

УДК 332.1

## Potential and Risks of Resource-Export Model for Siberia and Krasnoyarsk Krai Economy Development

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Received 3.12.2010, received in revised form 10.12.2010, accepted 17.12.2010

*The article deals with the resource-export model of the economy of Krasnoyarsk Krai in the scope of Russia development strategy up to 2030 and long-term trends of the world innovation development. Resource-export potential of Russia is assessed, domestic and global factors having an influence on the competitiveness and effectiveness of Krasnoyarsk Krai and Siberia regions resource-export economy development in the future are analyzed.*

*Keywords: resource-oriented economy, resource-export model of economy, natural resources, structural technological changes, the institutional conditions for resources usage, global regulation of resources utilization, innovation development*

Resource-export model of regional economy development assumes that the level of income of regional economy participants (company, population, region on the whole) directly or indirectly is determined by the scale of natural and mineral resources and raw materials extraction, followed by their sale in the Russian and world markets. Such model as a rule is based mainly on the development of economic activities, connected with mining and primary processing of resources. The possibility to implement such models of economic development is supported by a stable demand for resource and primary products in the world markets, scales of explored

resources, developed logistics and infrastructure within the areas of resources location.

In terms of increasing demand and current prices for primary products in the world markets resource-oriented economy sectors have got a priority development in Russia; within the last two decades such development was based on increase of using previously explored and infrastructure equipped deposits

The price competitiveness of Russian resources in the world markets was supported by relatively low expenses for their extraction in comparison with the other world producers. The relatively low costs level was determined by the

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fact that mining companies generally suffered recurrent costs for maintenance of existing deposits and did not invest neither in geological exploration nor in the development of production and social infrastructure of the areas.

The world financial crisis started in 2008 has in fact demonstrated catastrophic consequences for regional economies based on the resource-export development model. For example, the decrease of a demand and fall of prices for nonferrous metals in 2008-2009 affected not only profit of companies producing aluminum, nickel, cooper and etc. in Krasnoyarsk Krai, but also led to a sharp reduction of Russian Federation subject's budget followed by Krasnoyarsk Krai transformation from the donor region to region-recipient in relation to federal budget.

At present the economy of the most Siberian regions is developing in the frames of resource-export model.

At least two key competitive advantages such as provision with a wide range of natural resources and favorable geographic location as a corridor between West Europe and East Asia –

are stimulated the specialization of Siberia regions in resource-export direction.

Energetic, mineral and forest resources needed by both Russian and global economies, form the basis of Siberia region's economy, with the rare exceptions.

Siberia concentrates 80% of total Russian coal reserves, 70 % – cooper , 68 % – nickel, 86 % – lead , 77 % – zinc, 82 % – molybdenum, 41% – gold and 99 % – metals of platinum group. (Natural resources of Russia, 2007). Region territory has more than a half of hydropower potential of Russia and a half of total reserves of industrial wood.

Let us consider more detailed an example of Kasnoyarsk Krai resource-export specialization as one of the most significant representative of Siberia region.

So, among the basic sectors of Russian economy, been oriented to export, Krasnoyarsk Krai is one of the most potentially independent RF subject in natural and mineral resources. Among the most important resources are: nonferrous metals (cooper, nickel, lead, zinc, aluminum, etc.), ferrous metals (iron, manganese, titanium), noble metals (platinoids and ore gold), rare metals, huge resources of brown low-sulphur power-generating coals, oil, gas and gas condensate, mining and chemical raw materials (magnesite, talc, vermiculite and etc.), water and forest resources.

The structure of Krai industry includes a wide spectrum of branches and resource-oriented industrial specialization of branches which account for more than 70% of gross regional product (E.B. Bukharova, etc., 2009). At present key branches are fuel and energy complex (thermal power and hydropower engineering, coal, gas, oil-refining), nonferrous metallurgy, chemical industry, forest industry complex, construction materials production.

The possibility for companies dealing with raw materials extraction to appropriate major portion of resource rent did not stimulate the development of productions within the Krai territory with deep processing of raw materials having high value added. Therefore, Krai currently keeps a high level of industrial complex competitiveness, namely through the development of economic activities of the lower order: conventional energetic and fuel complex, energetic metallurgy, logging.

Krai is aimed mainly at raw materials export. Krasnoyarsk Krai is one of the leading Russian suppliers of nonferrous metals (cooper, nickel, cobalt, aluminum) and precious metals (platinoids and gold) to the world markets. Products of the lower stages of natural resources processing production – saw timber, chipboards, special synthetic rubber, and basic chemical production

products – are exported from Krasnoyarsk Krai on a significantly smaller scale.

Mechanical engineering products, including high-tech products (communications satellite, equipment for atomic electric power stations etc.) occupy insignificant place in export. At the same time, an overwhelming share of import is taken by technological equipment, final demand goods, and foodstuff.

