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## Research on the Issues of Economic Growth Centres' Establishment in the South of the Angara-Yenisei Macroregion

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**Abstract.** The article considers the peculiarities and conditions for the implementation of large investment projects and the possibility of forming regional centres for promising economic growth on this basis. The authors have analysed large investment projects aimed at developing the mineral and raw materials sector in the southern regions of the Angara-Yenisei macroregion, and assessed the impact of projects on indicators of socio-economic development of territories. The article shows that the project approach aimed at implementing individual investment projects and creating growth points in the mineral and raw materials sector should be supplemented by measures aimed at developing the territorial infrastructure, stimulating small and medium-sized businesses and improving all aspects of life support for the population.

**Keywords:** Angara-Yenisei macroregion, centre for promising economic growth, clusters, large investment project, integrated socio-economic development.

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Research area: economics.

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## Introduction

The raw material orientation of industry and export is one of the main disadvantages of the modern economic development of Russia. At the same time, it is the raw materials industries, in combination with the necessary transport, energy and social infrastructure, that create favourable opportunities for the formation of new centres and points of economic growth in a number of regions of the country, primarily in Siberia and the Far East.

The features of the potential and growth factors of the Siberian and Eastern regions determine the choice of a package of strategic projects that implement the priorities of their economic development. If in the regions of the European part of Russia one can count on an inflow of private investment in a wide variety of industries (directed toward both to the domestic and foreign markets), then in the regions of the Asian part of the country the spectrum of possible industries is much narrower. These include, first of all, the development of natural resources.

The most important factor constraining the economic development of the resource regions of the country as a whole and the implementation of existing large-scale investment projects in particular is the insufficient level of development of transport and energy infrastructure, as well as the weak integration of extractive industries into value chains based on deep processing of the extracted raw materials.

In many respects, it is for this reason that most of the regional points of growth and socio-economic development outlined by the constituent entities of the Russian Federation have not yet been supported either by the state or by business. Federal infrastructure facilities that were completed and started by the state (together with business) often do not provide the declared efficiency.

A fundamental scientific problem is the development of approaches to optimizing the scheme of interaction of various stakeholders (federal, regional, local government bodies and private investors) in the implementation of interregional investment projects, taking into account the balance of interests and risks in the long term.

## Theoretical framework

Consideration of the problems of spatial economic development should be linked with such theoretical concepts as the theory of economic space organization (Losch, 1959), the theory of functions and location of human settlement system (central places) (Christaller, 1933), the theory of spatial diffusion of innovations (Hägerstrand, 1985), the centre-peripheral paradigm of D. Friedman (Friedman, 1966), the theory of growth poles by F. Perroux (Perroux, 1954); concept of social determination of market relations by K. Polanyi (Polanyi, 1944), paradigms of “basic cities” and “market rooting” (Engelen et al., 2017; Thompson et al., 2020). Important in studying the prospects for spatial economic development are the work of the Soviet economists-geographers N.N. Baransky, N.N. Kolosovsky, M.K. Bandman et al. on the theoretical issues of the location of production and the creation of territorial production complexes (Bandman, 1990; Bandman et al., 2000); as well as the economists N.N. Nekrasov, A.G. Granberg (Granberg, 1985) et al. on the methodological issues of regional economics, the research by the Council for the Study of Productive Forces, the Institute of Regional Economy Problems of the Russian Academy of Sciences, the Institute of Economics of the Ural Branch of the Russian Academy of Sciences, the Institute of Economics and Industrial Engineering of the SB RAS (Resursnyye regiony..., 2017), etc.

In theoretical terms, we should note a certain disunity of research on the above range of issues. The problem of integration and development of districts and regions of Siberia on the basis of the formation of interregional and interbranch industrial clusters has not been raised in the scientific community of the country as a big all-Siberian and even all-Russian problem in the last decades. Therefore, many valuable scientific data and results related to this problem are still in a scattered and non-systematic form, do not add up to a single whole picture, explained by a logical and harmonious theory and supported by quantitative estimates.

Practical actions undertaken at the level of individual districts are not sufficiently systemic; as a rule, they solve narrow sectoral prob-

lems and local regional problems, seldom take into account the multiplicative general economic and social effect, which manifests itself at the level of inter-sectoral and inter-regional cooperation.

