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## Opportunities and prospects for the emergence of new refineries in Russia's Northern regions



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**Abstract.** The article is devoted to the study of the issue concerning the improvement of the system of regional oil products supply of Russia's Northern territories. It considers the key issues of the formation of oil industry, the regional economic branch that is new for the Murmansk Oblast. The research information base consists of analytical and statistical materials of the regional authorities of Russian Northern subjects and of data presented in the electronic media. The paper is addressed to economists, specialists of regional and local authorities, representatives of oil enterprises, and to all those interested in the range of problems of fuel-and-energy development of our country's North.

**Key words:** Russia, Northern regions, Murmansk Oblast, oil processing.

Russia's Northern territories are traditionally the largest centers of not only the extraction, but also of the consumption of natural resources. High needs are observed in the sphere of fuel and energy resources – natural gas, coal, oil products. While the programs of reorientation of territorial energy complexes to the use of energy and gas sources, that are relatively cheaper than oil, and the energy efficiency of both Northern and non-Northern regions have been given rather increased attention in our country, the diversification of oil products supplies, the expansion of their local production in the Northern zone have not yet yielded any tangible results. Therefore, an acute shortage of petroleum refineries remains a permanent danger to the energy security of the Northern territories of the Russian Federation.

The aim of this article is to define some of the prospects of and the prerequisites to the emergence of new production facilities within the Northern zone of the Russian Federation. In view of this, the actions have been taken by regional authorities in cooperation with oil companies, in order to resolve the problems concerning oil products supply of the Northern regions of the Russian Federation. The article gives particular emphasis to the issue of launching oil products production in the territory of the Murmansk Oblast that is to be the basic region, serving the main cargo transportation along the Northern sea route.

In his report at the session of the Presidium of the State Council on April 28, 2004 Russian President V.V. Putin stressed the necessity of modernization and upgrade of the energy economy of the Northern territories as one of the main directions of the state policy in the spheres of economic and social development of Russia's Northern regions and Far East [3]. The issues concerning fuel supplies by particular subjects of the Russian Federation over the last decade have been repeatedly addressed not only at the highest governmental level, but also

in social and scientific circles. The recognized national experts in this field participated in the discussion. Thus, for example, one of the most famous monographs "Economics and energy of the regions of the Russian Federation" (2001) highlighted the definition of the problem of fuel and energy supply of the regions provided with imported (particularly long-range) fuel [10].

Over the last 20 years only two large refining facilities have been built and commissioned in Russia – Nizhnekamsk and Antipinsky oil refineries (NPZ). There is no other such enterprise out of the 30 major domestic refineries directly in Russia's Arctic zone with access to the Northern sea route. The nearest sources of oil products supply for the Northern subjects of the Russian Federation are the following: LLC Production Association KINEF (Leningrad Oblast), JSC Lukoil-Ukhtaneftepererabotka (Komi Republic), Antipinsky oil refinery (Khanty–Mansi Autonomous Okrug, Khanty- Mansiysk), Surgut condensate stabilization plant (CSP), Purovsky condensate processing plant (CPP) (Yamalo-Nenets Autonomous Okrug (YNAO). Therefore, the idea of establishing a local oil refinery in the Subarctic in order to satisfy the region's domestic needs for petroleum products, to supply its products to other Northern regions under the "Severny Zavoz" (northern delivery) program, using the Northern sea route, and to participate simultaneously in export deliveries, started up relatively long ago. The plans providing for the establishment of large oil refineries in the Murmansk Oblast, the Sakha Republic (Yakutia) and the Sakhalin Oblast are the examples illustrating the elaboration of such projects.

The development of the project on the construction of an oil refinery in Murmansk was originally associated with the initiative to set up the Murmansk pipeline system (OAO LUKOIL, OJSC Yukos Oil Company, etc.) In 2000 the oil refinery project was most intensively developed by LUKOIL company.

