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REDEVELOPMENT OF THE ARCTIC AREA OF RUSSIA AS AN OBJECTIVE OF SYSTEMS RESEARCH AND SPECIAL-PURPOSE PROGRAM MANAGEMENT METHODOLOGICAL ISSUES¹

This paper is focused on the substantiation of the methodological foundations behind the implementation of regulatory and legal documents related to the development of the Russian Arctic, based on the hypothesis that this development represents the most ambitious, integral megaproject in the history of Russia. This substantiation is underpinned by a project approach to the identification of a subject of study and a system approach to the assessment of a possibility of forming an integral structure of the megaproject, in principle, in the conditions of abnormally high differences between the territorial components of the Arctic zone of Russia, as well as to the analysis of the dependence of Russian Arctic redevelopment pattern, mechanisms and rate on external and internal factors. This has resulted in the formation of a set of the consistent methodological positions designed for practical use in the government control of the Arctic Region development in the foreseeable future. The most important one of them is to identify the object of the government control of Arctic zone development as a systemically organized generality of many coordinated actions of federal, regional and municipal authorities, corporations, entrepreneurs and civil society institutions joined by a unity of purpose and by naturally established and specially organized economic, social and infrastructural links. The government control of this object is possible only based on the principles of systemacity and rational proportion of centralization, decentralization and continuity of management activities specializing solely in the Arctic problems. To this end, a principally new methodological problem arises: to integrate the Arctic zone territorial unit development projects and programs for the benefit of achieving the common goals of the Arctic megaproject with the review of the previously determined development prospects for these units, with making necessary corrections in them. The paper presents the relevant recommendations.

Keywords: Arctic zone of the Russian Federation, redevelopment, integrated development, methodology, program- and target-oriented management, development projects, Arctic megaproject, system approach, territorial units, integration

Problem Formulation

Bringing the vast Arctic zone into the state corresponding to its constantly growing geopolitical, social, economic and infrastructural significance, as well as to the modern vision of the criteria and priorities of this process, comes to the forefront among the topical problems related to the development of Russia. We have earlier called it a regional Arctic redevelopment megaproject [1] because, until now, this region has been developed in compliance with other tasks and in fundamentally different conditions.²

Formulating a modern paradigm of the development and sustainability of the Arctic Region, academician A. I. Tatarkin emphasizes that this paradigm is based on a system approach, use of base zones (including the Ural region as a strategic jumping-off place and a node where the vectors of the development of Russia cross), and conservation of the traditional lifestyles of indigenous minorities and unique ecosystems of the Arctic region. The implementation of the mentioned paradigm is based on the following principles: preventiveness (prevention or mitigation of hazardous environmental impacts), environmental imperative (a priority of environmental safety over economic benefits of development), environmental and ecological balance (production development and location in the territory in accordance with its environmental capacity), humanization (consideration of interests of the indigenous population of the North), and conservation of biodiversity [2, pp. 638–352; 3].

Taking this into account, the redevelopment of the Russian Arctic in compliance with current requirements for such a process may be considered successful if the following is achieved in the course

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² For more information, refer to the Monumental Multi-Author Monograph [2, pp. 77–144].

of implementation of multiple particular solutions: first, a balance between the extraction of all kinds of natural resources and the restoration of the environmental potential; second, a real diversification of economic activities, considering the development of economically beneficial interlinks with other territories of the country and foreign countries; third, a balance between workplaces and a settlement system, with strict adherence to legitimate rights of indigenous population in the territory of the traditional use of natural resources, as well as the entire scope of other rights arising from the ethnic self-identification among the representatives of this population.

The above-mentioned is possible only with the use of the program- and target-oriented techniques for megaproject implementation, which are able to provide consistency of economic, social, and environmental policy measures of federal, regional, and municipal authorities in the Arctic zone, as well as coordination of efforts of the business structures, which conduct or are going to conduct activities in the Arctic zone of Russia, in implementing a strategy for the integrated development of this zone. For the first time, a target for the Russian Arctic redevelopment shall become the entire Arctic Region of Russia with all the diversity of its components and problems, and all necessary actions shall be considered within a single (integral and system-linked) regional megaproject. To implement such an approach, in spite of its seeming self-evidence, is very difficult now, first of all, in connection with the multiplicity and fundamental differences of interests of participants in the megaproject and, as incredible as it may seem, due to the absence of just one positive example of regional megaproject implementation in the territory of Russia after the dissolution of the USSR. The specific reasons for this, with regard to several programs for development of the Far-East territories of Russia, were thoroughly analyzed in the papers of academician P. A. Minakir [4, pp. 185–210, 442–487, 669–804; 5], the conclusions of which, in our opinion, are confirmed by such a promising regional megaproject as the Industrial Ural—Polar Ural Project [7].³