### Problem statement

The Angara-Yenisei macroregion (AYR)<sup>1</sup> is a typical Siberian region of the resource type. By now, a certain system of territorial-production clusters (TPC) has already partially formed here, and its development can be predicted. Along with the developed (Central-Krasnoyarsk, Irkutsk-Cheremkhovsky TPC), this system highlights developing, emerging and projected (conceptual) territorial clusters, mainly specializing in the extraction, production and deep processing of fuel and energy, mineral raw materials and forest resources (Shishatsky, 2014).

The most promising among them are the Sayan (Khakass-Minusinsky and Kyzyl-Kuraginsky) TPCs located in the southern part of the Angara-Yenisei macro region<sup>2</sup> (Table 1).

Large infrastructure projects can be the integrating basis for the formation of the Sayan territorial-production clusters, namely the Elezest-Kyzyl-Kuragino railway (from Kyzyl the road can be extended to Western Mongolia to Urumchi and further to China – Pakistan, India), an increased throughput of the Artysheta-Mezhdurechensk-Tayshet section and the creation of transport infrastructure for the development of coal deposits in Khakassia, the transboundary automobile corridor Krasnoyarsk-Abakan-Kyzyl-Khandagayty-Ulanguom-Khovd-Urumchi, the Abakan-Biysk road.

<sup>1</sup> The Angara-Yenisei macroregion includes Krasnoyarsk Krai, the Irkutsk Region, the Khakassia Republic and the Republic of Tuva.

<sup>2</sup> The southern regions of the Angara-Yenisei macroregion include the southern macroregion of Krasnoyarsk Krai (the Minusinsk urban district and 7 municipal districts – Ermakovsky, Idrinsky, Karatuzsky, Krasnoturansky, Kuraginsky, Minusinsky, Shushensky), the Republic of Khakassia and the Republic of Tuva. The territory of this area is about 305.1 thousand km<sup>2</sup> (1.8 %, 7.0 % and 9.0 % of the area of the territory of the Russian Federation, Siberian Federal District and the Angara-Yenisei macroregion, respectively), as of 01.01.2020 about 1,091.9 thousand people lived here (0.7 %, 6.4 % and 17.8 % of the population of the Russian Federation, the Siberian Federal District and the Angara-Yenisei macroregion, respectively).

The implementation of these unique integrating projects will increase the transport accessibility and commercial attractiveness of the development of fuel and energy (oil, gas, coal) and various mineral resources (copper and nickel ores, gold, rare earths, iron ores and other deposits) located in the zone of influence of transport and energy infrastructure (Table 2).

Favourable factors for the formation and implementation of a package of large investment projects of the Sayan TPC are:

- the presence of the largest companies in the mineral resources sector in the region, which can potentially become leaders in cluster formations and determine the long-term strategy of the regional economic system (Norilsk Nickel, Rusal, SUEK, etc.);
- the interest of the state in the implementation of the complex investment project “Yenisey Siberia”<sup>3</sup>;
- the interest of the regions (Krasnoyarsk Krai, the Republic of Tuva and the Republic of Khakassia) in the integration of the socio-economic development of their territories<sup>4</sup>;
- the creation of an interregional Yenisey Siberia Development Corporation<sup>5</sup>.

The implementation of large-scale investment projects is characterized by a high share of innovation and development costs and high investment risks. These circumstances expand and complicate the problems of project implementation and assessment of their effectiveness.

A scientifically grounded systematic approach to assessing the conditions for the implementation of each specific project for the formation of TPC is required, taking into account the specificity of natural, economic, social and environ-

<sup>3</sup> Order of the Government of the Russian Federation of March 29, 2019 # 571-p “On the list of investment projects implemented as part of Yenisey Siberia complex investment project”.

<sup>4</sup> Agreement on cooperation between Krasnoyarsk Krai, the Republic of Tuva, the Republic of Khakassia on the implementation of the Yenisey Siberia project (13.04.2018, Krasnoyarsk). Available at: [http://www.krskstate.ru/dat/bin/docs\\_attach/78909\\_soglaenie.pdf](http://www.krskstate.ru/dat/bin/docs_attach/78909_soglaenie.pdf)

<sup>5</sup> Official website of the Yenisey Siberia Development Corporation. Available at: <https://en.ensib.ru/about/corporation>

