178,525	217,842
Tar	120	241	61	77	7,398	9,315
Delivery	3,467	3,592	67	72	234,686	252,378
Dressing of leather and sheepskins	422	603	145	211	61,420	88,999
Footwear	1,346	1,448	120	151	161,591	203,933
Fooling wool	847	992	74	81	62,865	68,840
Sewing	673	833	89	101	60,517	68,200
Blacksmith and locksmith business	673	795	102	131	68,734	88,256
Carpenters	3,404	3,657	113	138	387,182	471,035
Bondage	803	898	75	91	60,692	73,560
Carriages	665	697	84	99	55,956	66,475
Ceramists	308	356	71	88	22,103	27,153
Brick making	401	825	120	139	48,068	55,710
Bucket making	266	266	44	49	9,566	10,703
Making ships and sail-boats	335	411	95	116	32,005	38,798
Windmills	586	635	53	95	31,492	55,805
Watermills	403	502	106	165	42,730	66,616
Other types of crafts	868	1,206	75	104	65,100	90,619

⁸ Statisticheskij sbornik po Arkhangelskoj gubernii za 1925 god. Arkhangelsk: Izdanie Arkhgbustatbyuro, 1926. S. 181.

According to rough estimates of the provincial Bureau of Statistics in 1924—1925, craft establishments had 51,297 households with 70,515 people. 36.4% were employed in the Forestry and fisheries — 13.6%, in hunting — 13.3%, in delivery — 6.8%, in carpentry — 6.6%, in the tar production — 4.2%. In other spheres of commercial and handicraft activities the number of households ranged from 0.2% to 2.6%. All conditional net income of the studied households for 1924—1925 was estimated at more than 6.5 million rubles, the entire gross income — more than 7.6 million rubles. In the structure of gross income 44.7% were farms engaged in harvesting, 18.5% — in the fishery, in hunting — 8.0%, in carpentry — 6.2%, in delivery — 3.3%, in the extraction of tar — 2.9%, in mammal hunting on icebreakers — 2.3%, in the dressing of sheepskins — 1.2%. The minimum share of the tar production and basket making in the total gross income is 0.1%.

The most numerous group of the working population — individual householders: 96% lived in rural areas, 4% — in urban areas. Among 261,779 people: 23,528 people (9.1%) were born in urban areas, the rest — in the countryside. At the same time among 46,386 residents of urban settlements 28,452 (61.3%) were born in rural areas, so, they were internal migrants.

It should be noted that the production activities of commercial farms and the working population employed there proceeded when “Russia had an unique opportunity to go to the farmer's options for the development of agriculture through its self-developing system of cooperation” [5, p. 63]. This transition had allowed to recover the country's economy by 1926. We can agree with the opinion of O. Ovchinnikov about the cause of economic recovery, which consisted in the fact that “the power of human labor potential revealed, gave full play to the implementation of the personal interest — it was organically tied to the nation-wide interest. We construct, we manufacture products, we sell, we manage, we pay the price for our mistakes. In short, it was not on orders from above, but we made our own life” [5, p. 63—64]. However, in the 1930s the USSR experienced collectivization. It marked the failure of the party and governmental course on the formation of the country's “effective owner, self-regulating system of agriculture”. As a result of the total nationalization policy, the physical destruction of the owners and the dispossession of millions of people had formed a new, Soviet way of life of the rural worker on the ground: “no property and freedom” [5, p. 65]. We can also add: “no responsibility”.

By the early 1940s the formation of new workers of the socialist agricultural production in the Arkhangelsk Region had almost been completed. In 1940, in the Arkhangelsk Region (without Nenets Autonomous District) the countryside, there were 143,371 peasant and individual peasant farms; farms — 141,230 (98.5%) and individual peasant farms — 2,141 (1.5%). As part of the agricultural cooperatives or land cultivation partnerships, there were 134,401 farms or 95.2% of the

total. Commercial farms, fishing and hunting cooperatives collective cooperatives had socialized rural economy and labour: 6,829 farms (4.8%)⁹ in total. On the 1st of January 1940 the five state farms employed 1,260 workers.

On the 1st of January 1950 statistical records of the rural population of the Arkhangelsk Region recorded 167,668 farms, including those where nobody lived or worked. The proportion of state farmers was 61.5%, households (families) of workers and employees or cooperatives — 29.5%, individual farms and craftsmen — 0.1% (177 households), other households — 0.6% (1,073 farms)¹⁰. As you can see, in 1940—1950 the number of farms in all forms of cooperative, compared with the number of households farmers, fell by 17%. The number of individual households and craftsmen decreased from 1,783 to 177, or 90.1%. Moreover, the basic form of socialized economy was collective. According to the statistical data, as of January 1, 1950, a part of the rural population was represented two-thirds of the farmers. As a result of the Census 1959 in Arkhangelsk Region a part of the employed population were 117,129 people: farmers and cooperative workers — 5,891, craftsmen — 650, individual farmers — 156¹¹. These look like the final results of collectivization in agriculture of the Arkhangelsk Region.

In subsequent decades of the Soviet rule according to the Census 1959, 1979 and 1989, official statistics recorded changes, especially in the three main social groups of the employed population: workers, employees and farmers¹². The number of farmers had decreased dramatically over the years 1959—1989, and workers and employees increased. The analysis of census data revealed several significant moments. *First*, it emphasizes that after the formation of the Arkhangelsk Region in September 1937 the number of its population increased. *Secondly*, the economy of the northern region got an increased proportion of workers in the leading sectors of the economy. *Third*, as noted above, in agriculture a new type of the employee — the collective farmer revealed as a result of collectivization. *Fourthly*, it is necessary to make some comments to the analysis of the results of the population census 1979. The problem was the different amount of farmers. In general, the region had 14,424 people but in the rural areas their amount was 13,162. The difference was 1,262 people, who were accounted as workers of the collective state farmers. In my opinion, it is more logical to refer these people to other groups of the employed population not reflected in the results of the 1979 census (*Table 4*).

⁹ GAAO. F.1892. Op.4, d.71. Counted by the author.

¹⁰ GAAO. F.1892. Op.12. D.7259, ll.48,58,58ob. (without NAO).

¹¹ GAAO. Op.21. D.7562, l.21.

¹² GAAO. F.187. Op.1. D.854, l.10ob. F.1892. Op.21. D.7562, l.21. F.1892. Op.24. D.5705, l.36ob. D. 5706, l.4. F.1892. Op.27. D.33, l.6.

Table 4

Employed people of the Arkhangelsk County

Year	Employed	Including:			
		Workers	Clerks	Farmers	Other groups of population*
1926	261,779	18,508	18,345	-	206,098
1959	669,648	392,251	146,580	117,129	6,808
1979	806,490	550,263	241,722	13,162	1,262
1989	834,155	542,112	277,743	13,817	843

*1926 r. — single owners who were helped by family members; 1959 - craftsmens, farmers, etc.; 1989 - self-employed

The number of employed people in the Arkhangelsk region in 1926—1989 increased by 3.2 times, workers — 29.3 times, employees — 15.1 times. The number of employed population in a given period of time in the other groups decreased from 206 098 to 843 people, or 244.5 times. There was a trend to reduction in number of farmers directly engaged in agricultural production. In 1950 there were 307,948 farmers (without accounting of missing), in 1989 — 13,817, i.e. it decreased by 22.3 times. It should be noted that during this time a significant part of collective farms were created, they received the status of state-owned agricultural enterprises. Former farmers became workers and employees of business organizations. The processes of transformation that occurred in the Soviet period in the socio-economic development of the Arkhangelsk Region (the former province), direct impact on the formation of its working population structure. Population census data allows identification of the main trends of this process and its results, which had its positive and negative consequences in the life of the Arkhangelsk Region and its population.

Migration in the Arkhangelsk Region

On the basis of census 1926—1989 we will analyze the changes that have occurred over this time period in the population composition of the Arkhangelsk region¹³. We are talking about two groups of people. The first consists of people living permanently in the place of residence since birth, the second — not since birth. In 1926 the Arkhangelsk County had a population of 429,184 people. 70.6% lived in place of permanent residence since birth and not since birth — 29.2%. The correlations between the residents, continuously living in the place of permanent residence since birth and not since birth, was 2.4 to 1. In 1989, the population of the Arkhangelsk region was 1,569,679 people. 53.1% of people were not natives in the place of permanent residence at the time of the census. 46.9% continuously lived in the place of permanent residence since birth. In general, during the monitoring period, the proportion of the population living at the place of his birth, decreased by 23.7% and at the same time increased by 23.9% in the group of persons who continuous-

¹³ GAAO. F. 187. Op.1. D. 854, ll. 29,30. F.1892. Op. 27. D. 40, ll. 3—43. Accounted by the author

ly resided in the place of their permanent residence since birth. Among the urban population there was a slight increase of 5.6% in the number of natives of urban settlements, while reducing of residents of other settlements by 5.3%. In 1926, in rural areas every fifth citizen was not a native at the place of residence. In 1989 this ratio was almost equal: 49.9% and 50.1%. If we compare Census 1926 data and the results of the census of 1989, in a group of individuals born and living at the place of birth, this figure fell to 29.5%, and increased by 29.7% in the group "not since birth".

A comparative analysis of the population continuously living in the place of permanent residence, shows that workers were divided into four groups by the time of residence. Time periods for the 1926 census were not quite coincide with the temporary grouping of length of residence in 1989. In 1926 in Arkhangelsk County people who continuously resided in the place of residence from three to nine years were 30.5% of non-natives; from one year and up to two years — 26.9%; ten to nineteen years — 18.1%; from twenty years and more — every fifth worker. Census of 1989 revealed different results. Every third non-local resident could find himself in a temporary group "from 20 years or more". Almost every fourth migrant continuously resided in the place of permanent residence for 10—19 or 3—9 years. In the group of "1 year to 2 years", the figure was 18.5%. In the period between the censuses 1926 and 1989 we observed an increase in the proportion of migrants living in a group of "20 or more years" by 11.6 points, in the group "10—19 years" — by 4.9 points. In the other two temporary groups the reduction ranged between 8.2 and 8.4%. Processed census data is shown in the Table 5.

Table 5
Not local population by time of residence in the Arkhangelsk Region
(sensus 1926 and 1989)¹⁴

Population	Year	Not local residents including: Constantly living in the area				
		Total %	1—2 years	3—9 years	10—19 years	20 years and more
Urban and rural population						
Total	1926	100.0	26.9	30.5	18.1	24.6
	1989	100.0	18.5	22.3	23.0	36.2
Men	1926	100.0	37.4	35.7	15.5	11.4
	1989	100.0	23.1	23.5	22.5	30.9
Women	1926	100.0	21.6	27.9	19.4	31.1
	1989	100.0	14.5	21.2	23.4	40.9
Urban population						
Total	1926	100.0	35.9	35.7	16.4	11.9
	1989	100.0	16.9	20.8	23.6	38.7
Men	1926	100.0	37.0	36.7	15.2	11.0
	1989	100.0	21.5	22.1	23.1	33.4
Women	1926	100.0	35.0	34.7	17.7	12.8
	1989	100.0	13.0	19.7	24.0	43.3

¹⁴ GAAO. F.187. Op.1. D.854, ll.22ob., 23ob. F.1892. Op.27. D.40, l.21,22,23,27,28,29,33.34. Accounted by the author

		Rural population			
Total	1926	100.0	18.1	25.6	19.8
	1989	100.0	23.2	26.8	21.1
	1926	100.0	38.1	33.1	16.4
Men	1989	100.0	27.6	27.7	20.7
	1926	100.0	13.6	23.9	20.6
	1989	100.0	19.0	25.9	21.5
Women					33.6

Among male migrants in the Arkhangelsk County in 1926, 37.4% continuously lived at the place of residence for 1–2 years. Almost the same figure was typical for groups of migrants living there for 3–9 years (35.7%). In the other two groups, 15.5% of non-native-born permanent residents lived there for 10–19 years, 11.4% — more than 20 years. In 1926, almost three-quarters of male migrants were a part of the first two groups and lived in the county for 1–9 years and one quarter — more than 10 years. It is possible to pre-assume that this ratio indicates the intensity of the migration of the male population of the Arkhangelsk County. Census 1989 had identified three practically equivalent temporary male migrant groups in the Arkhangelsk Region. Each group had a share of migrants of apprx. 23.0%. At the same time there was a decrease of this index compare to 1926 by 14.3% in the group of residents living there “1–2 years”; and in the temporary group “3–9 years” the decrease was 12.2%. At the same time in a group of male migrants, who were part of a group of permanent residence for 20 years or more, there was an increase from 11.4% in 1926 to 30.9% in 1989. Accordingly, the group of 10–19 years residents increased by 7%.

Among women migrants in 1926 two groups “1–2 years” and “10–19 years” every fifth of non-native-born persons had been continuously living at the place of permanent residence. 31.1% of non-native-born females indicated the duration of their continuous residence as 20 years or more. According to the 1989 census, 40.9% of migrant women responded that the length of their residence at the place of permanent residence was 20 years and more; 23.4% — 10–19 years, 14.5% — 1–2 years. Every fifth non-local person continuously lived in the Arkhangelsk County for 3–9 years at the place of permanent residence. Comparative analysis of census 1926 and 1989 shows the increase in the number of female migrants with a duration of stay for 20 years and more by 9.8%; 10–19 years by 4%, while the groups of people who were staying there for 1–2 year and 3–9 years reduced.

In 1926, among the migrants of both sexes 35.9% resided in the urban settlements with a duration of stay of 1–2 years, almost the same number is in the groups of 3–9 years. 16.4% had a permanent residence within 10–19 years and 11.9% — 20 and more years. There were no significant differences among non-native-born urban population of both sexes there.

Census 1989 data reveals the trend of gradual increase in the proportion of migrants depending on the length of life in urban settlements. It is typical for non-native residents, both male

and female. For example, 16.9% — with a duration of stay of 1—2 year and 20 years or more — 38.7%. The proportion of male migrants to the duration of continuous residence time in the first three groups ranged from 21.5—23.1%. Every third male migrant worker was residing in the place of permanent residence for 20 years and more. Among the female migrants in urban settlements the duration of residence was 1—2 years — 13.0%, 3—9 years — 19.5%, 10—19 years — 24.0% and 20 years or more — 43.3%.

Migrants in rural areas with a duration of residence of 1—2 years accounted for 18.1% in 1926. Men, non-native residents, — 38.1%, women — 13.6%. Among all rural migrants every fourth was living at places of permanent residence for 3—9 years. There were no significant differences in the temporary group of men and women. Every fifth non-local native represented a temporary group of residence with a duration of 10—19 years. Every third worker had lived for the duration of 20 years and more. Among non-native-born females, this group was the most numerous — 41.9%, whereas among men it was about 12.4% of the migrant population. Thus, 71.2% of non-native-born male migrants lived at the same place for 1—9 years. 62.5% of women workers were members of the two groups with the duration of temporary residence of 10 years or more.

Analysis of the results of the population census 1989 revealed no significant differences in the group of non-natives living in rural areas by the duration of their stay. The largest share of immigrants was represented in the group with a duration of stay of 20 years and more — 29.0%, the lowest (21.1%) — in the time group 10-19 years. In the other two groups this figure was within the boundaries of 23.2—26.8%. Male migrants with duration of stay from one to two years and 3—9 years, there were 27.6% and 27.7% respectively, ie almost equal. Note that these two groups were leading in 1926. But, compared with the census of 1926 data, men who were not natives in their place of residence, in 1989 increased their share. It almost doubled in the group with a duration of stay 20 years or more. In the group 10—19 years, the growth was insignificant — by 4.3 points. Every third non-local female resident was in a group with a duration of stay 20 years or more. Compared to 1926, this group decreased by 8.3%. However, there was a minimal increase in the number of migrant women in the other groups from 0.9% to 5.4%.

Inter-regional migrant exchange in the Arkhangelsk North

It is time to refer to the content of population censuses, characterizing the results of migration exchange in the Arkhangelsk North (county, region) and the other territories of the USSR (Russian Federation). *The first group* consists of migrants who were born in other territories of the USSR (Russian Federation), but were constantly living in the Arkhangelsk county region. *The second group* included former residents of the Arkhangelsk region, constantly living in other regions

of the Soviet Union (Russian Federation). For a comparative analysis of the results of the census we took the population census 1926 and 2002. They are presented in Table 6¹⁵.