Export and import activities are oriented mainly to far foreign countries, so in 2008 export deliveries were carried out to 73 countries of the world. Main partners are Great Britain, Portugal, France, Switzerland, Germany, Netherlands, Sweden, South Korea, China, Kazakhstan, Turkey, Egypt, USA – these countries has 92,8% of the total export volume. Krai has cooperated with 66 partner countries in import operations. The biggest import deliveries to Krasnoyarsk Krai were carried out from France, Germany, Netherlands, Sweden, Finland, Kazakhstan, Tadjikistan, China, Japan, Australia, Guinea, USA, Venezuela (92,1% from the total value of import)

So, international economic relations of Krasnoyarsk Krai cover markets of almost all continents. Therewith trade relations with Western Europe, Central and South – East Asia dominate.

Krasnoyarsk Krai products are exported through the main transit corridors: Trans-Siberian Railway with access to the South Siberian and Turkestan-Siberian railways, the Northern Sea Route. Products of JSC “Norilsk Nickel” are exported by the Northern Sea Route to Europe and North America, the latitudinal rail corridor is used for goods export to countries of Southeast Asia.

According to a Concept of long-tem development of Russia up to 2020, along with innovation development priorities, the priority trends were defined in the frames of which Russia

will implement its competitive advantages. These advantages are aimed at strengthening leading positions in a global energetic infrastructure, first of all at the expense of Siberia potential and execution of big investment projects, maximal use of transit transport potential, which was also reflected in documents on Siberia and its regions strategic development.

Therefore, one of the priority tasks, determined by the Strategy of social-economic development of Siberia up to 2020 (The Project for Siberia social-economic development Strategy, 2010) is the implementation of big projects on extraction and processing of natural resources and providing advanced reproduction of mineral raw materials that define spatial priorities of long-term development of regions having resource specialization:

- Arctic, polar regions, where focal development of natural resources (oil, gas, nonferrous metals) will prevail, it is planned to restore and develop Northern Sea Rout, protection of nature environment and human environment of North native population;
- North-Siberian zone of the new economic development (Middle Ob, north of Tomsk region, the Lower Angara Region of Krasnoyarsk Krai, zone of Baykal-Amur Railroad and southern Yakutia), connected with scaled mining and primary processing of nature resources (oil, gas, wood, nonferrous, noble and rear metals), development of energetic and transport (construction of a new transport corridor in the 1<sup>st</sup> half of XXI century, the biggest trunk oil and gas pipelines);
- The Trans-Siberian Railway region and southern Siberia, characterized by high population density, comparable with the average level of central European parts of the country, should become in the

future the supporting base for economic development of northern, polar and arctic territories. It will require the further development of transport, energetic, social infrastructure supported by the modern large urban agglomerations of the eastern regions of Russia.

In doing so, the Strategy Project (The Project for Siberia social-economic development Strategy, 2010) underlines, that “ in spite of the undoubted priority of the innovative trend in the economy long-term development traditional branches and scales of Siberia natural resources development will still play a significant role for the period up to 2020. The role of traditional branches is determined by the necessity to establish reliable sources for investing the processes for economics modernization and transition of Russian Federation subjects to innovative development” (The Project for Siberia social-economic development Strategy, 2010).

In terms of world economies post-crisis development an appropriate question occurs – will the resource-export model of Russian and Siberian economy be able to provide reliable sources for modernization financing and will resource-oriented branches preserve competitiveness in the world markets?

Let us consider a set of external and internal factors, which impact on the economic development of separate branches, regions and a country on the whole can lead to reduction of Russian natural resource complex competitiveness in the world markets as well as to a decrease efficiency of resource-export model of economy. Substantial risks associated with the loss of Russian natural resources complex competitiveness in the world markets are connected first of all with external factors. Among those factors are conditions for changing world economy long-term trends; the most important trends for Siberia and Krasnoyarsk Krai are as follows:

**1. Change of world structure of natural resources consumption.** Post-crisis development shows a sustainable tendency of transfer to a higher level of a demand for resources of South-East, Asia- Pacific region, Brasilia, India and China countries economy. It causes changes in geography of raw materials deliveries, switching from west direction to east. Keeping Russian dominance in export of energetic resources and carbohydrates to new markets of Asia- Pacific region, determines the priority of new mineral resource deposits development (including hydrocarbon raw materials) in Eastern Siberia (Krasnoyarsk Krai: Evenkia, Taimyr, Lower Angara, Irkutsk region, Sakha-Yakutia Republic), requires designing a new system for hydrocarbon transportation and improving existing logistics. For example, the project on construction railroad Kuragino-Kyzyl in Krasnoyarsk Krai and Tuva is considered to be the beginning of a new strategic transport corridor to China. Implementation of investment projects on development of deposits of the Northern part of Krasnoyarsk Krai, construction of transport network, providing new deposits with due infrastructure will increase the cost of resources, delivered to the world markets.

**2. Demand for natural resources in world markets.** How quickly world economy demand for natural resources will recover and whether it will be restored at least in the pre-crisis volumes? – There are issues that have no definite and clear answer. However, it can be predicted with high probability that the economic crisis will push manufacturers to introduce intensively resource-saving technologies, thus reducing a demand for resources, first of all energy resources.