Table 1. Brief description of the Sayan TPC of the Angara-Yenisei macroregion

Clusters	Development level	Core of production specialization	Localization level	Territorial composition
Khakass-Minusinsky	Developing	Aluminium industry, hydropower, agro-industrial complex, coal industry, mechanical engineering	Interregional	Republic of Khakassia, Krasnoyarsk Krai (Minusinsk, Minusinsky and Shushensky regions)
Kyzyl-Kuraginsky	Forming (projected)	Coal industry, polymetallic ores, iron ore, gold, forest industry	Interregional (international)	Republic of Tuva, Krasnoyarsk Krai (Kuraginsky, Ermakovsky, Krasnoturansky, Karatuzsky, Id-rinsky Districts), Mongolia, China

Table 2. Projects for the development of mineral deposits located in the area of the Sayan TPC

Project Title	Geographic location	Project capacity of the primary production	Investment costs (billion roubles), in prices of 2018		
			Total	primary production	local infrastructure
Elegestky MPP	Chedi-Khol kozhuun (Republic of Tuva)	15 million tons of coal concentrate	60,9	41,9	19,0
Mezhegeysky MPP	Tandinsky kozhuun (Republic of Tuva)	5.1 million tons of coal concentrate	22,7	15,5	7,2
Beysky coal cluster	Altai, Beysky districts (Republic of Khakassia)	17.05 million tons of coking coal	71,9	47,5	24,4
Ak-Sugsky MPP	Todzhinsky kozhuun (Republic of Tuva)	456 thousand tons of copper-molybdenum concentrate	93,4	56,6	36,8
Kuraginsky iron ore cluster (Terekhovskoe, Tabratskoe, Khabalykskoe deposits)	Kuraginsky District (Krasnoyarsk Krai)	3445 thousand tons of salable iron ore concentrate (65 % of iron)	61,0	39,5	21,5
Lysansky MPP	Kuraginsky District (Krasnoyarsk Krai)	744 thousand tons of titanium-magnesium concentrate	12,6	6,1	6,5
Artemovsk gold ore cluster	Kuraginsky and Karatuzsky districts (Krasnoyarsk Krai)	4500 kg of gold	8,1	3,2	4,9
Tuva gold ore cluster	Kaa-Khem kozhuun (Republic of Tuva)	2400 kg of gold	5,7	2,2	3,5
Total			336,3	212,5	123,8
including					
Republic of Tuva			182,8	116,2	66,5
Republic of Khakassia			71,9	47,5	24,4
Southern regions of the Krasnoyarsk Krai			81,7	48,8	32,9

mental conditions, as well as the characteristics of the assets of private companies and their strategic interests in the world and Russian markets.

### Methods

One of the significant institutional innovations of the Strategy of Spatial Development of the Russian Federation until 2025<sup>6</sup> was the introduction of the category of so-called centres for prospective economic growth and the approval of the principle of priority development for individual territories as one of the important instruments of state policy of regional development. The practical implementation of this principle allows developing new territories as quickly and efficiently as possible, equalizing interregional economic disproportions, consistently ensuring the interests of the country's national and economic security.

However, in practice, any priority is a rather contradictory instrument of the state's socio-economic policy. The main problem here is that the implementation of this or that form of priority may conflict with other tasks of the socio-economic development of the country and its regions.

Within the framework of the currently widespread "project approach", when the implementation of individual investment projects is considered, their possible impact on the socio-economic development of the territory is not taken into account. The limitations of this approach can be revealed only after a comprehensive consideration of the implementation of the largest investment projects in a particular territory. In addition to the direct impact, it is important to consider the effects of the multiplicative impact of investment projects on the territory, confirming their status as development poles in the region. To fulfil the task of territorial development, an investment project must have a systemic impact on the surrounding socio-economic environment, that is, in addition to financial effects, generate additional socio-demographic and infrastructural effects.

<sup>6</sup> Order of the Government of the Russian Federation of February 13, 2019 # 207-p "On approval of the Strategy for the spatial development of the Russian Federation for the period up to 2025".

Figure 1 shows schematically three possible scenarios for the implementation of a large investment project: 1) spot implementation; 2) the spread of investments in the periphery; 3) stimulation of local economic growth.

The implementation of the investment project according to the scenario "stimulation of local economic growth" not only creates additional jobs, but also produces additional socio-demographic effects: arrangement of the habitat for those employed in the new production; stimulates the attraction and / or preservation of the population in a given territory, including by changing the settlement system.

As part of the infrastructural impact of the project, the infrastructure is being formed or improved on the territory, which is used in the main production, as well as contributes to the development of other types of economic activity and can perform social functions, improving the quality of life in the region.