Analyzing the data in the table, you need to make a few preliminary comments. *Firstly*, the materials of censuses 1939—1989, kept in GAAO and the territorial body of the Federal State Statistics Service in the Arkhangelsk Region (Arhangelskstat) lack the data on the migration of population within the region, as well as inter-regional exchange with other territories of the USSR. Therefore, a comparative analysis is possible if we use indirect indicators characterizing transformation of territories and settlements in the Arkhangelsk region and its impact on the migratory behavior of the population¹⁶. *Secondly*, the choice of the census of 2002 was made due to the fact that it had been held in the Russian Federation after the collapse of the USSR. Comparative analysis was done with the regard to timing. In case of the census 1926 it covered the time before and after the census 1896, then in case of the census 2002 — the time before the census 1989 and after it.

Table 6
*Population of the Arkhangelsk Region by place of birth and residence
on the territory of the Russian Federation (VPN-1926, 2002)*

Area	Living on the territory of the Arkhangelsk Region				Born in the Arkhangelsk Region			
	VPN-1926	%	VPN-2002	%	VPN-1926	%	VPN-2002	%
	Including the place of birth:				Including the place of residence			
USSR-1926, RF-2002	112,519	100.0	1,265,328	100.0	106,068	100.0	1,400,302	100.0
Arkhangelsk (county) region	77,004	68.4	1,055,083	83.4	77,004	72.6	1,055,083	75.3
North-West area	26,319	23.4	79,605	6.3	17,895	16.9	129,504	9.2
Vologda (county) region	8,124	7.2	46,929	3.7	2,603	2.5	24,493	1.7
Komi Republic (Zyryanskaya AO)	1,876	1.7	7,389	0.6	538	0.5	19,987	1.4
Republic of Karelia	1,295	1.2	4,438	0.4	4,082	3.8	8,951	0.6
Severo-Dvinskaya county	9,135	8.1	-	-	1,671	1.6	-	-
Leningrad (county) region	781	0.7	4,890	0.4	1,512	1.4	16,000	1.1
Murmansk (county) region	441	0.4	6,144	0.5	1,277	1.2	21,082	1.5
Novgorod (губерния) область	304	0.3	2,347	0.2	256	0.2	3,979	0.3
Pskov (county) region	307	0.3	2,796	0.2	192	0.2	3,635	0.3
Cherepovets (county)	628	0.6	-	-	236	0.2	-	-
St.-Petersburg (Leningrad)	3,428	3.0	4,672	0.4	5,528	5.2	31,377	2.2
Moscow	377	0.3	2,067	0.2	1,106	1.0	21,845	1.6
Kirov Region (Vyatka county)	504	0.4	11,004	0.9	240	0.2	5,311	0.4
Moscow (county) region	210	0.2	3,317	0.3	398	0.4	17,246	1.2
Nizhny Novgorod (county) region	372	0.3	6,301	0.5	312	0.3	5,812	0.4
Tverskaya (county) region	439	0.4	4,228	0.3	214	0.2	4,647	0.3
Yaroslavskaya (county) region	838	0.7	5,042	0.4	1,145	1.1	8,647	0.6
Republic of Tatarstan	771	0.7	2,649	0.2	135	0.1	3,459	0.2

¹⁵ GAAO. F.187. Op.1. D.854, l.l.29 ob. URL: http://www.gks.ru/free_doc/new_site/perepis2010/croc/perepis_itogi1612.htm Accounted by the author

¹⁶ Some aspects have already been discussed by me in the articles in "Municipal Law" and "Arctic and North" journals in 2013—2015.

Third, the published data from censuses can detect trends in migration of the population, by place of birth and place of permanent residence on the territory of the former Arkhangelsk County (1926) and the Arkhangelsk Region (2002), as well as in other areas of the USSR and the Russian Federation. *Fourth*, the study focuses on the territories of the former USSR and the Russian Federation where the exchange of migrants made a comparative analysis possible.

Comparative analysis of the results of the migration movements of the population in the Arkhangelsk Region according to the Census 1926 and 2002 reveals the following trends: in the Arkhangelsk County in 1926 there were permanently resettled 23.4% of migrants, representing the North-West region and in 2002 — 6.3%, respectively. In general, there is a decrease in the intensity of migration flows from other areas except for Murmansk, Kirov and Nizhny Novgorod. In the Vologda region, this figure decreased from 7.2% to 3.7%, in St. Petersburg — from 3.0% to 0.4%, in the Komi Republic — from 1.7% to 0.6%, in Karelia — from 1.2% to 0.4%.

In 1926 72.6% of residents were born in the Arkhangelsk region, lived on its territory, in 2002 — 75.3%. As you can see, there are no significant differences in this indicator. Almost three-quarters of the Arkhangelsk North natives were living there at the time of the census. Reduced share of natives from the Arkhangelsk region is observed in Karelia, St. Petersburg and in three more regions (Vologda, Leningrad and Yaroslavl). At the same time the rest of the territory had a tendency of slight increase in the outflow of the Northerners as a percentage of corelation in the study period.

Migration processes in 1921—1939 led not only to a change in the socio-demographic situation, but also had an impact on industrial and cultura development of the northern areas and urban settlements. Thousands of people moved from place to place, from city to city, and from village to town and back in search of employment. As it was noted by V.V. Smirnov in his dissertation: “Gradually, the new “citizens” broke their connections with the rural areas, in the cities a number of marginalized population increased, but at the same time we had an increase in the amount of workers, a group of workers-intellectuals appeared combined with the expansion of urban infrastructure and increase in the number of educated people. The village was “flooding the city”, but with its help it had become possible to fulfill the great plans for the industrial development of the region” [6, p. 119]. Along with the growth of urban population and the increasing number of migrants there was a falling general level of culture of northerners, and greater amount of deviant behavior among citizens.

Conclusion

1. The study of migration processes that took place in the Arkhangelsk region in the Soviet period of its history requires to take into account changes of the administrative and territorial entities in the USSR. In 1926 the Arkhangelsk County was reduced in comparison with 1917 by 1.9 times. The formation of the Arkhangelsk Region increased its area from 498 thousand km² in 1939 to 587.4 thousand km² in 1984, but it was less than the area of the former Arkhangelsk County in the early 20th century.

2. Administrative changes associated with the formation of the Arkhangelsk region and the accession of the Vologda and the Northern Dvina County, can be regarded as one of the factors increasing the population. It had increased from 429 thousand people in 1926 to 1.5 million in 1989, ie, 3.7 times. Significant changes had occurred in the composition of the employed (self-employed) population. In 1926, the most numerous group was individual farmers helped by family members. It accounts for 48.0% of the population and 78.0% of all employed in the farming. The workers were 4.3% of the population and 7.1% of all employees. The same figures were typical for clerks. In 1989, the number of workers compared to 1926 increased by 29.3 times, and clerks — 15.1 times. The largest group of the working population or “independent owners” fell from 206 thousand to 843 people or 244.5 times.

3. Analysis of the results of census of the Arkhangelsk region in 1926 and 1989 reveals the following trends in the migration. In 1926, 70.6% continuously lived at the place of permanent residence since birth, in 1989 — 53.1%. The proportion of the population living at the place of their birth decreased by 23.7% and at the same time increased by 23.9% in the group of persons who continuously resided in the place of their permanent residence since birth.

4. In the period between the censuses 1926 and 1989 we observed an increase in the proportion migrant group living at the same place for 20 years or more to 11.6%; in the group of 10–19 years residents it was 4.9%. In the other two groups “1–2 years” and “3–9 years” the decline varied between 8.2–8.4%. Census data 1989 revealed a tendency of gradual increase in the share of migrants in urban areas. It characterized the non-native residents, both male and female. Analysis of the results of the population census 1989 revealed no differences in the number of non-natives living in rural areas by the timing of their residence. The greatest proportion of migrants was represented in the group with a duration of stay of 20 years and more — 29.0%, the lowest (21.1%) was in the group of 10–19 years residents. In the other two groups this figure was within 23.2–26.8%.

5. Among the population living on the territory of the Arkhangelsk region, the proportion of its natives was 68.4% in 1926, while 31.6% of its inhabitants called a territory of birth other regions of the USSR. In 1926 in Arkhangelsk County had 23.4% permanently settled migrants from the North-West, in 2002 — 6.3%.

6. Analysis of census data by population group, whose birthplace was the Arkhangelsk region and area of residence – other regions of the USSR and the Russian Federation, showed that in 1926, 72.6% of residents were born in the Arkhangelsk region and were living on its territory, in 2002 — 75.3%. As you can see, there are no significant differences in this indicator. Almost three-quarters of these people were living there at the time of the census. A reduced share of natives of the Arkhangelsk region was living in Karelia, St. Petersburg and three regions (Vologda, Leningrad and Yaroslavl). At the same time, in other areas there was a tendency slight increase in a percentage of northerners during the analyzed period.

7. As it was shown by the comparative analysis of population censuses 1926 and 2002, the main outflow of migrants in the Arkhangelsk region was represented by its natives. Therefore, the V.A. Kudryavtsev idea that the population of the European North consisted of migrants from other areas of the USSR [7], can hardly be attributed to the Arkhangelsk Region.

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The region with the lowest attractiveness for young people?



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Abstract. The article presents the analysis of migration in the Arkhangelsk region. Focus is made on the people of working age — young people aged 15 to 29 years. The background for the study are the indicators of migration, statistics for the period 2010 — November 2014, laws and regulatory documents. The authors conclude that Arkhangelsk region is an area with low attractiveness to migrants. A significantly larger number of young, qualified personnel is leaving our area and its amount is bigger than the amount of newcomers. This situation damages regional economy and social sphere significantly.

Keywords: *Arkhangelsk region, migration of young people, demographic situation, migration patterns, ranking of the NWFD regions by immigration attractiveness*

The population of the Arkhangelsk Region is annually reducing by a variety of reasons. On the 1st of January 2015 the population of the Arkhangelsk Region, including the Nenets Autonomous District, was 1,183,323 people, including the urban population — 910,837 people, rural population — 272,486 people¹. It should be noted that the region loses an enormous share of the population every year. So, for example, only in 2010—2014 the population decreased by 45,708 people: 1,237,493 people in 2010 and 1,191,785 people in 2014. The most alarming phenomenon in the demographic situation affecting the "population decline, this depopulation (natural population decline due to excess of deaths over births)" [1, p. 443]. In 2010—2014 the Arkhangelsk region got a tendency to reduce the natural decline in population. But despite this, still disappointing is the excess of deaths over births, data proving that is in Table 1.

¹ Оценка численности населения на 1 января 2015 года. URL: http://arhangelskstat.gks.ru/wps/wcm/connect/rosstat_ts/arhangelskstat/resources/5907340048f4c24b8d40af1c1085d61b/Chisl.doc (Accessed: 04 December 2015).

Table 1

Major indices of migration in the Arkhangelsk Region and the Nenets Autonomous District²

Year	Born, people	Died, people	Depopulation index	Increase/reduce of population
2010	15,466	17,975	1.16	-2,509
2011	14,930	16,930	1.13	-2,000
2012	15,478	16,472	1.06	-994
2013	15,305	15,967	1.04	-662
2014	13,735	14,308	1.04	-573

Thus, the Arkhangelsk region has a permanent tendency to reduce the population and the excess of deaths over births.

Certainly the unfavorable demographic trends in the region are largely related to the deterioration of the migration situation, as there is a significant outflow of the population. Migration plays an important role in the socio-ekonomic development of many regions of Russia [2, 3]. This trend is typical for the Arkhangelsk Region. The number of the retired population in the region is much greater than the number of arriving, which naturally leads to a decline in population and migration and in general it shows a low attractiveness of the Arkhangelsk region for migrants. Referring to the statistical data, it can be noted that in 2003—2014 a fixed annual migration loss is between 5,835 people in 2008 to 10,244 in 2012.

Table 2

Migration of population in the Arkhangelsk Region and the Nenets Autonomous District³

Years	Increase (decrease) of population		
	Urban and rural population	Urban	Rural
2003	-7,604	-1,226	-6,378
2004	-7,691	-1,042	-6,649
2005	-9,251	-3,064	-6,187
2006	-8,908	-2,380	-6,528
2007	-5,835	-452	-5,383
2008	-7,638	-2,770	-4,868
2009	-6,143	-694	-5,449
2010	-10,104	-2,043	-8,061
2011	-9,347	-2,343	-7,004
2012	-10,244	-3,755	-6,489
2013	-9,848	-4,163	-5,685
2014	-7,721	-1,200	-1,509

Notes: For 2003—2010 the data was accounted with a regard to the results of the 2010 population census. In accordance with the international recommendations since 2011 the statistical accounting of long-term migration includes people who are registered at the place of residence for a period of 9 months or more.

² Pokazateli estestvennogo dvizheniya naseleniya Arkhangelskoj oblasti, vklyuchaya Neneckij avtonomnyj okrug. URL: <http://arhangelskstat.gks.ru> (Accessed: 04 February 2015).

³ Obshchie itogi migracii naseleniya. URL: http://arhangelskstat.gks.ru/wps/wcm/connect/rosstat_ts/arhangelsk-stat/resources/4857db80482d2661a4bba4ed3bc4492f/MIGR.doc (Accessed: 12 November 2015).

One of the most active social and demographic groups by the outflow of population is *youth*. The population of working age and younger is more adventurous to the migration processes, rather than the older generation.

Table 3

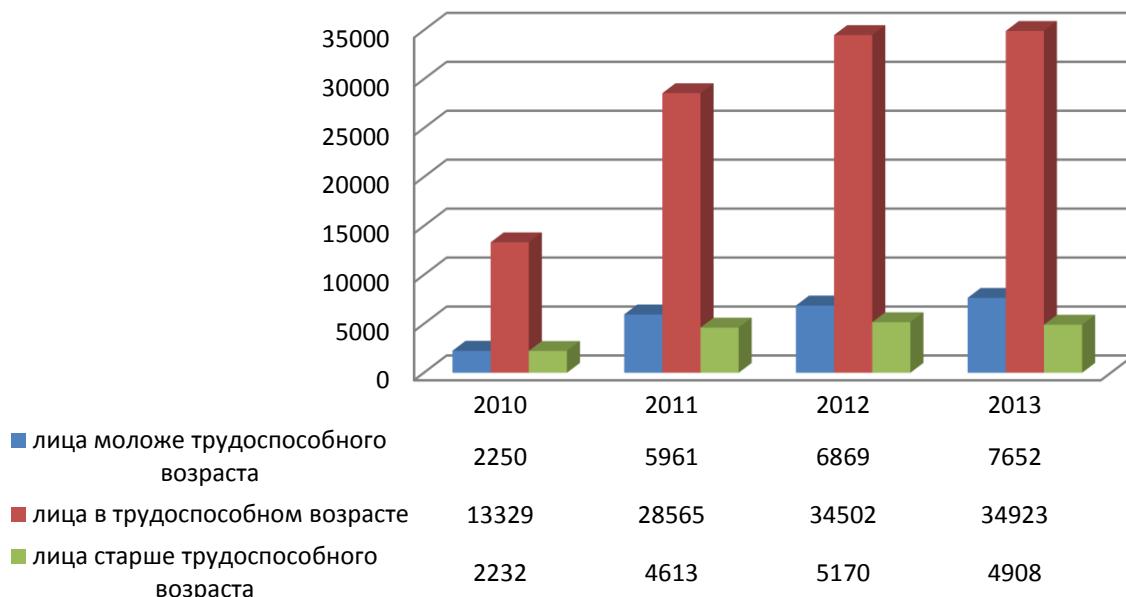
*Social and demographic characteristics of migrants in 2014,
the Arkhangelsk Region and the Nenets Autonomous District⁴*

Age of migrants	Amount of arrivals			Amount of departed			Increase of migration		
	all	men	women	all	men	women	all	men	women
Total	36,533	17,211	19,322	44,254	20,447	23,807	-7,721	-3,236	-4,485
Including the people aged:									
Yonger than employable age	6,659	3,337	3,322	7,616	3,879	3,737	-957	-542	-415
Employable	26,405	12,919	13,486	31,939	15,274	16,665	-5,534	-2,355	-3,179
Older than employable age	3,469	955	2,514	4,699	1,294	3,405	-1,230	-339	-891
14 years old and older	30,434	14,175	16,259	37,275	16,887	20,388	-6,841	-2,712	-4,129
18 years and older	28,021	12,888	15,133	34,508	15,438	19,070	-6,487	-2,550	-3,937
Age groups:									
0–4	2,752	1,389	1,363	3,026	1,559	1,467	-274	-170	-104
5–9	2,230	1,106	1,124	2,556	1,305	1,251	-326	-199	-127
10–14	1,327	659	668	1,657	828	829	-330	-169	-161
15–19	4,343	2,009	2,334	5,348	2,533	2,815	-1,005	-524	-481
20–24	4,727	2,054	2,673	5,431	2,344	3,087	-704	-290	-414
25–29	5,779	2,642	3,137	6,903	2,982	3,921	-1,124	-340	-784
30–34	3,999	1,876	2,123	4,976	2,259	2,717	-977	-383	-594
35–39	2,672	1,396	1,276	3,274	1,645	1,629	-602	-249	-353
40–44	1,581	850	731	2,002	1,060	942	-421	-210	-211
45–49	1,499	849	650	1,698	932	766	-199	-83	-116
50–54	1,496	767	729	1,848	870	978	-352	-103	-249
55–59	1,346	659	687	1,810	836	974	-464	-177	-287
60–64	953	424	529	1,419	603	816	-466	-179	-287
65–69	470	194	276	708	288	420	-238	-94	-144
70–74	386	131	255	473	160	313	-87	-29	-58
75–79	370	104	266	465	126	339	-95	-22	-73
80 years old and older	603	102	501	660	117	543	-57	-15	-42

The most numerous groups among former migrants are young people aged 15–19, 20–24, 25–29 and 30–34 years — people of working age (Table 3). It is 22,658 people or more than 51% of all departures from the region. This process, unfortunately, is widespread and leads to a reduction in the number of population, rapid aging and reduce the region's intellectual potential. The number of people of working age who left in 2014 was 31,939 or more than 72% of the total number of departures. The result is that there is a danger of increasing population aging.