Creation of a methodology for solving the tasks of regional megaprojects of such a scale as the redevelopment of the Russian Arctic is not only extremely interesting in scientific respect, but also associated with rather high responsibility. First of all, because its results shall create a conceptual basis for the update and implementation of the Strategy for Development of the Arctic Zone of the Russian Federation and National Security for the Period up to 2020, which was approved by the President of the Russian Federation on February 8, 2013, and the Government Program for the Socio-Economic Development of the Arctic Zone of the Russian Federation for the Period up to 2020, which was approved by the Resolution of the Government of the Russian Federation dated April 21, 2014. In connection with the above, the upcoming Russian Arctic redevelopment process shall also become a fundamentally new subject of state regulation, which assumes a system-based mutual agreement of multiple local strategies, programs, and projects of federal, regional, and municipal levels with the interests of economic entities and investors.

The scope of the tasks which, obviously, shall be solved for the scientifically-based redevelopment of the Russian Arctic is very wide. This paper covers only two blocks of problems mainly of conceptual and methodological nature, which are associated with system diagnostics and assessment of a possibility of forming an integral structure of the megaproject, in principle, in the conditions of abnormally high differences between the territorial components of the Arctic zone of Russia, as well as with the dependence of Russian Arctic redevelopment possibilities on external and internal factors. The discussion of these key issues allows us to formulate basic methodological positions with regard to the development and use of the program- and target-oriented techniques and the creation of institutional conditions for the redevelopment of the Russian Arctic in the summary part of this paper.

System Diagnostics of Territorial Components of Megaproject

The program- and target-oriented approach to organizing the upcoming redevelopment of the Arctic zone of Russia within a single megaproject (a single strategy, a single program, etc.) determines a need for solving a number of specific methodological issues associated with the exceptionally high territorial heterogeneity of this zone. At present, the scope of this zone is defined in Decree of the President of the Russian Federation On the Land Territories of the Arctic Zone of the Russian Federation No. 296 dated May 2, 2014, which was adopted “in order to implement the Fundamentals of

³ Refer to [6, 7, 8, 9].

the National Policy of the Russian Federation in the Arctic Region for the period up to 2020 and further perspective.”

In addition to the vast inland part exceeding 3.6 million sq. km, the Arctic zone of Russia includes 185,000 sq. km of archipelagoes of small and large islands (Solovetskie Islands, Franz Josef Land, Novaya Zemlya⁴, Severnaya Zemlya, New Siberian Islands), as well as individual large islands (for example, Wrangel, Vaigach, and Kolguev). This great space comprises administrative-territorial units of six different types, intercrossing areas of economic activities of the largest corporations and traditional use of natural resources, common and unique settlement systems, territories of active development and special conservation status, etc. The substantiation, making, and implementation of program-oriented decisions in these conditions require a methodologically grounded combination of unified and individual approaches.

The uniform territorial identification of the spatial components of the Arctic zone becomes problematic, starting from the westernmost one—Murmansk Region (area: 144,000 sq. km, population: 766,000 people). This is one of the most urbanized territories of Russia (the share of urban population is above 92 %), which is connected with the other regions of the country by a world-class railway, maritime transportation (Murmansk is the only ice-free Arctic port that operates on a year-round basis), air service (two large airports) and road transport. There are 16 urban settlements (including 12 urban districts) and over 100 rural settlements in this region. With regard to economic parameters, as well as the level of social and transport infrastructure development, Murmansk Region is comparable with the regions of Central Russia and exceeds some of them.⁵

Note that none of twenty territorial units of the Arctic zone of Russia, which are listed in the Decree of the President of the Russian Federation, is comparable with Murmansk Region by none of the parameters (except for the area). Thus, the richest (oil-and-gas bearing) Yamal-Nenets Autonomous District having the second largest area after Taimyr Dolgano-Nenets Municipal District (769,300 sq. km and 879,900 sq. km, respectively) and having two cities (Novy Urengoy and Noyabrsk) with the population over 100,000 people lags behind Murmansk Region in the population density by a factor of 7.5. In addition, it is characterized by the extremely non-uniform level of social and infrastructural support of the population in urban and rural settlements and prevalence of the rotation system of employment.⁶ A set of problems will arise in the course of oil and gas field development in the northernmost territory of the Yamal Peninsula [10].