The cooperation agreement, stipulating joint efforts ensuring oil products supply to Russia's Northern regions through the Murmansk Oblast oil tank farms, was signed between the company and the Murmansk Oblast administration on February 16, 1999 [15]. The enhanced interest in such production facility was expressed not only by the oblast government and the Ex-Governor of the Murmansk Oblast Yuri Evdokimov, but also by Russian President Vladimir Putin, who during his visit to the region stated to assist in solving the issue concerning the transfer of the oil base of the Northern Fleet from the Ministry of Defense to LUKOIL [7]. The oil base Mokhnatkina Pakhta, which is located in the area of the similarly named cape, near Severomorsk and has the entire infrastructure, required for the purpose, was proposed as the site of the future plant. The Pechenga Bay coast (the area of the Devkina Zavod' and Trifonov Ruchey) was considered as an alternative location [11].

According to the construction plan, the territory of the production site exceeded 100 ha (10 square km). In addition to the plant itself, the LUKOIL project also included the construction of oil terminal and transport system. The Neftchemproject institute (Rostov-on-Don) carried out initial calculations and prepared materials for the project. It was planned that the plant's production capacity would reach 3 million tons of oil per year, and its construction cost in the prices of that period would not exceed 200 million US dollars. The measures of project support from regional administration (jointly with the Murmansk city administration) would provide for authorizing long-term lease of land plots for constructing several (3 to 5) LUKOIL-Severo-Zapadnefteproduct petrol filling stations. In turn, the oil company would ensure oil product supplies to satisfy the needs of Murmansk. However, despite the signing of the preliminary agreement on the project implementation and

support at the federal level, all the attempts to negotiate the allotting of the territory for the plant with the Ministry of Defense of the Russian Federation failed [2].

In 2005, the idea of constructing a large oil enterprise on the Kola Peninsula was again actively discussed in the regional administration, socio-political and business circles. The need for such construction was declared by the Presidential Plenipotentiary Envoy to the Northwestern Federal District Lyubov Sovershaeva at the 5th International Forum "Fuel and Energy Complex of Russia: regional aspects", held in St. Petersburg on April 4, 2005. According to her, "... this project is not interesting for oil companies in terms of the economy, however, when solving the issues concerning energy security of the country and regions, one shall be driven by national interests" [21]. The construction of an oil refinery is economically feasible for the state, as the enterprise "...will allow providing oil products to the Murmansk and Arkhangelsk oblasts, to unload Oktyabrski and Northern Railways" [ibid.].

The active discussion of the far-reaching possibilities for deploying local production in the region resulted in the initiative development of rather large oil refinery (with the capacity up to 6 million tons of oil per year) by SINTEZ Group (JSC SINTEZ Petroleum). The main purpose of the future enterprise was to be the production and transportation of oil products to the countries of Northern Europe (straight-run gasoline and fuel oil), and partial coverage of the local regional needs in light petroleum products. Favorable oil market environment led to the SINTEZ attempt to diversify its own oil production and to establish a business structure with a complete production cycle, including production, processing and distribution network. A group of offshore fields (Medynsko-Varandeyskoye, Kolokolmorskoye, Admiralteyskoye and Pakhtusovskoye offshore areas), developed by

JSC Arktikshelfneftegaz and Sintezneftegaz, included in the SINTEZ Group was supposed to be the main source of raw materials for the refinery. Despite rather large balance reserves (more than 400 million tons of oil in 2007), companies, included in JSC SINTEZ Group, were forced to send produced oil for processing to the Republic of Bashkortostan, using the so-called job-processing contract. SINTEZ does not own a private refinery, therefore, the formation of processing assets would allow providing oil products to the network of filling stations functioning in Moscow, increasing independence from other participants in the domestic oil market. Moreover, the group companies were interested in the construction of the export terminal in the Kola Bay area for the export transfer of up to 25 million tons of oil jointly with other large companies (first of all, OJSC Rosneft) [16]. In the same way, in cooperation with other companies, selling crude oil for export through Murmansk Sea trading port, the future refinery was to be loaded with raw materials.

SINTEZ Group was ready to invest from 400 to 550 million US dollars in the implementation of these plans (depending on the terminal configuration) [1]. Despite the promise of such significant funds, as well as all kinds of support from the federal and local authorities (including the Prime Minister M. Fradkov and the Vice-Governor of the Murmansk Oblast A. Ruzankin), the practical implementation of these ambitious plans was considerably complicated. The site, selected for the construction of the refinery in the Western coast of the Kola Bay (area of the mouth of the Lavna River) was not linked with the region's electrical and transport networks [9]. In the end, the altered economic situation brought the project to a standstill at the earliest stage.