The outflow of people below working age is not so significant, but it is important compared to the older generation (Pic. 1).

⁴ Socialno-demograficheskaya harakteristika migrantov v 2014 godu URL: http://arhangelskstat.gks.ru/wps/wcm/connect/rosstat_ts/arhangelskstat/resources/fe68bd8048f4c10e8d19af1c1085d61b/SD_migr2014.doc (Accessed: 25 December 2015)



Picture 1. Amount of people departed from the Arkhangelsk Region and the Nenets Autonomous District. People of the working age are the most numerous group (the red one). Blue — below this age, green — older than it.

We should also pay attention to such an indicator as the ratio of the volume of migration of rural and urban population. In today's Russian society, reduce of the number of rural population is bigger than urban. One of the fundamental reasons for this phenomenon is the increase in migration outflow of rural youth to the city. In the rural areas we observe a rapidly growing number of elderly people and there is a decline in working-age people. The migration outflow from rural areas in the Arkhangelsk region exceeds the levels of migration outflow of urban population, which speaks of the difficulties of the rural labor market and the extremely low level of living comfort there.

Table 4

Migration in the urban and rural areas of the the Arkhangelsk Region and the Nenets Autonomous District⁵

Years	Urban (people)	Rural (people)
2010	-2,043	-8,061
2011	-2,343	-7,004
2012	-3,755	- 6,489
2013	-4,163	- 5,685

Note. In accordance with international recommendations since 2011 statistical accounting of long-term migration of population also includes persons who are registered at the place of residence for a period of 9 months or more.

In order to reduce the migration of young people and sustainable growth of population in the countryside and strengthening the working capacity of the region there is a program "Sustain-

⁵ Sootnoshenie obyomov migracii gorodskogo i selskogo naseleniya Arkhangelskoj oblasti, vklyuchayaya Neneckij avtonomnyj okrug. URL: <http://arhangelskstat.gks.ru> (Accessed: 04 February 2015).

able development of the rural areas of the Arkhangelsk region (2014-2017 years)", aimed at stimulation of investment activity in the agricultural sector and the creation of favorable infrastructure⁶.

A feature of the migratory movements in the Arkhangelsk Region is migration exchange between the other regions of Russia, the so-called inter-regional migration has a significant impact on the change in population. ***Where do the youth go when leaving their small motherland?*** Among the main subjects of the Russian Federation, where migrants come or leave, is St.-Petersburg. So, for the period from 2010 to 2013 the outflow to the Northern capital from the Arkhangelsk Region was 13,159 people and 4,825 people arrived. The next in the list is Vologda and Moscow region⁷ (*Table 5*).

Table 5

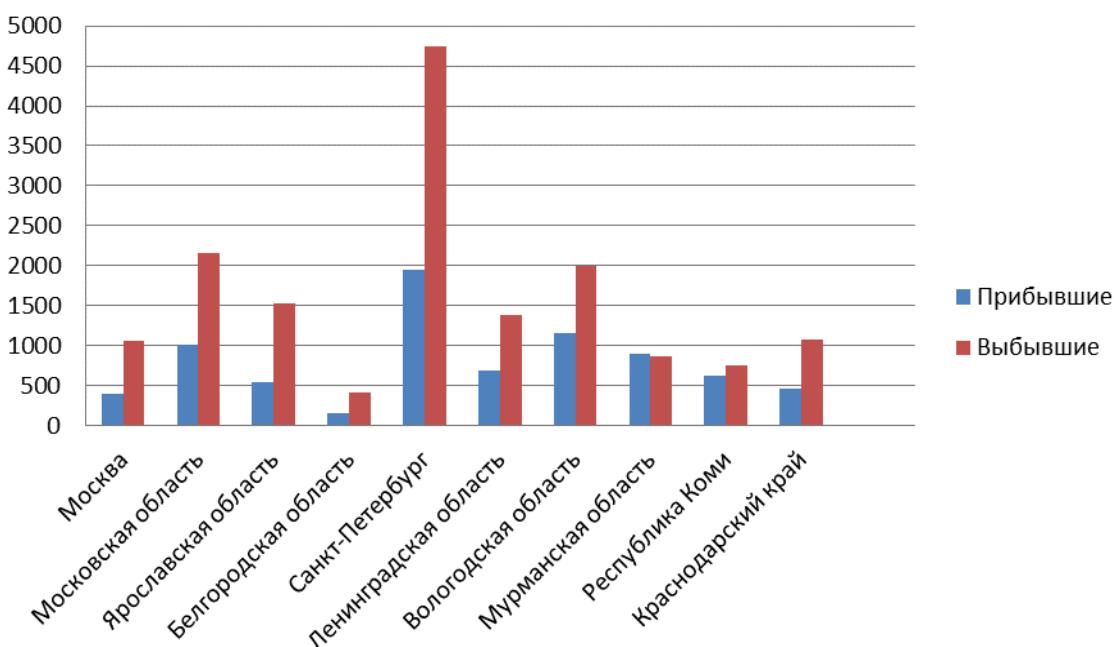
Migrational exchange between the Arkhangelsk Region, the Nenets Autonomous District and the other regions of Russia

	2010		2011		2012		2013	
	Arrived	Departed	Arrived	Departed	Arrived	Departed	Arrived	Departed
Moscow	60	748	201	664	327	1,006	404	1 065
Moscow Region	97	857	290	1,490	745	2,581	1 007	2,154
Yaroslavl Region	62	631	181	1 135	383	1 295	549	1 527
Belgorod Region	37	289	90	389	155	418	153	420
<u>St.Petersburg</u>	238	<u>1,348</u>	658	<u>3,022</u>	<u>1,982</u>	<u>4 038</u>	<u>1,947</u>	<u>4,751</u>
Leningrad Region	124	601	309	1 458	663	1 482	685	1 390
Vologda Region	316	888	750	1,719	1,005	2,033	1,157	1,994
Murmansk Region	239	460	843	1,089	1,022	984	904	870
Komi Republic	211	420	481	638	607	713	619	758
Krasnodarsky Krai	87	498	314	836	473	886	456	1069

During this period of time the number of the people who left the Arkhangelsk region and moved to all subjects of the Russian Federation is considered greater than the number of arrived people. In order to illustrate it we present migratory exchange for 2013 (*pic. 2*).

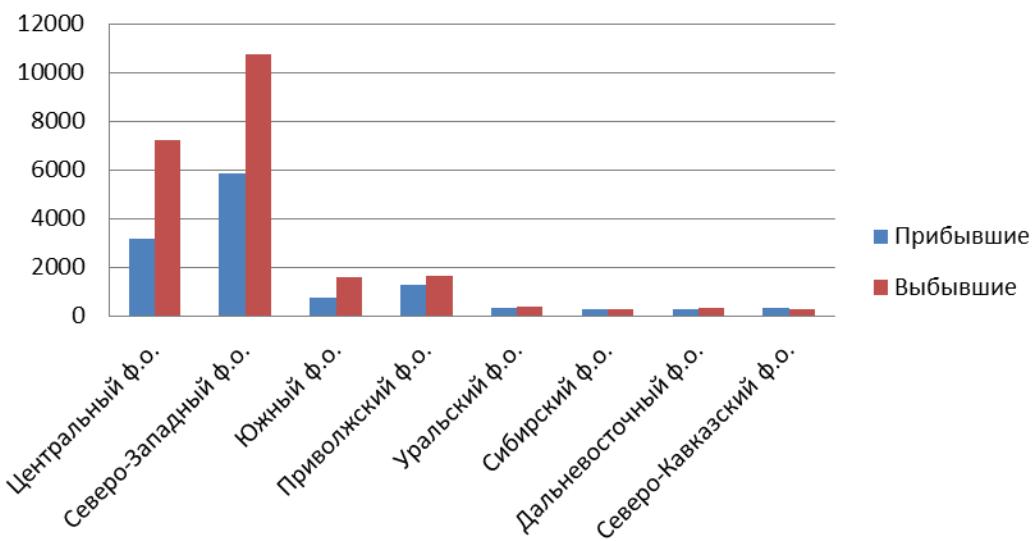
⁶ Postanovlenie Pravitelstva Arkhangelskoj oblasti ot 08.10.2013 № 461-pp «Ob utverzhdenii gosudarstvennoj programmy Arkhangelskoj oblasti «Ustoichivoe razvitiye selskih territorij Arkhangelskoj oblasti (2014—2017 gody)».

⁷ Migracionnyj obmen naseleniya Arkhangelskoj oblasti, vklyuchaya Neneckij avtonomnyj okrug s otdelnymi regionami RF s 2010—2013 gody // Statisticheskij sbornik. Arkhangelsk. S. 5—34.



Picture 2. Migrational exchange between the Arkhangelsk Region and the Nenets Autonomous District and other Russian regions 2013. The biggest exchange is with Saint-Petersburg.

Almost the same is the situation of migrational exchange to the federal districts (the number of people left is higher than the number of arrivals). But in 2013 the only district with positive migrational exchange was Siberian Federal District. The greatest importance still have North-West and Central Federal Districts (pic. 3).



Picture 3. Migrational exchange between the Arkhangelsk Region and the Nenets Autonomous District and Federal Districts of Russia 2013. The biggest exchange is with the North-West Federal District.

It is also interesting to refer to the list of regions of the North-West Federal District more attractive to migration in January — August 2014, where the Arkhangelsk Region got the 9th place with its migration loss of 4,087 persons (Table 6).

Table 6

Migration attraction rating for the areas of the North-West Federal District⁸

Nº	Subject of the Russian Federation	Arrived (people)	Departed (people)	Increase/decrease of migration
	Northwestern Federal District	377,062	348,828	+28,234
1	St. Petersburg	161,211	138,117	23,094
2	Leningrad region	61,974	47,163	14,811
3	Kaliningrad region	22,130	17,584	4,546
4	Vologda Region	22,186	21,767	419
5	Novgorod region	15,587	15,454	133
6	NAD	1,351	1,311	40
7	The Republic of Karelia	13,638	13,863	-225
8	Pskov region	16,344	16,973	-629
9	Arkhangelsk region	20,160	24,247	-4,087
10	Murmansk region	22,247	26,566	-4,319
11	Komi Republic	20,234	25,783	-5,549

St. Petersburg with a migration gain of 23,094 people and the Leningrad region are still the most attractive for migrants. By August 2014 the population has grown at the expense of migrants of 14,811 people. The last in the rating was the Murmansk Region with a migration loss of 4 319 people and the Republic of Komi with the loss of 5,549 people. The Arkhangelsk region was at the 9th place (minus 4,087 people).

The Arkhangelsk region is not only left by people who move to the other regions and countries. It also gets external migrants. Of interest is the number of people with a migration registration in the Arkhangelsk region. The total number of them, according to the Office of the Federal Migration Service of the Arkhangelsk region, in 2012 — 25,851 people in 2013 — 28,391 people, in 2014 — 27,751 people. Major groups of foreign people in Arkhangelsk in 2014 are migrants from: Ukraine, Azerbaijan, Uzbekistan, Tajikistan, Belarus, Armenia, Germany, Moldova, India, Norway and Finland.

Analysis of external migration flows for the past five years, allows us to define six priority countries where do the migrants come from: Ukraine, Azerbaijan, Uzbekistan, Tajikistan, Belarus and Armenia. Indian migrants in 2012 — 2,207 people, in 2013 — 3,181 people and in 2014 — 856 people. Migrants from Norway: 849, 680, 771 people, respectively. The aims of entry of external migrants: work in the construction, trade and other sectors, private and business trips. Ususally, migrants are young men aged 18 to 39 years.

The implementation of long-term target program "Assistance to the voluntary resettlement to the Arkhangelsk region for compatriots living abroad for 2013-2015" will increase the number of eco-

⁸ Samyj privlekatelnyj dlya migrantov region Rossii — Moskovskaya oblast. URL: <http://www.regnum.ru/news/polit/1863474.html> (Accessed: 17 February 2015).

nominally active population in the area. Migrants can fill the vacancies in educational, medical, state institutions, "workers of preschool education and specialists for agricultural organizations, which will ensure the development of social sphere and the economy of the Arkhangelsk Region"⁹.

Within the framework of the state program for the 2013—2014 the region got 417 people: 274 participants of the program and 143 family members. "Age of compatriots ranges from 19 to 60 years. 76% of compatriots are citizens of Ukraine, 6.1% — the Republic of Armenia, 4.8% — Moldova, 4.8% — the Republic of Uzbekistan, 2.5% — the Republic of Kazakhstan"¹⁰.

Conclusion

What makes people leave their homeland in the Arkhangelsk North? The main reasons for young people to departure from the Arkhangelsk region to more developed metropolitan areas: the bad climatic conditions, inflated costs for housing, low wages, lack of opportunities for self-realization and long-term growth, an insufficient number of recreational organizations, as well as undeveloped infrastructures of the region.

Does the region have the future when the young people leave? Of course, the answer to this question requires further research and analysis.

Summarizing the study of migration, it should be noted that the Arkhangelsk region is a territory, which "gives away" the population to other regions of the country; the most active age group is young people. This leads to suffering of economy and social sphere, a lack of skilled workers and specialists. The ongoing positive change in the socio-economic development of the region will undoubtedly help to reduce the outflow of young people.

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⁹ Postanovlenie Pravitelstva Arkhangelskoj oblasti ot 10.09.2013 № 412-pp «Ob utverzhdenii dolgosrochnoj celevoj programmy Arkhangelskoj oblasti «Okazanie sodejstviya dobrovolnomu pereseleniyu v Arkhangelskuyu oblast sootechestvennikov, prozhivayushih za rubezhom, na 2013—2015 gody».

¹⁰ Press-reliz o rabote UFMS Rossii po Arkhangelskoj oblasti po priyomu sootechestvennikov v ramkax Gosudarstvennoj programmy po okazaniyu sodejstviya dobrovolnomu pereseleniyu v RF sootechestvennikov, prozhivayushhix za rubezhom.URL: <http://www.ufmsarh.ru/pressreliz7.php> (Accessed: 17 February 2015).

СОХРАНЕНИЕ КУЛЬТУРНОЙ И ПРИРОДНОЙ СРЕДЫ АРКТИКИ PROTECTING CULTURAL AND NATURAL ENVIRONMENT OF THE ARCTIC

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International environmental cooperation in the Arctic



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Abstract. Key challenges and threats to the Arctic environment are associated with progressive pollution and degradation of environmental components in the face of increasing anthropogenic load, the accumulation of waste, climate change and others. International cooperation in the field of environmental safety, unprecedented speed and energy cooperation in the Arctic can serve as a positive example and a lesson for humanity. An important role in environmental cooperation play an international environmental organization, the Arctic Council, states. On the con-Jania cooperation affects contradictory trends determining the current state of international co-relations. It is concluded that joint efforts need to create a system of global interaction, which, taking into account the interests of all parties, would be enabled to make rational use of natural resources in the Arctic.

Keywords: *Arctic, environment, international cooperation*

The load of civilization on the environment has been growing over the past century and it has now reached the maximum values. Many countries plan the development and use natural re-

sources for the growth of production. Many industrial developed countries have largely exhausted their resource potential. In this situation, the Arctic is seen as a strategical reserve for the future development by many countries taking active steps to expand the research, economic and even military presence in the region. The Arctic is, to a greater extent than other regions, a subject to the human impact. It is one of the most fragile ecosystems on the planet. Environmental problems in the Arctic are likely to grow out of the regional to the global because of its natural and geographical features.