There are significant differences in the condition and development prospects of two other autonomous districts forming a part of the Arctic zone of Russia. Thus, from the geographical and historical point of view, Nenets Autonomous District is close to the north-western part of Russia, while it represents a territory with the most extreme, undoubtedly, Arctic natural climatic conditions and presence of a significant group of the indigenous population of the North (over 18 %). The relatively stable population size over the last 25 years can be considered as the best indicator of Nenets Autonomous District condition and prospects.⁷

There are a qualitatively different situation and development prospects in Chukotka Autonomous District. The size of its population has decreased by a factor of three over the same 25 years, which demonstrates the highest out-migration in Russia. Tin and tungsten production has almost completely ceased along with significant decrease in gold extraction over this period, and almost all products made in the Chukot Peninsula are consumed in the domestic market.⁸

There are fundamental differences in the problems and, therefore, tasks of the territory redevelopment of the cities assigned as individual territorial units of the Arctic zone: Arkhangelsk, Novodvinsk, Severodvinsk, Vorkuta, and Norilsk. While problems and tasks for the first three cities are generally similar to those specific for most of the Russian cities, an imbalance between the availability

⁴ The Novaya Zemlya Archipelago is the only one island territorial unit of the Arctic zone of Russia with its own development program Socio-Economic Development of Municipal Formation Urban District Novaya Zemlya. Retrieved from: <http://nov-zemlya.ru/in/md/econ>.

⁵ The Strategy for Socio-Economic Development of the Northwestern Federal District for the Period up to 2020 (http://minec.government.ru/activities/strat_plan/sub01/); the Strategy for Development of the Arctic Zone of the Russian Federation and National Security for the Period up to 2020 (http://minec.government.ru/activities/strat_plan/arkticzone/); the Strategy for Socio-Economic Development of Murmansk Region up to 2020 and for the Period up to 2025. (http://minec.government.ru/activities/strat_plan/sub02/).

⁶ Retrieved from: <http://www.yamalonenetskiiao.ru>.

⁷ The implementation of the “May Decrees” of the President of the Russian Federation in the Nenets Autonomous District. Retrieved from: <http://adm-nao.ru/ukazy-prezidenta-rf-ot-7-maya-2012-goda-596-606>.

⁸ Retrieved from: http://www.chukotka.org/power/priority_areas/priorities_for_development.

of able-bodied population and workplaces (commuting is actually impossible) is still one of the main problems in Vorkuta, the once prosperous “coal capital” with good transport connection with other regions, due to the reduction in demand for coal from the Pechora Basin.⁹ In absolutely single-industry Norilsk, where the world’s largest copper, nickel, and platinoid production is concentrated, the same problem is aggravated by the unfavorable environmental condition (emissions from metallurgical production facilities) and absence of rail or road communication with other regions of the country.¹⁰

There are incomparable potential and problems of ten municipal districts distinguished as individual territorial units of the Arctic zone. A group of three municipal districts of Arkhangelsk Region stands apart among them; these districts are relatively well incorporated into the structure of the other districts of this region and the regions of the Northwestern Federal District in general. They are characterized by small (by Arctic standards) area (46,100 sq. km, 34,400 sq. km and 24,700 sq. km for Primorsky, Mezen, and Onega Districts, respectively), significant share (about 40 %) of rural population, presence of ports and unique tourist attractions (the Solovetsky Archipelago within Primorsky District), and need for the diversification of the economy and transformation of the settlement system typical for most of the municipal districts of Central Russia.¹¹ At the same time, the Arctic zone municipal districts located in the north of Krasnoyarsk Territory and, especially, the Republic of Sakha (Yakutia) differ markedly both over these constituent entities of the Russian Federation and Russia in general.