At the same time, Gamma Sever company, engaged in petroleum products wholesale and transportation in the Murmansk Oblast, expressed intentions to build an oil refinery with

little production capacity (up to 100 thousand tons of hydrocarbons per year). Taibola railway station (Murmansk branch of the Oktyabrski railway, Kolsky District) was designated by the developer as the site for the construction of the enterprise. Stable gas condensate and fractional oil condensate, a by-product of oil crude production was expected to be the main raw material used by the company for the production of commodity products. The required volume of investments ranged from 120 to 150 million rubles. Small capacity of mini-refineries did not allow counting on the expansion of sales geography outside the Kolsky District municipalities and regional center. The project on the construction of a mini-refinery LLC Gamma Sever was considered at the session of the interdepartmental commission on the economics of location in June 2007 in the Murmansk Oblast Government. Members of the Commission criticized the economic justification and the environmental aspects of the project implementation. With regard to economic complications concerning the launching of production at the selected site of Taibola railway station, it was stated that currently it is not functioning, and the assumed costings for commissioning, and the developer's expenses for the operation and maintenance of the station, as well as other project indicators were not submitted for the Commission's discussion. The representative of the Oktyabrski railway suggested that the finished products would be most likely transported to the nearest Kola station instead of Taibola station that would adversely affect the pricing process [4]. In case the initial decision on the restoration of Taibola station is adopted, the increase in expenditure can make the project unprofitable at all. Members of the Commission called into question the environmental safety of the plant, as well. According to the Deputy of the regional committee on natural resources Aleksei Smirnov, the planner can not guarantee that the water area of the Kola River will be

protected from pollution. “The consequences can be extremely critical”, Smirnov noted [ibid]. In further discussion all arguments of the Deputy Director of Gamma Sever Company V. Lisin about the existence of two alternative sites for the complex construction were neglected. Deputy Chairman of the Commission Aleksandr Makarov made a remark on the company’s failure to submit the project documentation, which was one of the main reasons why the Commission rejected the possibility of further discussion concerning the construction of this modular oil refinery by LLC Gamma Sever.

The topic of Murmansk oil refinery was again actively discussed with the plans of CJSC Sevmorneftegaz (Gazprom Neft Shelf LLC, JSC Gazprom) being mostly supported by the regional authorities in 2010. The emergence of this project was directly related to the expected intensification of the activities concerning the development of raw hydrocarbon deposits in the Arctic shelf. This time the conversation again turned on the establishment of mega-plant capable to fundamentally change the fuel problem of the Northern region. However, the initiator explained at once that, despite the export production being the primary purpose of the facility, considerable part of oil products can be forwarded to the needs of the domestic market. Several variants of the refinery productivity were considered. According to Sevmorneftegaz General Director Aleksandr Mandel, the enterprise capacity was to be 5–10 million tons [20].

Depending on the volume of the refinery production output, the investments of JSC Gazprom could reach 7 billion US dollars [19]. The basic raw-material base for the project was expected to be the oil deliveries from Prirazlomnoye, Dolginskoye, Varandeykoye, Medynskoye fields (Pechora sea), and perhaps, from Rostovtsevskoye and Novoportovskoye fields in Yamal. The basic stages concerning the preparation and realization of such huge and

tremendous plans envisaged the completion of the elaboration of technological and economic substantiation of investments into the project by the end of 2010. Following the adoption of the decision in principle concerning the construction of the facility, the term of construction stage was to make up to 5 years. The launching of the refinery was to coincide with the achievement of peak oil production at Prirazlomnoye field. By this time, according to the then available plans, the first oil production had to be started in Dolginskoye field. The refinery was to be located at the production site near the village Mezhdurechie.

Plans to build a refinery were intertwined with the other project of JSC Gazprom in the village of Teriberka, where JSC Gazprom planned to construct the plant for liquefying natural gas using Shtokman gas condensate field as the source of raw materials. Therefore, in addition to the plans of oil processing, oil refineries could have been used for processing gas condensate from the Shtokman field in the amount of up to 600 thousand tons per year. According to Gazprom plans, about 1.5 million tons of produced oil products were to meet the concern’s own needs in the region, a total of up to 4 million tons were to satisfy the needs of the Murmansk and Arkhangel’sk oblasts. Thus, the total volume of deliveries outside the region and for export would have not exceeded 4.5 million tons.