The general scheme for assessing the scenarios of the socio-economic development of the macroregion with the inclusion of a model block for the development of territorial-production clusters and a block for assessing the social and environmental consequences of the implementation of large investment projects is shown in Fig. 2 and 3.

### Discussion

At present, the Republic of Tuva and the southern group of Krasnoyarsk Krai districts belong to depressed territories. The Republic of Khakassia is characterized by a higher (but also insufficient) level of economic development – the per capita GRP income is 25 % lower than the national average and 10 % lower than the average Siberian level (Table 3).

The growth rates of the most important indicators remained very low over the past years (2010-2018). The results of development in the southern regions of Krasnoyarsk Krai were especially depressing – depopulation, a decrease in the level of income of the population and the cessation of economic growth (Table 4).

The analysis of large investment projects planned for implementation, which form the basis of the formed TPC (Elegestky MPP, Beysky coal cluster, Ak-Sugsky MPP, Kuragin-

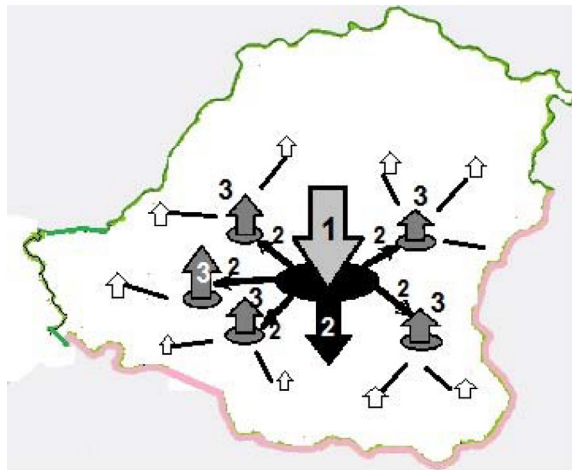


Fig. 1. Scheme of the impact of a large investment project on territorial development according to three possible scenarios for the implementation of a large investment project:  
 1) spot implementation; 2) the spread of investments in the periphery;  
 3) stimulation of local economic growth

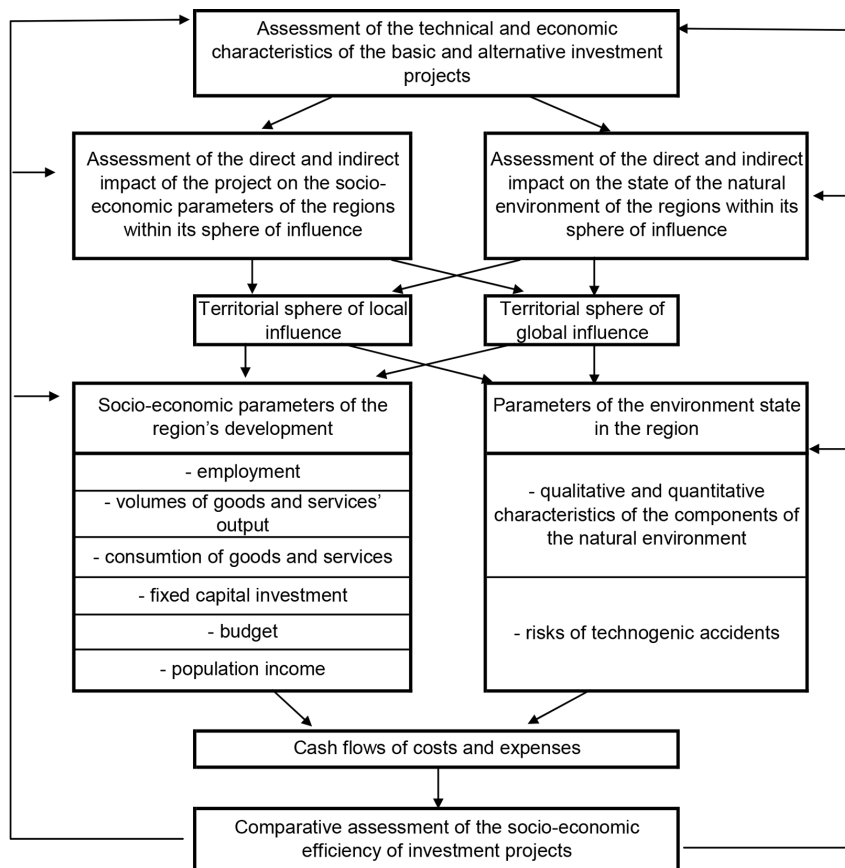


Fig. 2. Scheme of a comprehensive assessment of the socio-economic and environmental consequences of the implementation of large investment projects