A representative example of north-eastern municipal districts can be Ust-Yansky Ulus (District) with a typical focal settlement system. This municipal formation has no reliable year-round transport connection with the settlements of the ulus and the city of Yakutsk; it is provided only by air in summer and by ice road in winter. Every eighth resident is badly in need of housing improvement; utilities in all settlements of the ulus are worn out to a high degree; there is a lack of modern equipment in healthcare and educational institutions; the paying capacity of the population is low.¹²

A specific (with a special status) territorial unit of the Arctic zone of Russia is Taimyr Dolgano-Nenets Municipal District established in compliance with the Federal Constitutional Law On Formation of a New Constituent Entity of the Russian Federation as a Result of Integration of Krasnoyarsk Territory, Taimyr (Dolgano-Nenets) Autonomous District and Evenk Autonomous District.¹³ As noted above, this is the most extensive component of the Arctic zone, almost half of which is occupied by the world’s largest Big Arctic Reserve. This municipal district with its relatively low population density¹⁴ differs from the others also in the fact that it contains another individual territorial unit of the Arctic zone, Urban District Norilsk City, which is connected with the administrative center of the municipal district, Dudinka, by a single railway branch.

The given examples show that the Arctic zone of Russia does not contain any of the territorial units indicated in the Decree of the President of the Russian Federation On the Land Territories of the Arctic Zone of the Russian Federation, which would not require its own target program taking into account their specific features, and the development of which, at the same time, would be carried out on a common (with other such programs) basis allowing us to arrange the development prospects of these territories as the parts of the Arctic macro-region and with orientation toward the common objective of Arctic Region redevelopment. In this regard, an important methodological task arises to substantiate the rational transformation of the whole settlement system in the Arctic zone. The solution and even formulation of problems of such class, with all their topicality, have not been duly considered yet in domestic region studies [11].

⁹ The Strategy for Socio-Economic Development of Municipal Formation Urban District Vorkuta for the Period up to 2020. Available at: <http://xn--80adypkng.xn--p1ai/about/info/news/2764>.

¹⁰ The Program for Socio-Economic Development of Municipal Formation Norilsk City up to 2020. Retrieved from: <http://www.norilsk-city.ru/21369/index.shtml>.

¹¹ Typical example: The List of Municipal Programs of Municipal Formation Mezen Municipal District for 2015. Retrieved from: <http://www.mezen.ru/municipal-nye-programmy.html>.

¹² The Integrated Program for Socio-Economic Development of the Municipal Formation Ust-Yansky Ulus (District) of the Republic of Sakha (Yakutia) for 2014–2016 and for Perspective up to 2022. Approved by Resolution of the District Council of Deputies No. 15/2 dated April 23, 2014. Retrieved from: <http://www.sakha.gov.ru/node/11125>.

¹³ The special status of this municipal district is determined by the aims of preserving the preferences earlier granted to this territory as an autonomous national district.

¹⁴ Dolgans — 5,393 people, Nenets — 3,494 people, Nganasans — 747 people, Evenks — 266 people, Enets — 204 people, Kets — 19 people, Selkups — 9 people. Retrieved from: <http://www.taimyr24.ru>.

It must be borne in mind that even now the Arctic zone of Russia is a territory of unmatched economic interests of the largest corporations and numerous (several thousand) small private companies and enterprises, from deer farms to diamond mining companies and from transport companies to construction ones. Irrespective of the range of activity, their tactical top-priority objective is always to make a profit, which is far from always consistent with the strategic tasks of the redevelopment of the Arctic Region and its certain areas. Therefore, another important methodological task arises: to create a fundamentally new class of program- and target-oriented developments of a long-term strategy for functioning in the Arctic zone of Russia for all organizational forms of economic entities and all kinds of economic activities as an obligatory structural element of the overall program for the redevelopment of this zone. The opportunities and lines of solving such methodological tasks are considered in the summary section.

Assessment of Russian Arctic Redevelopment Dependence on External and Internal Factors

The redevelopment of the Arctic zone of Russia, like no other regional megaproject, depends on many variables of domestic and external order. All its resource, economic and infrastructural components, and, therefore, the whole megaproject are in the area of abnormally high risks and uncertainties. Each key issue to be unambiguously addressed in the Arctic zone development program is still controversial or is proposed for a solution on political and other grounds of the current period. At the same time, it is clear that the Russian Arctic redevelopment period may take several decades, in the course of which everything will change—from climatic conditions and placement of main forces in geopolitics to world prices for energy resources. Thus, the assessments of these resources being significantly different, it is believed that at least 10–15 % of their world reserves are concentrated in the Arctic zone.¹⁵ International experts suppose that the costs associated with production in the Arctic shelf will be from 40 to USD 100 billion for oil and USD 4–12 million Btu for gas¹⁶, which is economically viable only in favorable economic conditions in the world and domestic markets. Investment risks in these conditions are very high, however, the risks of general economic and geopolitical nature become the most important ones.¹⁷ In this regard, it becomes methodologically important to select a risk assessment method which is consistent with the essence of the Arctic megaproject.