In 2011 the construction project of Gazprom refinery in the Kola Peninsula was adjusted, however, a fundamental decision to start the construction was never adopted. After that the Western shore of the Kola Bay “...near the projected construction of a new Murmansk sea trading port district” was named as the potential deployment of the facility [18]. 12 possible options were initially considered in the process of choosing the most suitable area for locating the refinery. Gazprom VNIIGAZ LLC was mentioned as the leading project organization [12]. The commodity

nomenclature of refinery production had been expanding and included, besides oil, high value added products – petrochemical commodities. Diesel fuel, motor gasoline (AI-92/95), marine fuel, jet fuel and petrochemical materials were to be the major plant products. Preliminary characteristics of the future enterprise and the upcoming construction were voiced by Deputy Chairman of the State Duma of the Russian Federation, President of the Russian gas society Valery Yazev, who visited the Murmansk Oblast in early November 2011. The required capital investments, according to the adjusted estimates, increased and made up about 250 billion rubles. According to the new project, more than 1.800 jobs were planned to be created. The planned production capacity was to reach 16 million tons per year. It was assumed that the production territory of the refinery will amount to 12-18 square kilometres. Along with the plant, the whole complex infrastructure was planned to be constructed “from scratch”: branch railway, mooring facilities, harbour vessels, cumulative base of finished products, terminal raw pipeline, feed pipeline, etc.

During the meeting between the members of the Murmansk Oblast Government (Chairman of the Committee of Industrial Development, Nature and Environment Oleg Krapivin, Economic Development Minister Sergei Agarkov) and the representatives of JSC Gazprom at the end of July 2011, the latter submitted for consideration the Declaration of Intent with regard to the future plant-siting that provided for the 9-year implementation period of the refinery construction phase – 2011–2020 [17]. The total lifetime of the facility made up 25 years. By the end of the year the company decided that in case of a positive outcome of those preliminary public hearings and agreements, the construction would not start earlier than in 2016. Some additional characteristics of the enterprise concerning the environmental and economic aspects of its activities were declared in December, 2011

during the public hearings for the substantiation of investments in the construction of an oil refinery held in Polyarnyy town (Closed Administrative-Territorial Unit Aleksandrovsk) and the village of Mezhdurechie (Kolsky District of the Murmansk Oblast). Head of the Department of Industrial and Ecological Safety of JSC Scientific-production firm Diem (the developer of the project concerning the environmental impact assessment) Aleksandr Fedorenko noted that “...the functioning of the complex will result in 29 types of waste with total amount of more than 23 000 tons per year. The largest part of them (95.6%) is hazard class III waste – the so-called oil-slime. Up to 97% of oil sludge will be processed at the enterprise and will be subject to disposal at the landfill of solid domestic waste. The location of the landfill has not been yet determined: it may be on the territory of the oil refinery complex itself, outside companies may be invited thereto” [8]. As a result, the total number of jobs that were to be created in the region's economy increased from 1816 to 4025 [13]. The volume of tax payments to the regional budget for the whole running time of the plant was expected to make up 278 billion rubles. The assessment with regard to the number of specialists and workers, required for construction and installation activities on the territory of the village, reached 8000 people (the number of the village Mezhdurechie residents – 975). Additional generation of about 200 megawatt electrical would have been required for the power supply of the plant in the Kolsky District by 2020. Despite the fact that the first public hearings were successful and environmental aspects of the future refinery activities were not sharply criticized by professional attendees, subsequently, the environmental risk of the project was the main reason for the suspension. In September 2012, the Federal Supervisory Natural Resources Management Service (Rosprirodnadzor) has completed government expert review of the documentation “Feasibility

study of the oil refinery construction in the Murmansk area". The expert commission stated the incompliance of the submitted documents with the legislative requirements in the field of environmental protection. Conclusion of the government expert review, presented by the expert commission was approved by Rosprirodnadzor Order No.524 as of September 28, 2012 [5]. Thus, despite the increased public attention and "green corridor" for Gazprom plans, provided by regional administration, Murmansk oil refinery project was frozen again at the stage of preliminary agreements with the federal regulatory authorities.