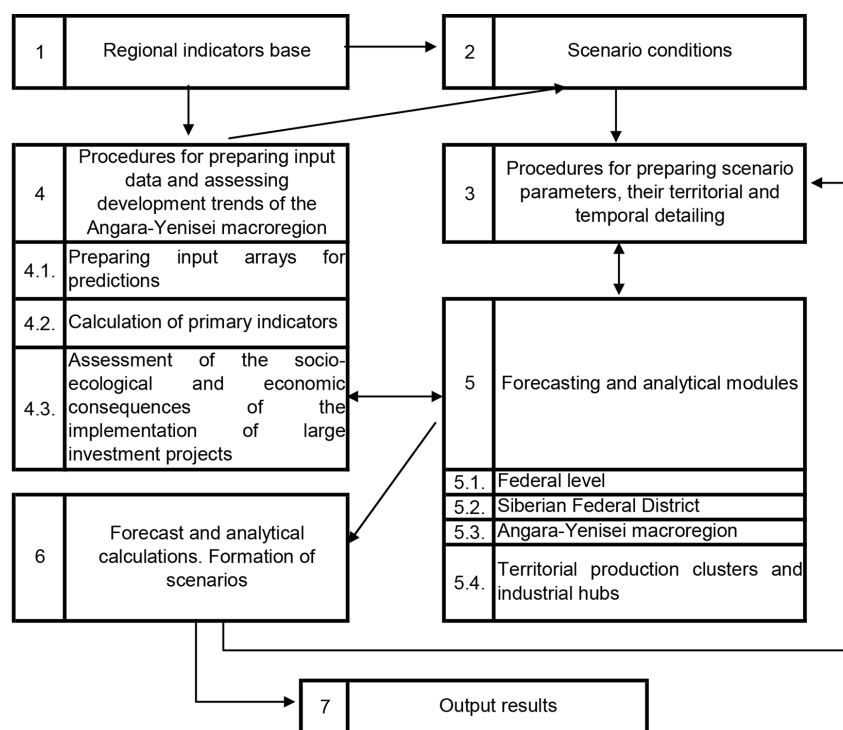


Fig. 3. Scheme for assessing scenarios of socio-economic development of a macroregion with the inclusion of a model block for the development of territorial-production clusters

Table 3. Ratio of per capita GRP in the regions of the Sayan economic centre with the average Russian and Siberian indicators (2018)

	The national per capita GRP in the Russian Federation = 100 %	The Siberian Federal District per capita GRP = 100 %
Southern regions of Krasnoyarsk Krai	48,8 %	58,2 %
Republic of Tuva	36,8 %	43,9 %
Republic of Khakassia	75,7 %	90,5 %

sky iron ore cluster, Lysansky MPP, etc.), made it possible to assess their impact on the level of the socio-economic development of Sayan Economic Centre's territories. The projects being implemented have a certain positive impact on the territory – they form a new spatial configuration of economic growth, shifting the overall economic potential from the centre to peripheral areas. After launching the planned enterprises, this shift will be expressed mainly in an increase in the volume of the gross regional product and revenues of local budgets. The impact on the settlement system will be

less pronounced, since the involvement of shift workers in the projects and the mono-profile of the accompanying settlements will not contribute to the creation of new industries in them, and, therefore, to the attraction of a significant number of the population.

Raw materials orientation of production within the framework of projects for the development of mineral resources has a limited effect on the development of the territory after the completion of construction. This effect is concentrated mainly in the service industries:

Table 4. Main indicators of the socio-economic development of the Sayan Economic Centre's regions in 2018

Indicators	Period	Southern regions of Krasnoyarsk Krai	Republic of Khakassia	Republic of Tuva	Total
Gross regional product	million roubles	84000	235311	68774	388085
	growth, in % by 2010	101,1	120,5	111,9	114,1
Population (by the end of the year)	thousand people	231,8	536,2	324,4	1092,4
	growth, in % by 2010	93,9	100,6	105,7	100,5
Population income	thousand roubles per person per month	14,0	21,6	15,6	18,2
	growth, in % by 2010	93,8	110,5	92,7	102,7
Own budget revenues	million roubles	5137,6	30244,8	6944,7	42327,1
	growth, in % by 2010	102,4	157,5	121,6	141,4

Note: the authors' assessment is based on official statistics; the dynamics of cost indicators is given in comparable prices.