It is not improbable that a simulation method (Monte-Carlo method) may be appropriate in such cases; in principle, it allows us to construct a discounted income (net present value—NPV) distribution density function and find NPV dispersion and mathematical expectation for one or more investment projects, taking into account all cross ratios between initial parameters. Other types of modeling, for example, using neural networks, also seem to be promising.¹⁸

To coordinate most of Arctic zone development projects with the defense tasks detailed in the Strategy for Development of the Arctic Zone of the Russian Federation and National Security for the Period up to 2020, which was approved by the President of the Russian Federation on February 20, 2013, becomes a separate methodological problem.¹⁹ On October 21, 2014, Defense Minister S. K. Shoigu stated that a large group of Russian military units had been deployed throughout the Arctic belt, from Murmansk to Chukotka, already in this year.²⁰

The reinforcement of military presence becomes systemically associated with the prospects of solving all other tasks of Russian Arctic redevelopment. Specific examples are given below. In September 2014, it was officially announced that construction of military towns started on Wrangel Island and Cape Otto Schmidt, where block-modules were delivered for the construction of the Polar Star complex. In July 2014, it became known that the Ministry of Defense of the Russian Federation was planning to build six military towns in the Arctic Region, and the construction of the Tiksi aerodrome above the

¹⁵ Refer also to: Future of the Arctic — A New Dawn for Exploration. Wood Mackenzie. 2006. (<http://www.woodmacresearch.com/>); Circum-Arctic Resource Appraisal: Estimates of Undiscovered Oil and Gas North of the Arctic Circle — CARA. U.S. Geological Survey. 2008 (<http://energy.usgs.gov/RegionalStudies/Arctic.aspx>); IEA (2013). Resources to Reserves 2013: Oil, Gas and Coal Technologies for the Energy Markets of the Future, OECD Publishing, Paris. DOI. Retrieved from: <http://dx.doi.org/10.1787/9789264090705-en>.

¹⁶ IEA (2013). World Energy Outlook 2013. IEA. Retrieved from: www.worldenergyoutlook.org.

¹⁷ Western specialists believe that, taking into account political and economic risks in Russia, money flows shall be calculated using a discount factor equal to at least 25 % or, in some cases, up to 35 %. Retrieved from: http://ria.ru/defense_safety/20150316/1052855895.html#ixzz3UZIq8xmv.

¹⁸ For example, refer to [12, 13].

¹⁹ Retrieved from: <http://www.government.ru>.

²⁰ Retrieved from: www.interfax.ru/russia/403066.

Arctic Circle would be completed in 2015. A decision was made to deploy a task force on Kotelny Island and a separate motorized rifle brigade in the settlement of Alakurtti in Murmansk Region. In addition, radar stations and air direction centers will be deployed on the Alexander I Land islands (Franz Josef Archipelago), Novaya Zemlya, Wrangel Island, and Cape Schmidt. It is also planned to reinforce the border troops of the FSB. The works on the rehabilitation of air defense infrastructure on the Arctic islands shall be completed by the end of 2015.²¹

It would be methodologically incorrect to address the issues of military power projection in the Russian Arctic apart from such redevelopment tasks as, for example, restructuring of the settlement system in the coastal Arctic zone. The positioning of small, but technically equipped military contingents having modern means of transportation on a permanent basis would be reasonable not “in the middle of nowhere,” but as close as possible (where practical) to the existing settlements. This would make it possible to engage the part of the local population in the productive labor associated with civil service of military facilities, organize the provision of local food products (fresh meat and fish) to military personnel, solve the problems of medical services for the local population in especially complicated cases, use the military transport infrastructure for local needs within reasonable bounds,²² etc.