Key challenges and threats to the Arctic environment

Challenges of the 21st century, related to the Arctic region, are: climate warming, the possibility of development of hydrocarbon reserves under the ice and bio-resources of the northern seas. Violation of sustainable climate leads to the abnormal growth of meteorological phenomena, instability and global climate change, disturbance of the solar spectrum, desertification, displacement of the geographical zones and the spread of dangerous diseases. The natural mechanism of the stable environment is disturbed. As it is noted in the subprogram "Development and use of the Arctic" of the federal target program "World Ocean", climate change will have serious economic, social and environmental consequences. Particularly serious economic consequences may cause a violation of the stability of transport (gas and oil pipelines, roads) and social infrastructure (housing and other social facilities)¹.

One of the manifestations of climate change in the Arctic is the reduction of the ice cover in the Arctic Ocean. The flow of warm air from lower latitudes led to an increase of the surface air temperature. At the same time, there is a decrease in ice area and its thickness in the Arctic. On the other hand, a decrease in the ice cover of the Arctic Ocean may facilitate access to the resources of the continental shelf and to make the use of the Northern Sea route for transcontinental traffic real. Norwegian researchers observed the Arctic climate and noticed that the melting of glaciers continues even in times of very low temperature. Earlier the Arctic ocean area has always covered with ice, regardless of the season. Now the ice, that previously covered the ocean all the year round, begins to melt in the summer.

The complexity of climate change issues is determined by the uncertainty in the assessment of ongoing and projected climate changes. The Climate doctrine of the Russian Federation stated that in spite of the extensive and convincing scientific data about current and projected climate change, there was a considerable uncertainty in the estimates of how climate change

¹ Podprogramma «Osvoenie i ispolzovanie Arktiki» federalnoj celevoj programmy «Mirovoj Okean» / Prinyata post-anovleniem Pravitelstva RF ot 10.08.1998. URL: https://www.consultant.ru/document/cons_doc_LAW_99342 (дата обращения: 14.01.2016)

would occur and how it would impact the environmental systems, economic and political activity, as well as social processes in different states and regions. The Russian Federation proceeds from the need for action in terms of non-certainty estimates of the future climate changes and their consequences, and is ready to meaningful participation in relevant international initiatives². The Arctic is characterized by high vulnerability of the environment to human impact and slow speed of recovery of damaged natural objects (natural ecosystems, landscapes). This leads to the accumulation of industrial waste and reduced tundra pastures, so important for the traditional resource use of the indigenous peoples.

Western partners largely lay responsibility on Russian companies for the pollution in the Arctic, because our territory has serious sources of pollution: mining and metallurgy, pulp and paper mills, oil and gas industry, nuclear industry, Northern fleet and fishing vessels, as well as wastewater discharge. At the same time, a significant contribution to pollution in AZRF is made by the sources outside Russia. Among them: nuclear fuel recycling enterprises in Europe, industry in North America, Western and Central Europe, Central and Southeast Asia. Due to the circulation of air masses in the Arctic pollutants, gas and aerosol impurities accumulate in the atmosphere.

State interests of the Russian Federation in the field of nuclear and radiation safety are determined by the need to preserve public health, the prevention of pollution of the environment, particularly the political and economic significance of the use of atomic energy. An important element of effective work in this area is international cooperation, which is actively developing on the basis of bilateral and multilateral agreements. Together with the United States, Norway and the United Kingdom has implemented a number of projects on environmental issues in the Arctic (AMEC), aimed at radio ecological safety while handling radioactive waste and spent nuclear fuel generated at the nuclear submarine dismantlement. The European Union had TACIS technical assistance program aimed at improving the safety of nuclear power plants and other civilian nuclear facilities. Effective arrangements for international cooperation activities were carried out within the framework of the IAEA. The initiative of the US-Russia-IAEA led to the International Conference on Security of Radioactive Sources, approved by the Code on the Safety and Security of Radioactive Sources³.

² Klimaticheskaya doktrina Rossijskoj Federacii. Utverzhdena postanovleniem Pravitelstva RF ot 17.12.2009 URL: <http://meteoinfo.ru/climatedoctrine> (Accessed: 14 January 2016).

³ Doklad «O razvitiu mezhdunarodnogo sotrudnichestva v oblasti yadernoj i radiacionnoj bezopasnosti». Zasedanie prezidiuma Gosudarstvennogo soveta Rossijskoj Federacii. 16 dekabrya 2004 goda. URL: <http://archive.kremlin.ru/text/appears2/2004/12/16/97005.shtml> (Accessed: 14 January 2016).

As for the level of pollution of the Arctic seas, it is lower compared to the other seas. However, the accumulation of certain pollutants in the particular locations and populations of living organisms lead to their inclusion into the food of the locals, and their concentration is often higher than in food products outside the Arctic.

Russia plays a crucial role in the political processes related to the Arctic region, as it has the largest territory and long coastline. Any serious technological disaster there will cause the most adverse consequences, specifically for Russia. The main ecological challenges and threats in the AZRF:

- a) progressive pollution and degradation of environment in case of increasing anthropogenic load, the accumulation of waste and transboundary pollution;
- b) the high risks and costs in the development of natural resources, including the transport operations in extreme climatic conditions;
- c) a high degree of fixed assets' run out;
- d) global climate change and its impact on the spread of the permafrost, the development of dangerous hydro-meteorological, ice and other natural processes, increased risk of damage because of these processes or technogenic accidents.

The complexity of the Arctic resource exploration, led to understanding that to solve the existing challenges in the region and to implement the national interests in the Arctic is easier together. The reality is the fact that none of the Arctic countries alone will not be able to carry out a large project. At the same time the problems of the environment and ecological safety are the priority for any project in the region.

International cooperation in the field of environmental safety

Against the background of local conflicts and confrontation in the Middle East, Africa and Asia, the unprecedented speed and energy of co-operation in the Arctic these years could be a positive example and a lesson for humanity. Arctic regions today have become a lab of international cooperation. Even in case of temporary tension in international relations, cooperation is continued on many levels [1, p. 8]. The system of international cooperation in the field of ecological safety of the Arctic started in the early 1970s. At the same time, according to some experts, it has not yet fully formed.

Questions of international cooperation and legal regulation of environmental security in the Arctic is governed by a number of agreements, mainly by the general environmental requirements. Here are some of them: International Convention on Civil Liability for Oil Pollution Damage (1969), the London Convention on the Prevention of Marine Pollution (1972), the UN Declaration

of the Stockholm Conference on the Human environment (1972), the Convention on Transboundary Air Pollution (1979), the UN Convention on the Law of the Sea (1982), International Convention for the Prevention of Pollution from Ships (1973), International Convention for the Oil pollution Response and Cooperation (1990), United Nations Framework Convention on Climate Change (1992), the 1997 Kyoto Protocol to the UN Framework Convention on Climate Change 1992, the Rio de Janeiro Declaration on Environment and Development (1992) and etc. [2].

An important role in the international environmental cooperation in the Arctic is played by international environmental organizations, intergovernmental, non-governmental and financial institutions: the International Arctic Science Committee (IASC), the International Independent Ecological and Political university (MNEPU), Arctic Monitoring Program and evaluation of environment for the protection of the Arctic flora and fauna, World Meteorological organization, the Working group on the protection of the Arctic marine environment, Greenpeace, Bellona, the World Wildlife Fund and others.

In order to solve the environmental problems of the region in 1991 the eight Arctic countries: Canada, Denmark, Finland, Iceland, Norway, Russian Federation, Sweden and the United States adopted the Strategy for environmental protection of the Arctic (AEPS). In 1996 the Ministries of Foreign Affairs of these countries have signed the Ottawa Declaration and formed the Arctic Council, which aims at providing the sustainable development of the region. The Arctic Council is a key of international environmental cooperation in the Arctic.

The main goals and objectives of the Arctic Council: the environmental monitoring; obtaining accurate and sufficient information on the state of the Arctic environment; working out proposals and recommendations for the prevention and control of pollution for the Arctic states and observer countries. Arctic Council's work is carried out within the framework of the six working groups on various environmental aspects:

- a) Arctic Contaminants Action Program (ACAP)
- b) Arctic Monitoring and Assessment Programme (AMAP)
- c) Conservation of Arctic Flora and Fauna (CAFF)
- d) Emergency Prevention, Preparedness and Response (EPPR)
- e) Protection of the Arctic Marine Environment (PAME)
- f) Sustainable Development Working Group (SDWG)

An important contribution to the development of international environmental cooperation, and specific projects is made by the Barents Council. The Council works with a number of environmental projects; prospective climate strategy of the region, aimed at softing the climate change and

adapting to it. Proclaimed aim of the Council is the strengthening of stability, trust and sustainable development of the region, bilateral and multilateral cooperation in the field of economy, trade, science and technology, environment, infrastructure, education and cultural exchanges, tourism, as well as projects aimed at improving the situation of indigenous peoples of the North. Most of the projects are focused on the Russian part of the Barents Region.

BEAR Working Group on Environment focuses on common problems: global climate change and its impact on the Barents region and specific measures for the modernization of water supply, wastewater treatment. The Council worked out the climate cal strategy of the Barents Region (discussed at the 14th Ministerial Session of the Council), aimed at softening the climate change, adapting to it and the formation of the system of monitoring and modeling.

A special role in preserving the Arctic environment remains with the Arctic states. They come from a real opportunity to ensure the cooperation and constructive engagement of countries to overcome their differences. Arctic coastal states have declared their common responsibility for the situation in the waters and on the shores of the Arctic Ocean.

In the adopted on 28 May 2008 in Greenland (Ilulissat) Declaration of the five Arctic coastal states it was discussed the fact that climate change and the melting of ice might have an impact on fragile ecosystems, way of life of local communities and indigenous peoples and the development of natural resources. By virtue of its sovereignty, rights and jurisdiction over large areas of the Arctic Ocean (AO), coastal states are in a unique position to respond to these opportunities and challenges. All five Arctic coastal states whose territories are close to the Arctic Ocean, outlined not only those marine areas under their sovereignty, but also the 200-mile exclusive economic zone, where they are enjoying their jurisdiction and sovereign natural resource rights, according to contemporary international law.

In his speech at the conference of the five Arctic coastal states (Ilulissat, Greenland, May 28, 2008) Russian Minister of Foreign Affairs Sergey Lavrov pointed out that the countries whith the access to the Arctic Ocean have a special responsibility to protect its waters and coasr from pollution and to ensure sustainable development in the region.

In 2015, in the Arctic agenda some results were archieved:

- a) the International Maritime Organization agreed on the basic provisions of international security code for ships navigating in polar waters ("Polar Code");
- b) the text of amendments to the SOLAS Convention was agreed (SOLAS);
- c) amendments to the International Convention for the Prevention of Pollution from ships (MARPOL) were adopted, a number of research projects is being implemented.

In 2015 the experts from Russia, the USA, Germany, South Korea, Great Britain, New Zealand and Poland were involved in expedition to study the changes in the atmosphere, the ice and the waters of the Arctic Ocean.

The statements made at the highest political level bring hope for further positive development of international environmental cooperation in the Arctic. On 30—31 of August 2015 in Anchorage at the International conference on the Arctic, the US President Barack Obama expressed the desire to continue cooperation with all Arctic countries through the Arctic Council, especially on the climate issues. He just said that the problems arising in the Arctic could not be solved alone, so we could solve them only together [3, p. 11—12].

US Secretary of State John Kerry, who became a chairman of the Arctic Council, identified environmental issues in the region, safety and economy for protection of the Arctic marine environment as Washington's priority. The US offer adoption of a program "Regional Seas" in the Arctic Ocean similar to the program in other countries around the world, as well as to increase the scope of research problems of the ocean acidification. In an effort to overcome the consequences of the climate change, Americans intend to intensify the Arctic Council actions against damping and soot and methane emissions in the Arctic and to maintain a regular dialogue between the key players, decision-makers on this issue [4].

US presidency program in the AC focuses on three areas:

- a) The first — the protection, security and strategic management in the Arctic.
- b) The second — the improvement of the economic sphere and living conditions.
- c) The third — adaptation to climate change impacts.

Considering the problems of international cooperation in the Arctic, it is impossible not to note the fact that they affect the content of the contradictory tendencies that determine the current state of the global situation. This is proved by the sanction against Russia, related to the events in Ukraine, a sharp drop in demand and a precipitous drop in oil prices, the war a terrorist organization ISIS in Syria.

The US State Department Special Representative for the Arctic, Admiral Robert Papp, recently said in an interview (January 2016), that a significant drop in energy prices "would reduce the intensity of emotions" in the Arctic. Even 10 years ago the United States were looking for oil resources, so companies such as Shell, Conoco Philips, British Petroleum, were presented in the Arctic. "We felt the need for additional energy resources. But now the US are the energy resource exporters and the Arctic resources were no longer needed. Companies no longer consider the work in the

Arctic as a good investment. Perhaps someday the situation would change, but in the next decade – hardly”⁴.

In addition, Washington does not experience any anxiety about Russia's actions in the Arctic, its a military exercises and new military bases and the US sees no destabilization in the Arctic that Russia starts there “the most massive military growth since the Cold war”. In the same interview Papp said that he examined the question, and Russia was responsible because it had a long coastline and northern sea routes through the Arctic. Now Russia is improving its bases and communications in the Arctic and it is attracting resources. This is a legitimate activity, because you need to have the supporting infrastructure in your own territorial waters. At the same time a retired American admiral fully justifies the military building up of NATO and its presence in the Arctic and points out that the United States and Russia have always kept open channels of communication. He believes that the Arctic Council is obliged to preserve the Arctic Region without conflict.

The preservation of the principled position of Russia on the international partnership in the Arctic was explained by Russian Deputy Prime Minister Dmitry Rogozin at the Session of State Committee on the development of the Arctic in Sochi on the 5th of October 2015. He said that the range of interaction is wide: starting from common research and ending up with the specific projects. According to him: “In difficult international relations the Arctic is one of the few themes where a constructive dialogue with our foreign partners did not stop but continues to develop, including the dialog with the United States on the majority of areas of cooperation” [5].

Even in a deep crisis in relations between Russia and the West, the agenda and discussed issues in the Arctic format were constructive. So, in a few years of approvals and financial issues the financing tools of the Arctic Council projects started to work and the benefits from this activity gets Russia. Special groups were made to prepare the plan on prevention of oil spills and pollution, as well as for the implementation of the agreements on reduction of soot and methane emissions in the Arctic. Cooperation in the framework of the Arctic Coast Guard Forum, which involves the joint work of the security forces and law enforcement agencies on common problems in the Arctic.

Conclusion

Thus, the Arctic is a special, complex ecosystem and at the same time unique or, in terms of international relations, transnational environment. It includes many actors of the modern world: states, international organizations and international corporations. Russia should take part in all the positive initiatives aimed at sustainable development and international environmental cooperation

⁴ “SShA sami stali energoekspertyorom i resursy v Arktike teper ne nuzhny”. Specpredstavitel Gosdepartamenta po Arktike rasskazal o planax Vashingtona v Zapolyare. URL: <http://www.kommersant.ru/doc/2890393> (Accessed: 15 January 2016).

in the Arctic and work in all institutions operating in the region. "Adherence to the balance between the ecosystem approach and commitment to the industrial development of the Arctic is possible and necessary. International cooperation offers the prospect not only for the organization of environmental research, but also for the development of green economy, economic and social development while respecting environmental requirements"[1, p. 61].

In the future, we need to work together to create a system of global interaction, taking into account the interests of all parties, enabled to make rational use of natural resources in the Arctic. The successful solution of the natural resource issues in the region, based on the principles of sustainable development, green economy will allow to preserve the fragile ecosystem of the Arctic, which is to become a guarantor of international security for many years.

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Ecophysiological characteristic of plants communities under the bird rookery of West Spitsbergen



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Abstract. In the Arctic nature carries out its unique experiments, an example of which is the vegetation of bird colonies, where life is determined by the organic matter, which is taken out from the sea birds and is used only under the bird colonies. The absorption of nitrogen in the Arctic is limited by abiotic factors: low temperature and humidity, the slow erosion of rocks, low transpiration and the presence of permafrost. The data on the content of total nitrogen and chlorophyll in plants and lichens in communities located beneath bird colonies in the West Svalbard. The study showed that plant communities of rookeries, where the effect of one of the limiting factors of the Arctic (poor soil horizon) is reduced, give some idea of the "Green Arctic", where the current climate change is guiding it.