In terms of modern technological improvements the main trends of resource usage will be connected not only with resource-saving, but also with changes in resource consumption.

For example, the development of new technologies on the basis of nanotechnologies

can lead in the future to a reduction of demand for traditional resources and at the same time to form a considerable demand for other resources (diamonds, rare metals, etc.)

**3. Growth of competitiveness from developing countries having significant resources of raw materials.** Rapid growth of prices for natural resources in pre-crisis period has stimulated exploration and mining new deposits of minerals in developing countries. In the most Russian sectors of mining industry the works on exploration, increasing of recoverable reserves and their involvement in turnover were carried out at very low level. A present elaboration of new technologies for hydrocarbons extraction from shale beds can bring to world markets new producing countries.

**4. Structural changes in energy consumption.** Under the influence of technological improvements the structure of demand for energetic resources should naturally change. Thus, according to experts evaluations, under the conditions of significant growth in energy demand the share of energy generated by hydropower plants is predicted to come down and the consumption of natural gas increase while reducing the share of oil. Additional feasibility study on construction of new hydro electric power stations on northern rivers and exploration of new oil and gas deposits is required applicable to the development of north regions of Krasnoyarsk Krai.

**5. Changing international institutional environment in the use and maintaining of global resources.** Within the frames of Kyoto Protocol instruments for global management of nature and environment will be strongly improved in the future (Kuzyk B.N. Yakovets Yu.V., 2004; Nicholas Stern,2006). First of all it will lead to increase of costs for resource branches development, reduce profitability and competitiveness.

Secondly, along with external factors, the influence of internal factors is connected with certain risks of weakening Russia position in the world markets and suffering losses in price competition

**1. Infrastructure underdevelopment of resource territories.** Enhancement of exporting branches of Siberian economy within the frames of existing concepts of strategic development is associated with the necessity to develop infrastructure of Siberian Federal District territory. It is determined by the fact that mineral and forest resources are located in the northern areas which infrastructures are not equipped. Therefore, in order to expand exploitation scale, significant investments are required for creation both social and production infrastructure.

**2. Low technological level of mining facilities.** Substantial technological backlog and low working efficiency of branches dealing with natural resources mining and primary processing in comparison with the leading countries will lead to the weakening of competitive positions. Production updating and establishment of new facilities on resources processing will require considerable investments. Besides, there are no Russian companies specialized in the production of modern equipment for resource branches.

**3. Imperfection of mechanisms of state regulation of subsoil management.** The existing mechanisms for nature management did not provide conditions for rational and careful use of natural resources corresponding to ecological requirements. Those mechanisms did not allow regions having deposits to receive incomes as a part of resource rent for investment in social infrastructure of regions and to create proper environment for people.

**4. Quantity and quality of human resources.** Siberia and Krasnoyarsk Krai are characterized by low population density and the lack of qualified labor force. Besides, resource

regions show a stable tendency of depopulation due to the high level of mortality, low birth rate and negative balance of migration. The rate of infrastructure and social development of these areas is well below average indications and it does not create conditions for attracting human resources

The current conditions of world economy development in terms of crisis and during the post-crisis period cause the necessity to re-evaluate factors, which should be taken into account while elaboration of strategic decisions on development of Russian economy on the whole and Siberian economy particularly.

So, under the influence of the listed external and internal factors world markets demand for traditional mineral and natural resources will reduce with the increase of competitiveness from other countries.

Low economic efficiency of Russian mining company's activities and the necessity to explore new deposits under the complicated natural and geographical conditions and within infrastructure

unequipped territories will lead to a significant reduction of products competitiveness on global markets. In the frames of resource-export model it will have destructive consequences for the region economy.

Under these circumstances it is necessary to take as top priorities the elaboration of proper mechanisms and incentives to upgrade resource mining productions and development of sector of raw materials deep processing, bringing its share in the production process to the corresponding index of European countries. After that it is reasonable to estimate total exploration scale with consideration that export of natural raw materials should be reduced to a required minimum along with the reduction of export to foreign countries.

For this purpose it is suggested to consider in the Project on the Strategy for Siberia development the alternative connected with the possible restriction of new productions development and construction, if they are not oriented to deep processing of primary natural resources and obtaining value added.

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## **Потенциал и риски ресурсно-экспортной модели экономического развития Сибири и Красноярского края**

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*Статья рассматривает ресурсно-экспортную модель экономики Красноярского края в контексте Стратегии долгосрочного социально-экономического развития России на период до 2030 г. Оценен ресурсно-экспортный потенциал России с учетом факторов конкурентоспособности и эффективности текущей модели развития регионов Сибири. Проанализированы перспективы развития ресурсно-экспортной модели развития Сибири и Красноярского края.*

*Ключевые слова: ресурсно-ориентированная экономика, ресурсно-экспортная модель экономики, природные ресурсы, структурно-технологические изменения, институциональные условия ресурсопользования, глобальное управление ресурсопользованием, инновационное развитие.*

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