The above said is only a particular example of using the effect caused by territorial and sectoral integration of military power projection and solution of infrastructural, informational, economic, and almost all other problems associated with the upcoming redevelopment of the Russian Arctic. In a broader context of the integrated safety of the Russian Arctic zone, which is reasonably considered by the President of the Russian Federation to be the priority line of activity in this macro-region,²³ the noted synergic effect of the efforts of civil and power structures becomes even more extensive and significant. A connecting link in the liaison of the mentioned structures is the EMERCOM of Russia, the divisions of which shall provide the stable and safe work of all facilities in the Arctic Region and, above all, the people living there.

According to the design of the integrated system for emergency monitoring, prevention, and response in the Arctic zone, it is planned to create a network of 10 emergency rescue centers in the settlements on the coast of the Arctic Ocean: in the Northwestern Federal District—in Arkhangelsk, Murmansk, Vorkuta, and Naryan-Mar; in the Ural Federal District—in Nadym; in the Siberian Federal District—in Dudinka; in the Far Eastern Federal District—in Tiksi, Pevek, Anadyr, and the settlement of Provideniye, with a control center in Dudinka.

The security of the population and territories of the Arctic zone is provided by a group of forces and facilities of the territorial subsystem of the Unified State System of Prevention and Response to Natural and Man-Made Emergency Situations (RSChS), which, along with the divisions of the Russian Emergencies Ministry, also includes the forces and facilities of the Ministry of Defense of the Russian Federation, State Border Service of the FSB of Russia, Ministry of Transport of the Russian Federation, Ministry of Natural Resources and Environment of the Russian Federation, Federal Agency of Maritime and River Transport (Rosmorrechflot), Federal Air Transport Agency (Rosaviatsiya) and Russian Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet). In addition, emergency rescue teams of the largest companies operating in the Arctic Region. Together with the Russian Federal Space Agency (ROSCOSMOS), the EMERCOM of Russia is working on the creation of special centers for receipt, processing, and distribution of Earth's remote sensing information in Murmansk, Dudinka, and Anadyr [15].

Key Methodological Issues of Program- and Target-Oriented Management of Regional Megaproject of Russian Arctic Redevelopment

In spite of the availability of the above-mentioned directive documents regarding the development of the Russian Arctic, a task to develop a methodological substantiation for this fundamentally new (with regard to the scale and structural complexity) regional megaproject has not been even set. For

²¹ Russia has started construction of modular military towns in the Arctic Region. Retrieved from: www.realty.newsru.com>article/08sep2014/polar_star.

²² In particular, refer to [14].

²³ President of the Russian Federation V. V. Putin's speech at the extended meeting of the Security Council of the Russian Federation On the Implementation of the National Policy of the Russian Federation in the Arctic Region in National Security Interests. Retrieved from: <http://www.scrf.gov.ru/conferences/58.html>.

this reason, we can now only give a broad outline and determine basic methodological positions of the considered megaproject implementation.

1. State Program- and Target-Oriented Management of Arctic Megaproject Implementation. The redevelopment of the Russian Arctic can be effective only if it is considered and programmably designed as a single integral subject of government control, and this subject will be thought of as a systemically organized generality of many coordinated actions of federal, regional, and municipal authorities, corporations, entrepreneurs, and civil society institutions joined by a unity of purpose and by naturally established and specially organized economic, social, and infrastructural links. This is possible only upon condition of the system identification of this subject, i.e. if the correlation is achieved between the specific tasks and actions of all its participants and the common goal and sub-goals of Russian Arctic redevelopment. From this perspective, the Program for the Socio-Economic Development of the Arctic Zone of the Russian Federation for the Period up to 2020, which was approved by the Government of the Russian Federation on April 21, 2014, unfortunately, seems to be inadequate to the system-based essence of the subject of the Arctic megaproject. This program consists of the separate and poorly interconnected program-oriented tasks of previously adopted federal and state programs, as well as the federal targeted investment program projects which shall be implemented to some extent in the Arctic Region, based on the fact that “some state programs pay special attention to the Arctic zone of the Russian Federation and highlight specific state policies for this territory.” We believe that the logic and sequence of actions in the program for the implementation of the systemically organized Arctic megaproject shall be reverse to the sequence of actions which was used in the government program. In particular: not the megaproject implementation program shall be assembled from individual tasks (fragments) of previously adopted particular programs and projects, but the latter shall be reviewed, corrected and coordinated in accordance with the target objectives and tasks of the specially developed separate program of Arctic Region redevelopment.