Keywords: *West Spitsbergen, plants, lichens, ornithogenic communities, pigments of plastid, total nitrogen, the "Green Arctic"*

Low nitrogen content limits the growth of plants at high latitudes [1]. Absorption of nitrogen in the Arctic is limited by abiotic factors: the low temperature and humidity, the slow erosion of the rocks, low transpiration and the presence of the permafrost. The slow speed of the natural decomposition of organic matter and a long term ice cover lead to a reduction of vegetation period up to 6-8 weeks. In nature, there are various ways that improve plant nutrition for these poor soils. Under these conditions, free nitrogen-fixing microorganisms, ericoids, work and exsiccosis symbioses that utilize available soil nitrogen goes on. Some species consume ammonia. Against the background of the poor nitrogen areas, rich with organic matter places exist and they are related to bird colonies and formed

ornithocophilous community. Ornithogenic soil associated with the places of seasonal replenishment of organic matter; on top of the rookery its maximum is reached and its amount is gradually reduced to its base. This territory usually has nitrogen content. Communities along the nitrogen concentration gradient are a natural model system that allows analysis of the reaction of certain plants to additive nitrogen. Purpose is to study the content of plastid pigments and total nitrogen in plants and lichens, as a reaction to the changing conditions on the transect on the slope under the rookery.

Materials and methods

The research was carried out in July 2011, at Cape Starostin, based on the fragments of rock ridge ($78^{\circ} 04'44''$ N, $13^{\circ} 50'16''$ E). Rookery was about 150 meters along the rock of about 400 m. The height of the rock to the rookery area is about 12 meters. The mountains are composed of limestone, dolomite, conglomerate-breccias Carboniferous-Permian. The area was inhabited by a colony of fulmars (*Fulmarus glacialis*), a small numbered one [2]. The rookery is of the southern orientation, so it has a light for about 11 hours a day. The territory on the way to the rookery represents a community of the upland tundra with numerous lakes and marshy places. Mountain foothills were intensely colored with a red-brown color, the height is 300—400 m, snow tongues are 150—200 m. Transect¹ was laid down on top of the high rock, where there is a waterfall and a snowfield departs. In period between the 19th of April and 24th of August this latitudes enjoy the polar day and a stable temperature transition through 0°C to positive values takes place between the 5th of June; to negative — on the 18th of September. The most warm month is July with an average temperature of 8.0°C. The average for the annual precipitation is 563 mm, with most of the falls in winter [3, p. 10—12].

Composition of the ornithocophilous vegetation near the rookeries is quite specific [4, 2004], and it includes oligomers, monodominant meadows, dominated by *Trisetum spicatum* (L.) K. Richt., *Poa arctica* R. Br. var. *vivipara*, *Poa alpina* L. var. *vivipara*, *Poa alpigena* (Fr.) Lindm, there are herbaceous plants: *Cochlearia groenlandica* L., *Cerastium alpinum* L., *Bistorta vivipara* (L.) F. Gray, *Saxifraga cernua* L., *Arabis alpina* L., *Chrysosplenium tetrandrum* (N.Lund) Th. Fr. Participation of species typical for the zonal tundra and mountain tundra is small: *Salix polaris* Walenb. L., *Saxifraga oppositifolia* L., *S. cespitosa* L., a significant part of species and their diversity falls on moss and lichen synusia. Indices of species diversity of communities constitute 5—13 species per society.

Species of plants and lichens were identified by the PABSI staff: vascular — V.A. Kostina, mosses — O.A. Belkin, lichens — L.A. Konoreva. Latin names are given by the following sources: for vascular plants [5]; moss [6]; lichens [7].

¹ Transcendent (from. Latin words *trans* — through, across, and *sectio* — section) — narrow and long platform used to study the quantitative characteristics of the species and their changes.

The content of plastid pigments was determined in alcohol extracts using spectrum-photometer UV-1800 ("Shimadzu", Japan) by optical density at the absorption maxima of chlorophyll a and b, carotenoids [8; 9]. Samples for the determination of total nitrogen content were collected at once, dried at 60°C and analyzed by the Kjeldahl method [10, 1970].

Results and discussion. Description of the community under the rookery

A transect with the release of 7 sample plots per an area of 1 m² was laid under rookeries in the plant community from top to bottom. Description of species and cover types (CP) of plants and lichens is presented in Table 1.

Table 1

Species and spread (%) of plants and lichen of the ornithocophilous community

Type	Trial area of transect (up-down)						
	1	2	3	4	5	6	7
<i>Oxyria digyna</i> (L.) Hill	40	-	-	-	-	-	+
<i>Puccinella phryganoides</i> (Trin.) Scribn. & Merr.	20	20	10	20	-	-	-
<i>Cerastium alpinum</i> L.	+	1	+	-	+	-	-
<i>Saxifraga cespitosa</i> L.	+	10	5	-	+	-	+
<i>S. oppositifolia</i> L.	+	1	20	-	20	1	+
<i>S. nivalis</i> L.	+	1	+	-	5	-	-
<i>S. cernua</i> L.	+	+	+	1	-	+	+
<i>Salix polaris</i> Walenb. L.	-	-	+	-	-	-	-
<i>Bistorta vivipara</i> (L.) F. Gray	-	-	30	-	-	-	-
<i>Luzula confusa</i> Lindeb.	-	-	-	10	1	2	2
<i>Cochlearia groenlandica</i> L.	-	+	-	-	-	-	+
<i>Dupontia pelligera</i> (Rupr.) A. Løve & Ritchie	-	+	-	-	-	10	2
<i>Alopecurus borealis</i> Trin.	-	-	-	20	+	5	5
<i>Ranunculus sulphureus</i> Soland.	-	-	-	-	-	+	+
<i>R. pygmaeus</i> Wahlenb.	+	-	-	-	-	+	+
Total higher vascular plants (amount of species)	8	8	8	4	6	7	10
<i>Sanionia uncinata</i> (Hedw.) Loeske	80	50	-	-	20	90	20
<i>Hylocomium splendens</i> (Hedw.) B. S. G.	10	50	50	50	20	15	20
<i>Aulacomnium palustre</i> (Hedw.) Schwaegr.	10	50	50	50	20	10	25
<i>Dicranum angustum</i> Lindb.	+	+	+	1	+	+	+
<i>Dicranum spadiceum</i> Zett.	+	+	+	1	+	+	+
<i>Polytrichastrum alpinum</i> (Hedw.) G. L. Sm.	-	-	+	+	-	+	+
<i>Paludella squarrosa</i> (Hedw.)	-	-	-	-	+	+	+
Brid.							
Total bryophytes (amount of species)	5	5	5	5	6	7	7
<i>Peltigera rufescens</i> (Weiss.) Humb.	21	25	3	2	2	2	-
<i>Peltigera leucophlebia</i> (Nyl.) Gyeln.	-	-	5	5	-	-	-
<i>Peltigera malacea</i> (Ach.) Funck	-	-	-	5	-	-	-
<i>Peltigera aphthosa</i> (L.) Willd.	-	+	1	-	+	1	-
<i>Xanthoria elegans</i> (Link.) Th Fr.	20	-	-	-	-	-	-
Total lichens (amount of species)	2	2	3	3	2	2	0

In total, in the chosen transect we have studied: 27 species, including 15 species of height vascular plants, 7 mosses and 5 lichens.

PI 1. Located below the rookery between a rock and snowfields (3 meters of snow on the language), near a waterfall, which provides its hydration. *Oxyria digyna* dominates with the active

participation *Puccinella phryganoides* on the background of the continuous moss cover, a great contribution is made by epilithic lichen *Xanthoria elegans* and *Peltigera rufescens* estimated coverage on rocky outcrops up to 20%.

PI 2. Located on transect 3 meters below. It has a rich moss cover (100%). Dominating species: *Puccinella phryganoides*, different species of the *Saxifraga* with huge leaves and peduncles, which are not typical for the normal habitat. Among lichens the *Peltigera rufescens* is dominating.

PI 3. Located at a distance of 5 meters below the previous one, along the rock, 15 meters from the snow cover. The moss cover is complete (100%). In a community with a large CP there are *Bistorta vivipara* and *Saxifraga oppositifolia* and lichens *Peltigera leucophlebia*, *Peltigera rufescens*, *Peltigera aphthosa*.

PI 4. Located at a distance of 40 meters from the rookery, 20m lower than the previous. The moss cover is complete (100%) with the present of marked PP cereals: *Puccinella phryganoides* and *Alopecurus borealis*. Lichens are represented by the species p. *Peltigera* (*Peltigera rufescens*, *Peltigera leucophlebia*, *Peltigera malacea*).

PI 5. Located 60 meters below from the previous one, there is no snowfield, 20 meters from the stones, on the left. The moss cover is thin (90%), there are rocks, wasteland, *Saxifraga oppositifolia* and *Alopecurus borealis* with the CP of 20%; the species composition of lichen and PP decreases.

PI 6. Located at the base of the slope, runoff goes to the right in the valley, at 120-130 meters below the previous site. Smooth area, continuous moss cover with domination of *Sanionia uncinata*. Among cereals: *Dupontia pelligera*, *Alopecurus borealis*, also one of lichens, with a small CP — *Peltigera rufescens*, *Peltigera aphthosa*.

PI 7. Located 200 meters lower than the previous site, along the flow (stream with snowfields and a rookery) with access to the upland area with the set of streams. Solid moss cover, grains with a small estimated coverage and lichens do not exist there.

A species distribution analysis on the transect showed that the number of species and the projection lichen cover is reduced along the slope, and is absent on the upland areas. The moss cover is rich in all the test areas, but the variety of species increases on the lower sited. The species composition of vascular plants is larger on the upper and lower parts of the transect. The projected coverage is decreasing along the slope. All transect has: two species of mosses (*Sanionia uncinata*, *Aulacomnium palustre*); such species are not presented among the vascular plants, which indicates the differential demands of this taxonomic group for growth conditions in the study area.

The content of plastid pigments

Comparative analysis of the content of chlorophyll in species growing near the rookery and the natural conditions of the Arctic tundra has shown an increase in pigments under ornithocophilous communities (25-100%) of the following species of vascular plants: *Luzula confusa* (the family Juncaceae.), *Puccinella phryganoides*, *Alopecurus borealis* (the family Poaceae.) and almost 2 times in mosses: *Sanionia uncinata*, *Aulacomnium palustre*, *Hylocomium splendens*. In lichen community pigment content changes have not been identified compare to natural conditions (*Table 2*).

Individuals *S. oppositifolia* on pl. 2 had different size, large and long shoots, but they had shown the lowest values of chlorophyll content of 0.46 mg/g. Smaller plants within the test area (pl. 5) had higher values of chlorophyll content — 0.73 mg/g, which corresponded to this plant growing in natural communities. Reduction of chlorophyll content in rich soils are related, to the change of osmotic potential due to the absorption of nitrogen and consequently a higher water content in these plants. Large examples of *S. oppositifolia* have a larger vegetative mass, but almost do not bloom, which is also a negative reaction to the conditions of increased wealth of soil.

Table 2

The content of chlorophyll and total nitrogen in plants in natural and ornithocophilous areas

Type	Chlorophyll (a+b), mg/g of raw mass		Total Nitrogen, %	
	1	2	1	2
<i>Oxyria digyna</i>	0.76	0.61	4.7	4.4
<i>Bistorta vivipara</i>	1.32	1.17	3.3	3.5
<i>Saxifraga cespitosa</i>	0.39	0.37	1.5	2.1
<i>S. oppositifolia</i>	0.66	0.58	1.5	2.5
<i>S. nivalis</i>	0.98	1.10	2.5	2.8
<i>Salix polaris</i>	1.23	1.22	2.6	2.6
<i>Luzula confusa</i>	1.12	1.68	-	2.4
<i>Puccinella phryganoides</i>	0.78	1.81	2.1	3.2
<i>Dupontia pelligera</i>	1.38	1.38	1.7	3.3
<i>Alopecurus borealis</i>	1.28	1.56	2.0	-
<i>Sanionia uncinata</i>	0.18	0.42	1.0	1.2
<i>Hylocomium splendens</i>	0.14	0.30	-	0.8
<i>Aulacomnium palustre</i>	0.19	0.42	0.8	0.9

Note. 1 — natural conditions, 2 — anemophilous conditions. Dash — the lack of data.

Sanionia uncinata is the most common type of moss in all of the test areas with large estimated coverage. The content of chlorophyll changed in a transect from top to bottom: 0.25 (PL2), 0.27 (PL4); 0.72 (PL6) and 0.42 (PL7) mg/g of the wet weight. A similar pattern was observed for *Aulacomnium palustre*, whose chlorophyll content increases to the bottom of the slope: 0.29 (PL2), 0.49 (PL4) and 0.47 (PL7) mg/g of the wet weight. The content of chlorophyll in *Peltigera rufescens* varies by transect as follows: 0.35 (PL1), 0.15 (PL2), 0.23 (PL3) mg/g of the wet weight.

Total nitrogen content

Humidity is the major factor involved in the labeling of ornithophilous vegetation and in processing of organics. The disintegration of organic matter determines ornithocophilous community and the state of vegetation, which is a food for many soil organisms. All the freed mineral substances, especially nitrogen, are an important and the most informative exponents of the soil wealth and status of the plants. Determination of total nitrogen as a measure of functional activity of the plant organism demonstrated one general rule: the lower amount of nitrogen was observed in the test areas in the upper parts of cones of weathering, closer to the rookery, and the maximum concentration of nitrogen was observed at the lowest test area — close to the foot of the slope.

According to the content of total nitrogen, two groups could be distinguished among the vascular plants. The first group includes species with the unchanged nitrogen content in comparison with the natural conditions (*Oxyria digyna*, *Bistorta vivipara*, *Cerastium alpinum*, *Salix polaris*). However *Oxyria digyna* and *Cochlearia groenlandica* under anthropogenic communities (about cattle-breeding complex in Barentsburg) have several times more bio-mass, compared to plants of the natural habitat. For *Cerastium alpinum* it was also noted an increase in the total nitrogen content, but it was also found that another type of *C. arcticum* had a very high constitutive activity of nitrate reductase [11]. Its active work, could be explained by the genetic differences of the different species of the same family and the populations of the same species. This argument can explain a number of differences between the data obtained in this study and some literature [12].

The second group consists of species with the increased total nitrogen content. Thus, the species of *Saxifraga* (*Saxifraga cespitosa*, *Saxifraga oppositifolia*, *Saxifraga nivalis*) have an increase of 15–70%. The maximum values were observed in *Saxifraga oppositifolia*. It is known that *Saxifraga oppositifolia* is an ectomycorrhizal type, but in terms of Svalbard this is not implemented. [11] We can assume that, natural increase of nitrogen content in species of *Saxifraga* under ornithocophilous communities may be associated with the induction of this process in this eco-type of Spitsbergen only. In monocotyledonous plant (*Puccinella phryganoides*, *Dupontia pelligera*, *Luzula confusa*) the increase in total nitrogen was 50–100%. The reaction of these species may be associated with their ability to master the ruderal ecotopes. The response of mosses and lichens is less noticeable and the increase in the total nitrogen content amounted to 30–40% only in species such as *Aulacomnium palustre* and *Sanionia uncinata*, *Peltigera rufescens*.

The effect of increased nitrogen and warming is widely studied [13]. Studies have shown that only an increase in temperature has less impact on the projective cover (PC) of various types, and more, and as a rule, the negative effect is achieved with the addition of nitrogen or nitrogen in

combination with higher temperatures. In the context of the rookery the impact is happening in the system of soft experiment, where each type can find a “micro-niche” containing organic materials relevant to their needs. In this experiment, the shrubs (species of Salicaceae) reduced density of coverage in all variants of experience with the addition of nitrogen and increasing the temperature; in a rookery this type was rare and had a slight cover. Among the herbaceous species the greatest effect in the experiment was observed for *Cerastium alpinum*, its projective cover increased up to 90% in the form of nitrogen supplements. Great effect of stimulation growth of *Cerastium alpinum* was achieved as a response to the addition of nitrogen and warming; it was observed in other studies as well [14]. In our study, *Cerastium alpinum* presented along the transect, but its projective covering was insignificant. *Saxifraga oppositifolia* increases its cover with the addition of nitrogen, but decreases — in the variant with nitrogen temperature. In our study, this species increased the projective cover up to 20% at the bottom of the transect.