Table 5. Forecast of the main indicators of the Sayan Economic Centre's regions' socio-economic development in 2019-2027 (taking into account the implementation of infrastructure development projects and mineral resources development projects), growth in 2027 compared to the level of 2018 in % (value indicators in comparable prices)

	Gross Regional Product	Population	Population income	Own budget revenues
Option with limited multiplicative distribution of investments in the territory				
Southern regions of Krasnoyarsk Krai	119,5	96,2	103,9	119,2
Republic of Khakassia	122,6	101,0	112,7	129,4
Republic of Tuva	130,7	106,4	104,4	130,3
Total	123,3	101,6	109,1	128,3
Option with an additional multiplier effect of the investments' distribution in the territory				
Southern regions of Krasnoyarsk Krai	125,5	100,2	109,2	122,8
Republic of Khakassia	132,3	102,8	115,8	138,7
Republic of Tuva	137,9	107,3	111,6	139,8
Total	131,7	103,6	113,6	137,0

energy, communications, to some extent – in transport.

The development of integrating and complementary industries and types of economic activity (agro-industrial and forestry complex, tourism and recreation, processing of raw materials, mechanical engineering, services in border areas) can significantly improve the indicators of regional development (Table 5).

## Conclusion

1. The assumed formation of new economic centres in the conditions of compression of intensive economic activity contributes to the development of territorial structures of the Angara-Yenisei macroregion, but this development is of an extensive nature. The new centres of mining and industrial specialization will depend on the conjuncture of the world raw material markets and will not be able to flexibly integrate into the existing system of production and settlement.



2. The analysis of the impact of large investment projects on the socio-economic development of the Sayan Economic Centre as a supposed growth pole shows their limited effect on the diffusion of investments and the revitalization of economic activity.

3. A significant impact on the development of the social and industrial infrastructure of the entire region and the intensification of local production activities are exerted by projects for the development of agro-industrial production, tourism, and services in the border areas. It is these projects that should receive government support in the formation of promising growth centres in the Angara-Yenisei macroregion (The Sayan centre).

4. The project approach aimed at creating growth points in the mineral and raw materials sector should be complemented by measures related to the systemic development of infra-

structure, stimulating small and medium-sized businesses, and developing all aspects of the population's life support. Many of these measures lie in the institutional sphere (changes in taxation and tax distribution systems, the return of a number of environmental management powers to the regional level, etc.).

5. It is necessary to change the very system of planning economic development: the strategy of forming centres of economic growth should not be a "patchwork" made of large public-private investment projects and scattered state investments in point infrastructure objects. The set of measures of the strategy should proceed from a systemic vision of the socio-economic situation in spatial terms and the expected dynamics of its development. The strategy should include the necessary additions to the proposed large investment projects, ensure the creation of the missing elements of the

territorial organization, capable of enhancing the positive effects of projects on the territory and smoothing out the negative aspects of their implementation.

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## Исследование проблем формирования центров экономического роста в южных районах Ангаро-Енисейского макрорегиона

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**Аннотация.** В статье рассмотрены характерные особенности и условия реализации крупных инвестиционных проектов и возможности формирования на этой основе региональных центров перспективного экономического роста. Проведен анализ крупных инвестиционных проектов, направленных на развитие минерально-сырьевого сектора в южных районах Ангаро-Енисейского макрорегиона. Получена оценка воздействия проектов на показатели социально-экономического развития территорий. Показано, что проектный подход, нацеленный на реализацию отдельных инвестиционных проектов и создание точек роста в минерально-сырьевой сфере, должен дополняться мерами, направленными на развитие территориальной инфраструктуры, стимулирование малого и среднего бизнеса, улучшение всех сторон жизнеобеспечения населения.

**Ключевые слова:** Ангаро-Енисейский макрорегион, центр перспективного экономического роста, территориально-производственные кластеры, крупный инвестиционный проект, комплексное социально-экономическое развитие.

Исследование выполнено при финансовой поддержке Российского фонда фундаментальных исследований, Правительства Красноярского края, Красноярского краевого фонда науки в рамках научного проекта № 19–410–240003 «Обоснование приоритетов опережающего социально-экономического развития регионов Енисейской Сибири (на примере южных территорий Красноярского края, Республики Хакасия и Республики Тыва)».

Научная специальность: 08.00.00 — экономические науки.