Until the middle of 2012, the prospects for constructing major refinery in the region, though already rather vague, were associated with OAO LUKOIL that yet in May 2000, planned to start implementing the project concerning the construction of an enterprise with the production capacity of 3 million tons of oil products per year. In July 2012, the Governor of the Murmansk Oblast Maria Kovtun delivered a workshop with the General Director of OOO LUKOIL-Severo-Zapadnefteproduct Maxim Khitrov and the General Director of OOO LUKOIL-Rezervnefteprodukt Vladimir Ukhnev, during which the question concerning the prospects for the construction of OAO LUKOIL oil refinery in the region was raised again. According to the new regional head, "... it will allow reducing the transport component in the structure of fuel prices and will have a macroeconomic effect on the social and production activities of the region" [14]. On the part of the Murmansk Oblast administration, the measures to support the company's activities in the region stipulated the possibility of constructing 5 petrol filling stations of OOO LUKOIL-Severo-Zapadnefteproduct, as it was in 2000. However, LUKOIL company treated the development of new scale projects with an abundance of caution, taking into account its quite unsatisfactory experience in

implementing such plans in the Murmansk Oblast. At present, "the revival" of LUKOIL oil refinery project in the Murmansk Oblast, suggested by Maria Kovtun, has been once again indefinitely postponed. There are other projects of processing enterprises, capable of becoming the basis for "Severny Zavoz" system. The initiatives of the governments of the Sakhalin Oblast and the Sakha Republic (Yakutia) are distinguished among others.

The project concerning the Sakhalin oil refinery had been worked out for over 5 years, but the final technical-economical and investment solution was not taken either. The enterprise capacity was expected to make up from 4 to 10 million tons per year, which would be sufficient for satisfying the needs of Kamchatka Krai, the Chukchi Peninsula, the Magadan Oblast, along with the Sakhalin Oblast. The production surplus was planned to be exported to the countries of the South Asian region. JSC Gazprom was to be the main planner and the owner of the new enterprise. Another potential participant OJSC NK Rosneft withdrew from the project straightaway at an early stage of the development, referring to the insufficient level of domestic regional demand and low economic efficiency of the project [6]. Out of oil refining facilities, only a modular miniplant of Petrosakh company in Pobedino with the capacity of 200 thousand tons is functioning in Sakhalin at present, but oil refining makes up about 36 thousand tons, and will be reducing in the future.

The government of the Sakha Republic initiated plans for the construction of the plant producing synthetic motor fuels on the basis of gas processing, in order to cover part of the domestic demand, as well as to participate in supplying the border territories of the Republic. The expected emergence of such enterprise in the area of Aldan town would provide the southern and central regions of the Sakha Republic (Yakutia) with light oil products.

Previously, in 2007 ALROSA company gave up on the construction of an oil refinery in the Sakha Republic, after preliminary calculations and initial evaluation of the enterprise economic efficiency. The capacity of the refinery was expected to exceed 250 thousand tons of oil products per year. The main reason of the investor's decision to withdraw from the project on the construction of the oil refinery is the same as in the Sakhalin Oblast: insufficient attractiveness of the local market, difficult economic conditions and, as a consequence of all the above, low overall effectiveness of the implementation of the social project per se. Nevertheless, several alternatives of the construction of new energy facilities were considered in February 2010 within the framework of the Comprehensive plan of South Yakutia development. A new gas-chemical plant was to be additionally constructed in Aldan, or in Lensk. JSC Gazprom acted as the design contractor.

In addition to rather large-scale construction projects, pivotal for "Severny Zavoz" program of oil-refining enterprises, the plans to deploy small modular refineries have been actively developed, in order to meet the local needs of customers, remote from the centralized systems of petroleum products supply. The available experience in implementing similar projects in the economic conditions of the Northern territories is rather successful. For example, the program on the reconstruction and modernization of Evenkiya housing and public services (the northern district of Krasnoyarsk Krai) envisages the construction of mini-refineries in Baykit and Vanavar. Low-capacity oil refinery on the development of diesel fuel for domestic consumption was launched in 2009 in Vankor, making it possible to get rid of the need to import petroleum products for internal requirements of local communities. More than 20 oil refining units have been functioning in the field areas of Khanty–Mansi Autonomous Okrug. The network of small oil refineries has been deployed in Yakutia, as well. Three companies

The assessment of economic impact of local oil refineries and the reduction in transportation costs of oil products delivery in the Murmansk and Sakhalin oblasts, the Sakha Republic