Reaction of moss

The response of mosses in all variants of the field experiment was negative and most of the species disappear from the grounds by the third year (*p. Dicranum*). A similar reaction got the other groups of organisms (representatives of liverworts and lichens partially disappear or drastically reduce their abundance). In our study, we noted a sharp increase in the moss cover, throughout the transect, the formation of large moss meadows. It is known that 3-6 year increase in temperature led to a change in community composition (it became poorer), according to research carried out on 17 alpine and arctic areas [15]. Small plants that have a low potential to increase biomass, such kinds of *p. Saxifraga*, including *S. oppositifolia* reduce their projective cover [12; 16] with a long-term effect of high temperature due to the emergence of competition. This factor plays an important role in the disappearance of moss, which can not compete and make the shading with a strong impact of higher vascular plants [17].

Thus, grasses, mosses and lichens constitutively react to the warming and/or an increase in nitrogen, and the reaction depends on the type and function of habitat type [18, 2002]. However, this study shows a fairly mixed picture in the reaction of certain types belonging to the same functional type [13].

Ecosystem functions of plant communities of rookeries

Ornithophilous community rookeries are unique natural objects, where cause and effect relationships are difficult for understanding and modeling. Studies have shown that plant communities at the rookeries, where the reduced action of one of the limiting factors of the Arctic (poor soil horizon) give some idea of the “green Arctic”, where it is led by the climate change. In the Arc-

tic the nature carries out its unique experiments represented by the vegetation of rookeries, where life is determined by the organic matter, which is transferred by birds from the sea and is only used by bird colonies.

Ecosystem functions are valuable for natural integrity in the Arctic region. Understanding how they work is related to knowledge of resistance mechanisms and plant plasticity, growing in these ecotops, their potential responses to climatic changes in the Arctic that remains a relevant ecological problem, an important step of which is the development of reaction of individual species in the natural conditions. This is just one of the steps of research aimed at preservation of the fragile Arctic environment. Of course it requires scientific analysis and synthesis of many processes that go on not only in the plant world of the Arctic region, but also in the fauna and the waters of the northern seas and climate.

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ОБЗОРЫ. REVIEWS

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2-nd meeting of Arctic expert club (23 October 2015)



"Green economy: the environmental imperatives for economic development of the Russian Arctic": Resolution of the round table

Abstract. Here we publish the resolution of the round table "Green economy: the environmental imperatives for economic development of the Russian Arctic", held within the framework of the 2nd meeting of the Arctic Expert Club on the 23rd of October 2015. The organizers of the round table: the Institute of Regional Studies and Urban-planning of the Higher School of Economics, Arctic Center for Strategic Studies NArFU named after M.V. Lomonosov. Co-organizers the Russian Institute of Strategic Studies (RISS).

Keywords: *Russian Arctic, "Green Economy", environmental assessment, safety, accumulated environmental damage, dumping, marine natural resources, infrastructure, tourism, atlas, politics, international cooperation*

Russian Arctic includes both the land areas of the Arctic zone of the Russian Federation (the Russian Arctic), defined by Russian Presidential Decree № 296 of May 2, 2014, and the seas of the Arctic Ocean. The Russian Arctic and the Arctic Zone of the Russian Federation, as identical concepts – are inland sea territorial waters; exclusive economic waters areas of the Barents, White, Kara, Laptev, East Siberian and Chukchi seas; the continental shelf, defined by the UNCLOS; the waters of the Northern Sea Route as a historically established national transport communication of the Russian Federation; all as discovered and possible to be discovered areas and islands, located in the Arctic Ocean; northern territories of the Russian Federation, its subjects and municipalities on the coast of the northern seas bordering the Arctic Ocean and providing security of the Russian state; airspace (© Y.F. Lukin, 2015).

Local internal waters (12 nautical miles), the exclusive economic zone (200 nautical miles), continental shelf (350 nautical miles) — terms of the international law, UNCLOS. Their use is correlated with international enforcement practice. "Water area of the NSR" is defined in the federal law 28.07.2012 N 132-FZ "On Amendments to Certain Legislative Acts of the Russian Federation regarding state regulation of merchant shipping in the waters of the Northern Sea Route".

Determining the internal borders of sea waters in the Arctic and the Far North of Russia could be defined as the emerging area of the Arctic National transport line (ANTL) from Murmansk to Petropavlovsk-Kamchatsky, which was discussed in the Council of Federation of the 28th of January 2016 at the meeting of the Expert Council of the Arctic and Antarctic and (chairman V.A. Shtyrov). Objectively, however, we need to add 2 more ANTL seaports hubs in Arkhangelsk and Vladivostok. As a result, all of the sea coast from Arkhangelsk and Murmansk to Petropavlovsk-

Kamchatsky and Vladivostok will be included in ANTL. Russian waters of ANTL is longer than the NSR historically marked in the last century, fits the requirements of transportation and logistics, international shipping and trade.

The thesis of “everything adiscovered here and possible to be opened here land, islands located in the Arctic Ocean” is cited by the Order of the USSR Presidium of the Decree of 15 April 1926 “On the declaration of the USSR territory, lands and islands located in the Arctic Ocean”. Climate change may contribute to both the emergence of new and disappearance of old islands, which requires permanent verification. It should be taken into account that at the same time the world's oceans there is a struggle even for the most minor rocks and islands.

The composition of the Russian Arctic — AZRF, thus, keeps the best traditions (Russian empire — the Soviet Union — the Russian Federation) and legal connection with the acts of 1916, 1926, 1989, 2008. When the territories, islands and waters of the Arctic were included in the Russian Arctic (not only the land but also the sea) certainly a multidisciplinary approach was used to take into account not only the astronomical (Polar Circle), physical, geographical and bioclimatic approach, but also the administrative and territorial division from the standpoint of control, geo-cultural approach, cultural and historical traditions of the regions and their geopolitical importance, socio-economic and other criteria.

The Arctic is a special, complex ecosystem and at the same time unique in terms of international relations and transnational environment. It is an area where many of the modern world actors communicate: the states and their unions, international organizations, society and business, TNC and people. We may not realize it fully but Arctic is not only raw materials, carbohydrate delivery, and the whole landscape of the Russian Arctic but it is a real national wealth of our country, the quality of which largely determines the stability of biospheric processes, global climate, economic development, health of the population of Europe and Asia.

Today, Russia is actively returning to the Arctic, reviving the Northern Sea Route, its infrastructure, integrated solutions and etc. However, the strategy adopted, a long-term program of development of the Russian Arctic at federal and regional levels today does not work as we would say, it often turns out “as usual” due to various reasons. The conditions experienced by the financial and economic crisis, sanctions against Russia, a collapse of oil prices, devaluation of the ruble, worsening of geopolitical situation, the war against the ISIS — a terrorist organization banned in Russia, a new cold war, make the public targeted investment programs, especially at the regional level likely to become the future business.

In these difficult conditions it is more than urgent to provide, here and now, economic and environmental balance, protection of the natural and cultural environment in the Russian Arctic, understand and implement a transition to a green economy technologies for the benefit of the entire population, accounting that Arctic area is characterized by extremely vulnerable nature and long-pe-riod of its recovery. In the Arctic and the North of Russia the 6th technological order and the green economy has not yet become widely available, but they are the future.

The transition from the traditional model of economic growth to the “green economy” — is on-trend with reliance on resource-saving and environment-friendly production and elevated well-being and reduce of the risks of natural and cultural damage. The key issue of the green economy in the Arctic becomes a transition to a new technology of recycling, the creation of non-waste production. The green economy must turn the cart-waste back into the production cycle, causing minimum damage to the environment. The main problem today is largely in the economic price of the issue, the extent of the expenditure, and payback of environmentally friendly projects in the transition to a green economy in the North. Where to get the necessary resources and to find sources of funding for the promotion of the green economy in the Russian Arctic? The question often remains open, especially in the regions as the search of investors and implementation of projects based on public-private partnership.

It is important to have an assessment of human impact on the environment on the basis of inventarization of sources and facilities of such an impact; to collect information about the pollution of environmental components of the Arctic ecosystem and the violation of its state. In the Russian Arctic for several years we had a large-scale cleaning of islands and coastal areas and the removal of waste. This work actively involved regions, federal departments and agencies, including the Ministry of Defence of the Russian Federation. In 2011—2015 we worked on the assessment of AED and cleaned the Arctic areas: archipelago of Franz Josef Land, Wrangel Island, the settlement Amderma, Svalbard, and etc. The challenge now is to prevent future conflicts associated with the emerging of new polluting industries and especially it is important to pay attention to the development of housing, services and urban infrastructure of Murmansk, Vorkuta, Norilsk, Arkhangelsk, Severodvinsk, Tiksi and other cities and towns, where 80% of the total population of the Russian Arctic live in permanent and shifting settlements.

Creation of modern research and forecasting is extremely relevant for today in order to ensure the introduction of new knowledge, technologies, methods and accelerate the development of the production, of high-tech industries and green economy in the Russian Arctic. Conceptually, “green” economy is very close to the traditional culture of northerners, their worldview, values and can play a huge role in the future in the socio-economic and cultural development of all indigenous communities, large and small numbered peoples of the North, Siberia and the Far East.

Within the framework of the 2nd meeting of the Arctic expert club it was considered a key issues of green economy, environmental safety and the development of the Arctic resources; approaches to balance of economic and environmental development of the territories; current trends in the field of elimination of accumulated environmental damage (AED); modernization of management, regulatory and legal framework to ensure environmental security activities in the Russian Arctic; the development of the Northern Sea Route and the prevention of pollution of the northern seas due to the oil spills; problems of socio-economic and environmental development of industrial towns, located in the Russian Arctic; organization of international environmental cooperation and etc. It was noted that research activities in the Arctic, had stopped in the early 1990s, and in the last decade researchers in geophysics, seismology, archeology, glaciology, biology, geology, meteorology, environmental monitoring presented some new studies but they do not allow to form a scientific justification for the development of alternative economic activities in the high latitudes. The main problems is the interdisciplinary and cross-border interaction, the complexity of ordering and generalization of multidisciplinary information, assessment of environmental factors and results of human impact on the environmental protection issues.

1. Participants in the round table noted that sustainable ecological and economic development of the Russian Arctic on the principles of green economy requires solving of the economic and ecological issues:

- a) Integrated environmental management, using modern ecological and low-waste technologies of green economy, contributes to preservation of the Arctic eco-system with its new industrial development. Storage, removal, set and export of waste from the regions of the Russian Arctic, as well as their recycling, reduction of pollution should be one of the main conditions taken into account in the planning and implementation of any kind of state and businesses activity in the Russian Arctic.
- b) Use of advanced power generation technologies (eg, the project of Mezen hydroelectric power plants), the development of bioenergy for the local heat supply of the northern territories, the modernization of municipal energy efficiency system, the construction and transport, careful attitude to the consumption of water and access to the global market with new energy products, waste management compulsory for all stakeholders in the Arctic — these and other measures might give Russia unique opportunity to take

a leading position in the green economy and the reassessment of values in the world.

- c) Optimization; the identification and deployment of promising economic activities with a regard to the needs of economy and environmental safety; planned liquidation of "dirty" industries and past environmental damage in the Russian Arctic; measures for environmental protection in the areas with the emergency ecological situation, areas of environmental disaster with a regard to the threats to the life or health of people.
- d) Diversification of economic activities in the Arctic and in the North of Russia on the basis of effective use of biological resources in waters and on land; development of transport and communication infrastructure, Arctic tourism, services and other activities.
- e) Search for funding, the use of public-private partnership and other instruments for the active promotion of investment projects of green economy, introduction of modern technologies with the participation of science, government, business, private capital and the youth.
- f) Carrying out complex research projects in different scientific area of green economy, environment, natural resources, geophysics, seismology, archeology, glaciology, biology, geology, geography, meteorology, environmental monitoring, culture, history, philosophy using the RAS resources, universities, federal institutions, research foundations, and etc.

In order to prevent negative environmental impacts at the stage of the new industrial development of the Arctic, using the technology of the 6th technological order, it is important:

- 1.1. Interdisciplinary study: socio-economic, environmental, geopolitical, socio-cultural, physical, geographic, geological and geomorphological, meteorological, hydrographic, mapping; analysis and synthesis of the strategic directions of socio-economic activities, infrastructure and complex logistics systems for life support, perspective use of technologies of the sixth technological order in the Russian Arctic, in the Far North of Russia and on the territory of the Russian regions and on Svalbard; preparing appropriate analytical materials, databases, models of development done by the project teams of specialists of different areas of scientific knowledge.
- 1.2. Comprehensive analysis of the investment attractiveness of the AZRF and the Far North of Russia, taking into account the socio-economic situation, the strategic environmental assessment (SEA), the principles of the green economy, opportunities, risks and threats, determine the potential investors.
- 1.3. Development and implementation of Arctic project portfolio at the federal, regional and municipal levels, including projects of green economy, based on interdisciplinary environmental and economic, socio-cultural assessment of their values and priorities that involve specialists in various areas of scientific knowledge.
- 1.4. The implementation of social development projects and communications infrastructure of the Russian Arctic, the Northern Sea Route, Arctic National transport line (ANTL).
- 1.5. Selection of options, models of development of the subjects of the Russian Arctic, based on a multidisciplinary analysis of the development prospects of innovative and competitive sectors of the green economy, taking into account the needs of the indigenous peoples of the North, Siberia and Far East, creating new jobs and training, especially for young people.
- 1.6. Interdisciplinary scientific conceptual study for the establishment of legal, socio-economic and organizational conditions for the development of small and medium-sized business in the municipalities of the Russian Arctic and the Far North of Russia, including the green economy.

- 1.7. Strategic expert evaluation and development program of the Arctic tourism, its potential, perspective tourist products of the northern territories, and areas of environmental impact in the AZRF and the areas of the Russian presence on Spitsbergen.
 - 1.8. Creating a database of ecological sensitivity of the Arctic territory and waters to pollution, oil spills and dumping; analysis of the mining, oil, gas and other industries in impact areas and environmental hot spots in the Russian Arctic.
 - 1.9. Effective and operational training of a highly qualified personnel to work in the high latitudes and polar regions of the Russian Arctic, including the training of masters; obtaining additional education for work in "green economy" — the Northern (Arctic) Federal University named after M.V. Lomonosov and other Russian universities.
2. An important prerequisite for the establishment and effective functioning of the mechanism for the implementation of ecologic programm of the Russian policy, including the one in the Arctic, is the modernization of management, excellence, availability of legislation and its strict compliance by all economic entities. It is recommended to implement political, legal and scientific activities with the goals of environmental protection, environmental safety, green economic growth in the Russian Arctic:
- 2.1. Develop a "Concept of the green economy in the Russian Arctic", using the potential of the Federal Research Centre for Comprehensive Study of the Arctic of the Russian Academy of Sciences, Kola Science Centre, NArFU named after M.V. Lomonosov and other organizations.
 - 2.2. Development of "Environmental Security Strategy on the development of the Arctic for the period until 2030".
 - 2.3. Strategic environmental assessment (SEA) of all the industrial, infrastructural projects and programs with the involvement of local communities and science in terms of the environmental issues of the Russian Arctic, its waters, the objects on the Novaya Zemlya and the other islands of the Arctic Ocean, regardless of their departmental subordination.
 - 2.4. Amendments to Legislative Acts of the Russian Federation on environmental protection, ecology, continental shelf, the exclusive economic zone, territorial waters of the Russian Federation, as well as the adoption of a number of other legal acts.
 - 2.5. Formation of ecological unit and thematic maps in preparation for the National Atlas of the Arctic based on the fundamental natural and complexity of the research, the universalization of practical use.
 - 2.6. Assessing the impact of dumping on the environment of the Arctic and social conditions of indigenous peoples, taking into account the transboundary transportation of pollutants, monitoring of disposal sites, registration of dumping and publicity of information on these issues.
 - 2.7. Implementation of the program "Elimination of accumulated environmental damage" (EAED) in Russian part of the Arctic.
 - 2.8. Publication of the full list of all the islands in the Russian Arctic under the bylaw "State register of the Russian islands in the seas of the Arctic Ocean", with the actual status of each of the Arctic islands and its departmental belonging.
3. A particular relevance to the Russian Arctic and the Far North of Russia has the balanced development of industrial towns. The share of the Russian Arctic regions is a fifth part of all Russian industrial towns, the majority of which is in the decline. Diversified industrial towns and settlements of the Russian Arctic have become the most vulnerable due to its geographical location, historical

development, industrial specialization and low competitiveness of enterprises, declining population and a high proportion of industrial waste.

- 3.1. A comprehensive approach to the reorientation of the structural and functional organization-tion of single-industry towns. Environmental problems of cities require more detailed dis-looking as a result of ongoing and projected changes in the environment.
- 3.2. Sustainable development of single-industry towns, based on the introduction of "green technologies", Deaver-fication struktry economy will advance to a more eco-efficient pro- duction and rational use of local resources, to change the existing in-Frast-rukture, improve the well-being, quality of life and public health.
- 3.3. There is an opportunity to find new ways of development of natural resources, devel- opment of ma-small and medium businesses, Stockpiling and use of human capital.