For this purpose, it is necessary to:

- Perform an inventory check of the total array of previously made decisions with respect to their correspondence to the main goal of Arctic Region redevelopment and consistency with each other, with the selection of the most efficient decisions;
- Supplement this array with new backbone decisions;
- Assess the systemic and particular risks of megaproject implementation (see below);
- Develop scenarios of megaproject implementation, depending on the predicted influence of external and internal factors, with determining the priority decisions in the proposed circumstances;
- Develop and form a program- and target-oriented management system appropriate to the purpose and scope of works on megaproject implementation (see below);
- Create permanent mechanisms of using the system diagnostics of the decisions made and organizing the monitoring of Arctic megaproject implementation;
- Develop and use mechanisms for the integration of Arctic megaproject territorial unit development programs in order to achieve the main goal of the megaproject;
- In the course of preparing the program tasks, performing the system diagnostics of the decisions made and monitoring the implementation of the Arctic megaproject, assess the efficiency and effectiveness of these tasks and decisions;
- Organize a unified information system of Arctic megaproject development and implementation;
- Create a system of the continuous scientific support of the Arctic megaproject.

2. Organization of Arctic Megaproject Management. In connection with the specifics of the redevelopment of the Arctic Region as a subject of system study and state program- and target-oriented management, it is necessary to provide a special methodological substantiation for organizing the management of this megaproject. Such organization shall be based on the principles of systemacity, the rational proportion of centralization, and decentralization of management and continuity of management activity (which does not cancel the delegation of individual authorities as well).

In this regard, a question about the supreme body of the state program- and target-oriented management of the integrated development of the Russian Arctic zone requires a special understanding and a conceptual answer. In compliance with the Decree of the President of the Russian Federation dated February 3, 2015 and Resolution of the Government of the Russian Federation No. 228 dated March 14, 2015 and Directive of the Government of the Russian Federation No. 431-r dated March 14, 2015, which were issued in order to implement this Decree, a Commission on Arctic Development

(KVARK) was established.²⁴ Undoubtedly, this is an important step forward as compared to the previous years when the multifaceted, interdepartmental problems of Arctic Region development, which were critical for Russia in general, did not have a common organizational basis to address them. At the same time, the coordination status of the Commission on Arctic Development and over functioning of its members, for whom the participation in this commission is only one of their numerous duties²⁵, cause its incomplete correspondence to the criteria and requirements of the program- and target-oriented management of the Arctic megaproject, which limits the opportunities and efficiency of its implementation.

It appears that, in order to ensure the efficiency and effectiveness of program- and target-oriented management of the integrated development of the Russian Arctic zone, it is necessary to establish a supreme body with a federal ministry status in addition to the Commission on Arctic Development. The members of this body would work on a permanent basis and be engaged only in solving the tasks of the Arctic megaproject. (Such a precedent has been established for managing the recent program for the development of the Far East and Trans-Baikal Region.) From an administrative point of view, the mentioned Ministry of Arctic Affairs shall be within the scope of Deputy Prime Minister of the Russian Federation (same D. O. Rogozin). To ensure direct participation of the Administration of the President of the Russian Federation in the management of Arctic zone development, it would be reasonable to create a special division within the Domestic Policy Department and establish a Council on Arctic Development under the President of the Russian Federation.

At the same time, the Commission on Arctic Development retains its important basic function of a coordinator of the liaison between the government agencies participating in the Integrated Program for Arctic Region Development up to 2020 and the above-mentioned Arctic megaproject. With regard to the program- and target-oriented management of the development of the Arctic Region, as a model of the “Commission on Arctic Development—Ministry” liaison, it is possible to use the successful, in our opinion, experience accumulated in the sphere of ruling the country in natural and man-made emergency situations. In particular, this refers to the experience of the liaison between the Government Commission on Prevention of and Response to Emergency Situations and Fire Safety (the former Interdepartmental Commission)²⁶ and the EMERCOM of Russia.

3 Integration of Programs for Development of Territorial Units within Arctic Megaproject. The aforesaid is a detailed description of the abnormally high territorial heterogeneity of the Russian Arctic zone, which causes the need for the Arctic redevelopment megaproject to include the programs addressing the issues of these territories, varying in content. In this regard, it should be taken into account the Murmansk Region, cities and districts of the Arkhangelsk Region, Urban District Vorkuta of the Komi Republic, the city of Norilsk of the Krasnoyarsk Territory, uluses of the Republic of Sakha (Yakutia), and the autonomous districts within the officially approved Arctic zone of Russia have already adopted (most often, for the period up to 2020) and are implementing their own strategies and programs of socio-economic development.