Region	Volume of oil products consumption in the region, thousand tons per year	Overall transportation costs of oil products delivery to the region (main means of transport, excluding transshipment cost), thousand rubles per year	Average cost of oil products delivery to the region's territory, thousand rubles per year	The projected effect from the reduction in transportation costs of oil products delivery to the region, thousand rubles per year
Murmansk Oblast*	MF 300	600537	232317	368220
	DF 500	1052500	404455	648045
	FO 1800	3388338	1284876	2103462
Sakhalin Oblast**	MF 24.2	69304	35090	34214
	DF 37.2	105053	66001	39052
Sakha Republic (Yakutia)***	MF 258	969945	830631	139314
	DF 528	2037552	1722864	314688
	FO 10.5	37254	13482	23772
Total	-	8260483	4589716	3670767

Type codes: MF – motor fuel; DF – diesel fuel; FO – fuel oil.

Initial calculation data:

\* Riccom company web-page, calculation of railway tariffs on oil products transportation. Available at: <http://www.riccom.ru>, (retrieved from: July 20, 2012).

\*\* Information about the tariffs on sea ferry transportation of OAO Sakhmortek oil products (Vanino – Kholmok. Available at: <http://www.sakhmortek.ru/tariff>) (retrieved from: July 10, 2012).

\*\*\* Information of OAO Sakhaneftegazsbyt about the structure of the company's retail prices, the share of transportation costs. Available at: <http://www.sngs.ykt.ru/node/1> (retrieved from: July 15, 2012).



(OAO Sakhaneftegaz, CJSC Irelyakhneft and TAAS-Yuriakh Neftegazodobycha LLC) were engaged in the building of compact oil refinery complexes for satisfying internal fuel needs, but all of them for one reason or another were forced to halt construction in 2002. The construction of one of the projects (Vitim small oil refinery complex with the capacity of 50 thousand tons of products per year, customer – OAO Sakhaneftegaz) as of January 1, 2012 was 98% complete.

When making a comparison between the northern regions traditionally considered problem in the context of oil products supply, such as the Sakha Republic (Yakutia), Murmansk and Sakhalin oblasts, for example, from the viewpoint of potential transportation cost savings of regional consumers, an oil refinery in the Murmansk Oblast is more in demand. The table presents calculation data determining the estimated impact of the construction of an oil refinery, fully or partially satisfying the regional needs for the main types of energy resources in the territory of the federal subject, on the regional economy (oil product consumers). The overall effect of the reduction in the cost of oil products transportation from other regions on the regional economy is calculated as the difference between the cost of oil products transportation from outside to the regional oil bases and transportation costs within the territorial boundaries of the region from the location of a local oil refinery.

The obtained results indicate that in case the plans concerning the construction of oil refineries in the territory of all three federal subjects are implemented, the cumulative annual effect may exceed 3.5 billion rubles. The highest assessment of the expected impact of the local production deployment in the Murmansk Oblast (about 3.1 billion rubles per

year). The lowest assessment – in the Sakhalin Oblast – is stipulated by the insufficient completeness of regional consumption recording in the official statistics that resulted in the significant reduction of the last column index in summary settlements. Total common costs of regular delivery of energy resources that are attributable to the use of the main transportation means are estimated to be over 8.26 billion rubles for the three federal subjects under review. The presented results show that the deployment of regional production of oil products in these regions will allow decreasing costs in the sphere of oil products regional supply by 44.4% – up to 4.6 billion rubles along, due to the reduction of the transport component. Being aware of this, regional authorities actively support further promotion of the initiatives of both large federal and local companies involved in the development and implementation of projects regarding local production of energy resources and their rational use (energy-efficiency).

Thus, despite ongoing efforts on the optimization of the existing procurement scheme in the regions of the North and Far East in general, as well as in the Murmansk Oblast in particular, it is possible to say that the basic needs for motor fuel and light petroleum products have been satisfied on the basis of the deliveries from multiple centers of Russia's oil and gas industry. Therefore, the network expansion of small and modular oil refineries, established in the areas of intensive exploitation of hydrocarbon deposits, as well as the enhancement of transport and energy networks in Russia's North should be considered as the most likely directions of further modernization of the fuel and energy sphere of the Northern territories in the near future.

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