4. In the context of the current geopolitical situation and the active implementation of the state policy on development of domestic and international tourism, the relevant issues are the opportunities for the development of the *Arctic tourism*. This will diversify the sectoral specialization of Arctic macroregion, changing the orientation of the operation with non-renewable mineral re- sources, production of which could be and it has already been a significant environmental risk. Taking into account the fact that tourism is a niche tourist product, the objective of tourism and its development available now are:

- a) the existence of protected areas in regions which have the ability to receive tourists, the National Park "Russian Arctic", "Berengiya", "Onezhskoe Pomorje", "Yugyd va" and others.
- b) development of sea tourism along the Northern Sea Route, to the North Pole, the is- lands in the Arctic Ocean;
- c) the trend of growing interest in the environmental, ethnographic, sports and other types of turism amoung both foreign and Russian tourists.

The key recommendations are:

4.1. Encouraging the regional initiatives for the creation of tourist clusters and supporting them at the federal level at the expense of the Federal Target Program "Development of domestic tourism in the Russian Federation (2011-2018 years)".

4.2. Formation of a competitive Arctic tourism product and its promotion on the Russian and international exhibitions with the participation of the Federal Agency for Tourism Develop- ment.

4.3. Measures to ensure the conservation of cultural and natural environment of the Arctic, natural and cultural heritage while organizing the tourist routes, cruises, excursions and environ- mental education of the population.

5. Not less important is the optimization and improvement of the system of remote sensing (SRS) of the Earth; the use of GIS technology, GLONASS potential for rapid assessment of the environment in order to solve the problems of transport and communication and saving people; socio- economic and infrastructure development of the Russian Arctic; information and communication technologies and effective management decisions.

6. Of particular significance is the further development of international cooperation in the Arctic. The Arctic is becoming an increasingly important in global politics and economy. Arctic region has huge natural resources and good transportation facilities, attracts the attention of not only the Arctic countries (A8), but also in China, Japan, South Korea, India and other countries. The ongoing climate changes open water space of the Arctic not only for the development of hydrocarbon, mineral and biological re-resources, but also for new shipping routes in the global transport sys- tem (the Northern Sea Route and the Northwest sea passage, the National Arctic transport line).

Issues relevant of the international cooperation:

6.1. Russia's transition from periodic research of radioactive contamination of gamma emitting radionuclides to the constant monitoring of the problem is followed by a public presentation of the Integrated program to clean up the waters of the radioactive waste also aimed at removing the ground for speculation about the Russia's inability to ensure the environmental safety in the Arctic.

6.2. Russia's national interests in the Arctic should be expressed in a permanent activity:

- a) protection of the legal status of the Russian Arctic, transport communications and available natural resources through the application of UNCLOS (1982) and international law;
- b) preventing the transition of the Northern Sea Route (NSR, NATL) under international management, providing quality services and systematic assistance for the vessels on these routes, presentation of high environmental requirements for vessels passing the NSR;
- c) ensuring permanent or seasonal presence in the Arctic: scientific expeditions, transportation, fisheries, mining, temporary settlements;
- d) empowerment of permanent observers in the Arctic Council, the gradual increase of their role in support of the permanent observers;
- e) following the environmental safety standards by all the Arctic states, businesses, TNC and people.

6.3. Protection of the Russian Arctic as a national resource base and transport artery should be provided mainly by diplomatic means.

6.4. Determination of the position in respect of the China's aspirations in the Arctic based on the context of Russia-Chinese strategic partnership which is a factor of a multipolar world through a combination of prudent and calibrated balance of national interests and mutual cooperation.

6.5. Attracting foreign investment, international cooperation and integration of efforts, re-resources and technology for the full development of the Arctic and the implementation of significant inve-vestment projects on the principles of the "green economy" and sustainable development at the UN agenda until 2030.

6.6. International environmental cooperation in the Arctic in order to counter global threats related to the limitation of natural resources, habitat destruction and climate change.

7. The roundtable participants raised another important topic — the environmental consequences of the increased navigation along the Northern Sea Route, which is a major transportation routes and one of the leading factors in ensuring sustainable socio-economic development of the coastal areas; it is essential to ensure national security and strengthening Russian presence in the Arctic. One of the most important state decisions on the development of the NSR is a "Comprehensive NSR Development Project" (June 2015), which included a proposal of the NSR Administration for all year round use of the route and icebreakers assistance, equipment and personnel, diving operations and oil spill response. This depends on the allocation of funds from the federal budget.

8. At the round table it was highlighted the importance of government involvement in solving the problems of spatial planning for maritime and coastal activities in the Russian Arctic. The basic principles of ecologically sustainable management of marine areas and coastal areas are:

- 8.1. A balanced account of the economic, social and environmental conditions in the planning of marine economic development activities.
- 8.2. Optimization of marine resource use on the basis of ecological and economic approach.
- 8.3. Conservation and restoration of natural marine ecosystems and their biological diversity.

- 8.4. Preservation of unique, representative and environment-forming natural marine and coastal systems, and creation of basin systems of protected waters and coastal areas.
- 8.5. Preventing negative environmental impacts of economic activities and accounting of future environmental impacts.
- 8.6. Preservation of underwater cultural heritage.
- 8.7. Prevention, minimization of conflict relations between water areas.

Use of these principles for marine and coastal spatial planning related to the definition of environmentally and economically sound spatial solutions between different types of areas and territories (depending on their condition and use).

9. The roundtable participants noted that the Russian mainland part of the Russian Arctic and Far North is connected with the south of the country by the river flow systems, covering about two-thirds of the country's area, which is a favorable factor for the rapid mutual development of the green economy. Communication between the AZRF with the south of the Urals, Siberia, the Far East, the economic potential of the regions of concentration is a powerful factor for the development of green economy of the adjacent land areas in the Arctic and use of the maritime resources. Such a role could be performed by the basins of the Ob, Yenisey and Lena. Specifically it is needed to complete the reconstruction of Ket-Kassky channel (Ob and Yenisei) which is used to pass from the Ob River basin via gateways along the Angara cascade of the WP to the Baikal region and back. Also, the creation of a single water system Ob - Yenisei - Baikal will stimulate the flow of tourists.

10. At the end of the 2nd meeting of the Arctic expert club some specific recommendations and proposals to the federal bodies of executive power have been formulated.

10.1. Ministry of Economic Development of the Russian Federation and the Ministry of Energy of the Russian Federation were recommended to start development projects on the use of renewable energy resources in the Arctic zone of the Russian Federation (wind, water), based on existing positive experience of Russia, Canada and the United States.

10.2. Government of the Russian Federation, the State Commission on the Development of Arctic was recommended to develop the regulatory documents for the period up to 2025-2030 years; to correct and improve the Development Strategy of the Russian Arctic and the Russian State Program on socio-economic development of the Russian Arctic.:.

10.2.1. To identify key objective of socio-economic development of the Russian Arctic: improving the quality of life of the population, including the indigenous peoples of the North, Siberia and Far East.

10.2.2. To refresh the goals, objectives and actions for the development of the Russian Arctic in legal acts and strategic planning documents of the federal and regional levels, accounting the priorities of the green economy and redistribution of funding.

10.2.3. To develop a comprehensive plan of priority measures for the development of green economy in the Russian Arctic in the medium and long term perspective.

10.2.4. To enable the state support activities for the development of areas and municipalities of the Russian Arctic, aimed at:

- a) consolidation of the working population, especially youth, poverty reduction measures due to the higher costs of living in northern conditions, creating new jobs, improving the qualifications and additional training, improving the pension system;
- b) fast development of social, communication and transport infrastructure, utilities, roads, social facilities, corresponding to the northern conditions;

- c) the optimization of the local bio-energy, the introduction of energy saving technologies and materials, use of renewable energy sources;
- d) support for innovation, modernization of traditional industries, support for indigenous-peoples of the North, Siberia and Far East, the introduction of effective mechanisms of compensation and reimbursement of expenses (losses) caused to the environment and indigenous peoples, job quotas in the leading sectors of the economy and the organization of the additional professional education system;
- e) improving the quality and accessibility of education, cultural development, preservation of the positive values of the population in the Russian Arctic and the Far North of Russia;
- f) introduction of advanced technologies in communications, telecommunications, telemedicine, education, television and etc.;
- g) the price, tariff, tax and custom encouragement for the development of industries, taking into account the especially of development of the Arctic and Far North regions of Russia;
- h) the development of the environmental monitoring system, control over pollution of the natural environment, traditional territories of the indigenous peoples and negative environmental impacts caused by the economic and other activities;
- i) to provide security in the Russian Arctic (land of the Russian Arctic and Arctic waters).

10.3. Ministry of Transport of the Russian Federation, the EMERCOM of the Russian Federation and their departments, whose mandate includes work on request and assistance in accordance with the Agreement on cooperation in the field of rescue and response to marine pollution with oil in the Arctic (2013), were recommend to initiate a meeting of the parties to discuss the coordination and organization of joint exercises in order to deal with the oil spills. And also to initiate the discussion of this issue at the international level within the Russian-American group of joint planning (GJP) and to organize joint exercises on oil spill response in ice conditions as close as possible to the worst scenario.

10.4. Ministry of Natural Resources and Ecology of the Russian Federation were recommend to rewrite the adopted methodology for calculating financial support of the activities under the prevention plan and response to oil spills, including compensation of harm caused to the environment, bioresources, life, health and property of citizens and legal entities (MEP of Russia order №202 May 6, 2015). According to a number of experts, supported by the Public Council under the Ministry of Natural Resources and Ecology of the Russian Federation (report №68/17-s 30 September 2015), this method could not fully provide compensation for damage caused to the environment, the citizens and legal institutiona. The technique actually introduces the principle of compensation made by the persons responsible for the pollution instead of full compensation, which is contrary to the Federal Law "On the continental shelf of the Russian Federation", and "About internal sea waters, territorial sea and adjacent zone of the Rossian Federation". It should be taken into account when calculating the financial reserves for compensations and basic fees of the Ministry of Natural Resources for calculating the size of the environmental harm as a result of accidents on water.

10.5. Ministry of Energy and the Ministry of natural resources and ecology of the Russian Federation are encouraged to provide the statistics of volumes, areas and coordinates of oil spills. Government of the Russian Federation approved a paper №2556-p "On approval of the list of compulsory forms for the subjects of the state information system of fuel and energy complexes in order to provide the information to be included in the state information system of energy complex" The proposed list of forms, unfortunately, does not contain the requirements for information on the volume and area of oil spills. This decree introduces a requirement to provide

information about the loss of oil in the main pipeline. Thus, the information system of the fuel and energy complex-matic does not provide the state supervisory authorities and the citizens of the Russian Federation with the information about emergency on the oil pipelines, which are the main source of oil impact of the environment. It is clear that federal agencies need to initiate amendments to the relevant instructions of the Russian Government in the form of reporting of data on volumes, areas and coordinates of oil spills on the pipelines.

10.6. Rosprirodnadzor, Roshydromet, the Administration of the Northern Sea Route, the regional supervisory authorities in the field of environmental protection, oil companies involved in production and transportation of oil and oil products on the shelf seas of the Arctic ocean are recommended to consider the experience of civil society organizations in monitoring and environmental violations, taking into account compliance with the requirements of the Russian legislation.

11. Rosprirodnadzor was recommended to organize the coordination of Rosatom, Roshydromet, EMERCOM of Russia, Minmorrechflot of Russia, the Russian Ministry of Defence, Administration of the Northern Sea Route, the Northern Fleet of the Russian Navy, Russian Space Agency, non-governmental environmental organizations in order to create an integrated database of damaging objects and processes, dumping and its impact on environmental safety in the Russian Arctic and the Arctic ocean with a regard to the previous experience in environmental damage response in the Arctic.

12. Debatable and controversial in public opinion was and still is the issue of a total ban of economic activity in an extremely vulnerable ecology in the Arctic region, underscoring the relevance of the public discussion of the issue at a meeting of the Commission on the Development of the Arctic. It makes sense to examine the problem comprehensively, taking into account the prospects of development of the green economy, the possible introduction of temporary restrictions on the production of hydrocarbons in the deep offshore areas. Private business and state companies offer to focus on coastal waters, on the use of technologies of oil production, use of land deposits and associated gas. Also it is important to consider the question of development or correction of specific environmental standards for the Russian Arctic, taking into account the world experience, the achievements of modern science and law.

13. NArFU Rector, Doctor of Philosophy, Professor E.V. Kudrjashova was recommended to consider regular status of the annual conference "Arctic Social and Environmental Forum", promoting it as a permanent brand of the Northern (Arctic) Federal University named after M.V. Lomonosov within the country and on the international level.

14. There is a need to establish a working group to develop a strategy for the environmental safety concept in the Arctic on the basis of the Council for the Study of Productive Forces (SOPS) of RAS, Minisrty of economic development, the Institute for Regional Studies and Urban Planning SRI Higher School of Economics and the NArFU Arctic Centre of Strategic Studies .

15. Send the resolution of the round table of the Arctic Expert Club of the NArFU Arctic Centre for Strategic Studies to: V.A. Shtyrov — chairman of the Expert Board on the Arctic and Antarctic under the Council of Federation of the Federal Assembly; A.G. Ivanov — Secretary of Expert Board on the Arctic and Antarctic under the Council of Federation of the Federal Assembly; D.A. Rogozin — chairman of the State Commission on the Development of the Arctic in order to organize the joint cooperation and partnership.

16. To entrust the control over the implementation of recommendations on the NArFU Arctic Center for Strategic Studies (Director K.S. Zaykov) and the Institute of Regional Studies and Urban Planning SRI Higher School of Economics (deputy director E.E.Plisetsky).

17. Publish the final resolution in the scientific e-journal "Arctic and North" of the NArFu Center for Strategic Studies.

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Summary

Авторы, аннотации, ключевые слова
Authors, abstracts, keywords

ЭКОНОМИКА, ПОЛИТИКА, СОЦИУМ И КУЛЬТУРА ECONOMICS AND POLITICAL SCIENCE, SOCIETY AND CULTURE

Алсуфьев А.В. Арктические проекты Архангельской области

Aleksey V. Alsufev Arctic projects of the Arkhangelsk Region

Аннотация. В статье анализируется выполнение государственного оборонного заказа, потенциал северодвинских верфей и Судостроительного инновационного территориального кластера. Успешно реализуются в регионе проекты разработки алмазных месторождений. Ведутся проектные работы по освоению свинцово-цинкового месторождения «Павловское» на Новой Земле. Архангельская область становится лидером в развитии биоэнергетики на принципах «зелёной экономики», функционирует инновационный лесопромышленный кластер «ПоморИнноваЛес». Настоящим прорывом в научном освоении Арктики становится создание в Архангельске Федерального исследовательского центра комплексного изучения Арктики РАН. В целом наша область — это не только регион, генерирующий новые идеи и проекты, но и сохраняющий культурно-исторические традиции.

Ключевые слова: Архангельская область, проекты, оборонный заказ, кластеры, месторождение «Павловское», биоэнергетика, федеральный центр исследований Арктики

Варфоломеев Ю.А., Арбузов Ю.А. Анализ практического опыта ценообразования и сметного нормирования в строительстве на территории Арктической зоны России

Yury A. Varfolomeev, Yury A. Arbuzov Analysis of pricing and budget normalization for construction projects on the territory of the Russian Arctic

Аннотация. По результатам строительных экспертиз строящихся и капитально ремонтируемых объектов в Арктической зоне северо-запада России выполнен критический анализ опыта ценообразования и сметного нормирования. Выявлены недостатки и разработаны предложения по совершенствованию ценообразования. Внедрение предложений на практике позволит формировать объективную стартовую стоимость строительных проектов.

Ключевые слова: строительство, Арктическая зона, ценообразование, сметы, нормирование, расчёт

Abstract. The article analyzes the implementation of the state order for military defense products and the potential of Severodvinsk shipyards and shipbuilding innovative cluster. The area has a number of successfully implemented projects in the region and development industry for diamond deposits. The project aimed at development of lead-zinc deposit "Pavlovsk" on the Novaya Zemlya is done. Arkhangelsk region becomes a leader in the development of bio-energy on the principles of "green economy", and it operates an innovative timber cluster "PomorInnovaLes". The real breakthrough is the establishment of the RAS Federal Research Center for the complex study of the Arctic in Arkhangelsk. In general, our region is not just the area occupied with generating new ideas and projects, but also preserving cultural and historical traditions.