In these conditions, it is methodologically justified to apply the following requirements and elements of the process of territorial unit development project integration in interests of achieving the goals of the Arctic megaproject. First, to make an extended list of the tasks and expected functional parameters of each territorial unit in interests of achieving the goals of the megaproject, with the identification of the scope and sources of the resources needed for this purpose. Second, to carry out a qualitative and quantitative assessment of opportunities of territorial unit development in the case if production, transport & infrastructure and other projects of Arctic Region redevelopment are implemented. Third, to simultaneously review the previously developed strategies and programs of territorial unit development with making necessary corrections in them. In this connection, it is needed in these documents to create either individual sections reflecting the required actions

²⁴ Resolution of the Government of the Russian Federation No. 228 dated March 14, 2015. Retrieved from: <http://pravo.gov.ru/laws/acts/22/505056.html>.

²⁵ It will suffice to mention that Head of the Commission on Arctic Development, Deputy Prime Minister D. O. Rogozin, in addition to the chairmanship of this commission, is also in charge of such important areas of economy and national security as the defense industry complex, space industry, aircraft engineering, shipbuilding and protection against emergencies.

²⁶ Refer to Regulation on the Government Commission on Prevention of and Response to Emergency Situations and Fire Safety. Approved by Resolution of the Government of the Russian Federation No. 11 dated January 14, 2003 as amended and supplemented on May 9, 2003, January 11, 2006 and December 4, 2009. Retrieved from: <http://base.garant.ru/12129504>.

of federal, regional, and municipal authorities to transform the territories in the context of Arctic megaproject task implementation, or separate programs of such transformation. A necessary condition of implementing a system approach to the program- and target-oriented management of the Arctic redevelopment megaproject is to include the territorial section of this megaproject into the overall program of its development and implementation.

4. Creation and Functioning of Unified Information System of Arctic Megaproject Development and Implementation. At present, there is no adequate informational support of the development and implementation of the Arctic redevelopment megaproject, and its organization requires the use of the methodology for creation and functioning of information systems for support of the largest interindustry projects, for example, in cosmonautics. A basic principle of the mentioned methodology consists in the advanced generation of an information request for each item of the megaproject development and implementation program and for each its local project. Practice shows that in this case we reveal up to one-third of the crossing information arrays and approximately the same amount of the information contained in none of the available databases.

Created on such a basis, a large-scale information request, which will be supplemented and adjusted at all stages of megaproject development and implementation, shall be addressed to a specially established division having a right to obtain all necessary information from federal, regional, and municipal authorities, state and private corporations and enterprises, scientific centers, etc. At the same time, it is necessary to properly extend the functions of the country's statistics bodies with making additions in the existing statistical reports and with the transition to the system of continuous and immediate update of statistical information. We should believe that a methodologically grounded approach is also to create a special organizational structure able to meet all information needs of Arctic megaproject participants in online mode and on a free access basis.

5. Organization of Continuous Scientific Support System for Arctic Megaproject. The development and implementation of the megaproject requires the organization of continuous and purposeful scientific research in almost all directions. According to V. N. Lazhentsev's fair and accurate statement, "development of territories with extreme and harsh climate is expressed in active work on the assimilation and use of new knowledge and implementation of new technologies, rather than in an increase in the size of population and human resources and growth of gross regional product" [16]. In this regard, from the overall array of the Arctic problem studies conducted in various scientific centers of the country, it is necessary to extract a block of the fundamental and applied studies which are justified by the need for solving particular tasks and achieving the specific goal of the regional megaproject of Russian Arctic redevelopment.

In order to solve the mentioned problem, in principle, it is necessary to develop a new program of fundamental and applied studies, which is unlimited in time, and create a special organizational structure of the targeted selection of the proposals for carrying out such studies, funding them (separately from the existing funding system of the Russian Academy of Sciences) and receiving the results obtained. It is methodologically justified to create non- and inter-departmental research teams specializing in the scientific support of the Arctic megaproject. The studies carried out in the research divisions of large corporations and enterprises, which are oriented toward operations in the Arctic zone, as well as the corresponding studies conducted by order of these corporations and enterprises in Russia and abroad, should be considered to be an individual part of the scientific support of Arctic megaproject development and implementation.

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