Keywords: Arkhangelsk region, projects, defense industry contracts, clusters, "Pavlovsk" deposit, bio-energy, Federal Research Center of the Arctic

Abstract. According to the results of the building expertise of facilities that are constructed, operated and repaired in the Arctic zone of the North-West Russia the authors made a critical analysis of pricing and the estimated valuation. A number of shortcomings revealed and suggestions on improving the pricing were made. Implementation of the proposals could form an unbiased starting price of construction projects.

Keywords: construction, Arctic zone, pricing, estimates, normalization, calculation.

Залывский Н.П. Индекс счастья в странах Арктики: индексное измерение и сопоставление динамики развития экономики Арктического мира

Nikolay P. Zalyovsky The index of happiness in the Arctic: index measurement and comparison of the dynamics of Economics Arctic world

Аннотация. Автором осуществляется системное сравнение и авторская интерпретация уровня и динамики социально-экономических процессов в арктических странах с использованием статистических индексов различных международных институтов, научно-образовательных учреждений западных стран. Также анализируются обстоятельства, в той или иной мере влияющие на изменение места России в мировом рейтинге. Своим содержанием статья является и обоснованием целесообразности корректировки модели управления РФ как институциональной предпосылки ускорения её социально-экономического развития, достижения более достойных мест в мировых рейтингах.

Ключевые слова: арктические страны, международные индексы, рейтинг страны, лидеры индекса, глобализация, место России, динамика развития, инновации, развитие человека

Липина С.А. Инновационный вектор развития прибрежных территорий Российской Арктики
Svetlana A. Lipina Innovative development vector of the coastal areas of the Russian Arctic

Аннотация. В работе раскрываются возможности дальнейшего развития Арктической зоны Российской Федерации на основе инновационных стандартов и технологий, поскольку вся система государственного управления инновационными процессами в обязательном и первоочередном порядке должна базироваться на инновационной стратегии государства в целом и региона в частности, без которой невозможно представить реальное, глубокое и долговременное обновление экономики и всего общественного организма.

Ключевые слова: Россия, Арктика, инновации, стратегическое управление, пространственное развитие

Шевчук А.В., Куртееев В.В. О развитии основных направлений научных исследований Арктической зоны Российской Федерации

Anatoly V. Shevchuk, Valentin V. Kurteev On the development of the main research areas of the Arctic zone of the Russian Federation

Аннотация. В статье рассматриваются актуальные направления научных исследований с целью защиты окружающей среды и обеспечения экологической безопасности Арктики. В их число входят вопросы разработки Стратегии экологи-

Abstract. The author presented a systematic comparison and author's interpretation of the level and dynamics of social and economic processes in the Arctic countries using statistical indexes of various international institutions, scientific and educational institutions of the Western countries. The article is also focused on the circumstances affecting the change of Russia's place in the world rankings. The article is aimed at contributing to the adjustment of management of the Russian Federation as an institutional background of acceleration of its economic and social development aimed at achieving a worthy place in the world rankings.

Keywords: Arctic countries, international indexes, country's ranking, leaders of the index, globalization, the place of Russia, dynamics of development, innovation, human development

Abstract. The article examines the opportunities for further development of the Arctic zone of the Russian Federation on the basis of innovative standards and technology, as the whole system of state management of innovation processes should be based on innovative strategy of the state in general and the region in particular, without which it is impossible to imagine a real, deep and lasting renewal of the economy and entire society.

Keywords: Russia, Arctic, innovation, strategic management, spatial development

Abstract. The article is focused on the current research trends in the field of environmental protection and security in the Arctic. This means the development of Arctic environmental safety strategies for the

ческой безопасности осуществления работ по развитию Арктики на период до 2030 года, состояния антропогенного загрязнения и экологической ситуации в пределах АЗРФ, использования стратегической экологической оценки (СЭО) крупных инфраструктурных проектов в части влияния на окружающую среду Арктики и возможного нанесения ущерба, создания экологического блока в рамках Национального атласа Арктики. Оценка влияния дампинга (захоронения отходов в морях) на окружающую среду арктических регионов и социальные условия жизни коренных народов с учётом трансграничного переноса загрязняющих веществ. Задачи по ликвидации накопленного экологического ущерба (НЭУ) могут быть решены в рамках специальной целевой программы. Сформулированы возможные направления научных исследований в Арктике.

Ключевые слова: Арктическая зона РФ, окружающая среда, экологическая безопасность, стратегия, стратегическая экологическая оценка, экологический атлас, дампинг, накопленный экологический ущерб

ПРОБЛЕМЫ РАЗВИТИЯ СЕВЕРНОГО МОРСКОГО ПУТИ PROBLEMS OF DEVELOPMENT OF THE NORTHERN SEA ROUTE

Селин В.С. Движущие силы и проблемы развития грузопотоков Северного морского пути

Vladimir S. Selin Driving forces and development problems of cargo flows along the Northern Sea Route

Аннотация. Статья посвящена анализу тенденций и оценке перспектив функционирования Северного морского пути. Основная проблема состоит в том, что на эту достаточно сложную систему влияет множество факторов, часто противоречивых и плохо предсказуемых. Так, рост потребности в энергетических ресурсах обуславливает в целом необходимость освоения арктического шельфа. Однако возможное похолодание и ухудшение ледовой обстановки могут внести корректировки в возможности транспортировки этих ресурсов, например, на Азиатско-Тихоокеанский рынок. В этой связи наряду с методами факторного и экономического анализа в исследовании применялись экспертные подходы. Основным результатом является пакет предложений по поддержке арктических морских грузопотоков.

Ключевые слова: Арктика, морские грузопотоки, экономика, ресурсы, шельф, факторы, ледоколы, климат, программа

period until 2030, pollution and the environmental situation in the Russian Arctic, use of strategic environmental assessment (SEA) for the major infrastructure projects in terms of their impact on the Arctic environment and the possible damage, an environmental atlas of the Arctic zone of the Russian Federation within the project of the National Atlas of the Arctic. An assessment of the dumping impact (waste disposal in the sea) on the environment of the Arctic and indigenous peoples, taking into account the transboundary transfer of pollutants. All the tasks of the environmental damage elimination could be solved by special programs. The authors also formulated the possible outcomes of the proposed research in the Arctic.

Keywords: Arctic zone of the Russian Federation, environment, ecological safety, strategy, strategic environmental assessment, environmental atlas, dumping, accumulated environmental damage

Abstract. The author analyzed the trends and prospects of the Northern Sea Route. The main problem is that this rather complex system is influenced by many factors, often contradictory and poorly predictable. Thus, the increase in demand for energy and resources determines the overall need for the development of the Arctic shelf. However, the possible cooling and worsening of the ice conditions may adjust the possibility of transporting of the resources to the Asia-Pacific market, for instance. In this regard, along with the methods of factor and economic analysis the expert approach was used for the study. Its main result is a package of proposals aimed at supporting the Arctic marine cargo flow.

Keywords: Arctic, marine freight traffic, economy, resources, shelf, factors, icebreakers, climate, program

Плисецкий Е.Е. Приоритеты развития СМП в документах стратегического планирования

Evgeniy E. Plisetskiy Priorities of the strategic management and planning of the Northern Sea Route

Аннотация. Анализируются основные социально-экономические показатели 10 субъектов РФ, прибрежные территории которых примыкают к акватории Сев-морпути. Исследуются стратегии социально-экономического развития субъектов Севера, Дальнего Востока России. Планомерное развитие СМП обеспечивается выстраиванием единой системы государственно-частного управления транспортной артерией, реализацией других стратегических мероприятий. Необходимо формирование единого органа управления, модернизация арктической транспортной системы, производство в России наукоёмких, высокотехнологичных изделий гражданской морской техники для внутреннего рынка, создание тыловой инфраструктуры портов, в том числе контейнерных терминалов, таможенных складов и логистических центров.

Ключевые слова: Северный морской путь, регионы, стратегии развития

Abstract. The article is devoted to the analysis of the main socio-economic indicators of 10 subjects of the Russian Federation, with the coastal areas adjacent to the water area of the Northern Sea Route. The author studied the strategy of socio-economic development of the North and Far East Russia. The planned development of the NSR provides alignment of a unified system of public-private management of transportation artery and the implementation of other strategic activities. It is necessary to establish a single governing body, modernization of the Arctic transport system, production of high-tech products and marine technology for the home market, building a rear port infrastructure, container terminals, customs warehouses and logistics centers.

Keywords: *Northern Sea Route, regions, development strategies*

МИГРАЦИОННЫЕ ПРОЦЕССЫ MIGRATION PROCESSES

Константинов А.С. Социальный состав населения и миграционные процессы на Архангельском Севере по материалам переписей

Aleksandr S. Konstantinov The social composition of the population and migration on Arkhangelsk North according to the census materials

Аннотация. В статье исследуются социальный состав населения и миграционные процессы на Архангельском Севере — в Архангельской губернии, Архангельской области. На основе сравнительного анализа итогов переписей населения с 1926 года рассматриваются трансформационные изменения, которые произошли в миграционном поведении населения, в его составе по роду занятий, месту рождения и постоянного проживания в последующие десятилетия.

Ключевые слова: Архангельский Север, регион, переписи населения, социальный состав, миграционные процессы, изменения, занятость, место жительства

Abstract. The article investigates the social composition of the population and migration in the Arkhangelsk North — in the Arkhangelsk region. The background for the research is a comparative analysis of the census held in the area since 1926. The author focuses of the transformation and changes that had occurred in the migratory behavior of the population and composition of the population by occupation, place of birth and residence in the following decades.

Keywords: *Arkhangelsk North, region, census, social structure, migration, changes, employment, place of residence*

Сайданова С.В., Дернова Г.Н. Регион с низкой привлекательностью для молодёжи?

Svetlana V. Saidanova, Galina N. Dernova The region with the lowest attractiveness for young people?

Аннотация. В статье представлен анализ миграционных процессов в Архангельской области. Акцент сделан на самой трудоспособной группе населения — молодёжи в возрасте от 15 до 29 лет. При исследовании показателей миграции использованы статистические данные за пять лет с 2010 по ноябрь 2014 г., законодательные и нормативные документы. В ходе исследования авторы приходят к выводу, что Архангельская область — это регион с низкой привлекательностью для мигрантов. Значительно большее количество молодых квалифицированных кадров покидает нашу область, нежели приезжают сюда, отчего существенно страдает экономика, социальная сфера.

Ключевые слова: Архангельская область, миграция молодежи, демографическая обстановка, рейтинг регионов СЗФО по привлекательности миграции

Abstract. The article presents the analysis of migration in the Arkhangelsk region. Focus is made on the people of working age — young people aged 15 to 29 years. The background for the study are the indicators of migration, statistics for the period 2010 — November 2014, laws and regulatory documents. The authors conclude that Arkhangelsk region is an area with low attractiveness to migrants. A significantly larger number of young, qualified personnel is leaving our area and its amount is bigger than the amount of newcomers. This situation damages regional economy and social sphere significantly.

Keywords: Arkhangelsk region, migration of young people, demographic situation, migration patterns, ranking of the NFD regions by immigration attractiveness

СОХРАНЕНИЕ КУЛЬТУРНОЙ И ПРИРОДНОЙ СРЕДЫ АРКТИКИ PROTECTING CULTURAL AND NATURAL ENVIRONMENT OF THE ARCTIC

Коваль В.П., Лыжин Д.Н. Международное экологическое сотрудничество в Арктике

Vasiliy P.Koval Dmitry N. Lyzhin International environmental cooperation in the Arctic

Аннотация. Основные вызовы и угрозы экологии Арктики связаны с прогрессирующим загрязнением и деградацией компонентов природной среды в условиях усиливающейся антропогенной нагрузки, накоплением отходов, изменениями климата и др. Международное взаимодействие в сфере экологической безопасности, беспрецедентная скорость и энергия сотрудничества в Арктике могут служить позитивным примером и уроком для человечества. Важную роль в экологическом сотрудничестве играют международные природоохранные организации, Арктический совет, государства. На содержании сотрудничества сказывается противоречивость тенденций, определяющих современное состояние международных отношений в целом. Делается вывод о том, что совместными усилиями необходимо сформировать такую систему глобального взаимодействия, которая с учётом интересов всех сторон давала бы возможность рационально использовать природные ресурсы Арктики.

Ключевые слова: Арктика, экология, международное сотрудничество

Abstract. Key challenges and threats to the Arctic environment are associated with progressive pollution and degradation of environmental components in the face of increasing anthropogenic load, the accumulation of waste, climate change and others. International cooperation in the field of environmental safety, unprecedented speed and energy of cooperation in the Arctic could be a positive example and a lesson for humanity. An important role is played by an international environmental organization, the Arctic Council and states. The cooperation is affected by contradictory trends that are determining the current international relations. It is concluded that joint efforts are needed to create a system of global interaction, which, taking into account the interests of all parties, would be enabled to use the natural resources in the Arctic rationally.

Keywords: Arctic, the environment, international cooperation

Шмакова Н.Ю., Марковская Е.Ф. Эколо-физиологическая характеристика растительных сообществ под птичьим базаром на Западном Шпицбергене

Natalia Y. Shmakova, Evgenia F. Markovskaya Ecophysiological characteristic of plants communities under the bird rookery of West Spitsbergen

Аннотация. В условиях Арктики природа ставит свои неповторимые эксперименты, примером которых является растительность птичьих базаров, где жизнь определяется той органикой, которая выносится птицами с моря и используется только под птичьими базарами. Поглощение азота в Арктике лимитируется абиотическими факторами: низкими температурой и влажностью, медленной эрозией скал, низкой транспирацией и наличием вечной мерзлоты. Приведены данные о содержании общего азота и хлорофиллов в растениях и лишайниках в сообществах, расположенных под птичьим базаром на Западном Шпицбергене. Проведенное исследование показало, что растительные сообщества птичьих базаров, где снижено действие одного из лимитирующих факторов Арктики (бедность почвенного горизонта), дают некоторое представление о той «зелёной Арктике», куда её ведет современное изменение климата.

Ключевые слова: Западный Шпицберген, растения, лишайники, орнитофильные сообщества, пигменты пластид, общий азот, «Зелёная Арктика»

Abstract. In the Arctic nature carries out its unique experiments, an example of which is the vegetation of bird colonies, where life is determined by the organic matter, which is taken out from the sea by birds and is used only under the bird colonies. The absorption of nitrogen in the Arctic is limited by abiotic factors: low temperature and humidity, the slow erosion of rocks, low transpiration and the presence of permafrost. The authors present the data on the content of total nitrogen and chlorophyll in plants and lichens in communities located beneath bird colonies in the West Svalbard. The study has shown that plant communities of the rookeries, where the effect of one of the limiting factors of the Arctic (poor soil horizon) is reduced, give some idea of the “Green Arctic”, where the Arctic is led by the current climate change.

Keywords: West Spitsbergen, plants, lichens, ornithogenic communities, pigments of plastid, total nitrogen, the “Green Arctic”

ОБЗОРЫ. REVIEWS

Зелёная экономика: экологические императивы обеспечения экономического развития Российской Арктики. Резолюция заседания Арктического экспертного клуба 23 октября 2015 года
Green economy: ecological imperatives of the economic development of the Russian Arctic. Resolution of the round table of the Arctic expert club, 23 October 2015

Аннотация. Публикуется резолюция круглого стола «Зелёная экономика: экологические императивы обеспечения экономического развития Российской Арктики», прошедшего в рамках 2-го заседания Арктического экспертного клуба 23 октября 2015 года. Организаторами проведения круглого стола выступили: Институт региональных исследований и городского планирования НИУ Высшей школы экономики, Арктический центр стратегических исследований САФУ имени М.В. Ломоносова. Со-организаторы: Российский институт стратегических исследований (РИСИ).

Ключевые слова: Российская Арктика, зелёная экономика, экологическая оценка, безопасность, накопленный экологический ущерб, дампинг, морское природопользование, инфраструктура, туризм, атлас, политика, международное сотрудничество

Abstract. Here we publish the resolution of the round table “Green economy: the environmental imperatives for economic development of the Russian Arctic’, held within the framework of the 2nd meeting of the Arctic Expert Club on the 23rd of October 2015. The organizers of the round table: the Institute of Regional Studies and Urban-planning of the Higher School of Economics, Arctic Center for Strategic Studies NArFU Lomonosov. Co-organizers: the Russian Institute of Strategic Studies (RISS).

Keywords: Russian Arctic, “Green Economy”, environmental assessment, safety, accumulated environmental damage, dumping, marine natural resources, infrastructure, tourism, atlas, politics, international cooperation

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