RUSSIAN ALUMINIUM INDUSTRY: GLOBAL GROWTH

Vadim E. Grinberg

Editor-in-Chief, National Metallurgy, Moscow, Russia

WORLD ALUMINIUM

By early 2005, the following situation with regard to the distribution of the main manufacturers and consumers of aluminium has developed (Fig. 1). The areas obviously deficient in aluminium include North America, Europe and Asia. The abundant in aluminium areas are Russia, Latin America, Africa and Oceania. It is noteworthy, though, that the biggest share of aluminium consumption in Asia that of 6 million ton a year, belongs to China alone Fig. 1.

The main reason for the accelerated development of the primary aluminium production in developing countries is the low cost of energy. In due course, the gap between developing countries and highly developed countries in their rates of production growth will be increased. Just countries that possess considerable hydro-energy resources (such as Russia) or low-cost hydrocarbons (for example, Middle East) will get the advantage in the market.

Fig. 1. Balance of aluminium production and consumption in the main regions of the world.

According to Russian experts, the next few years will bring certain changes in the distribution of the main volumes of primary aluminium output.

A rise of aluminium production in Russia and Asia is expected along with a consumption expansion in virtually all areas, Fig. 2. That makes the mid- and long-term expectations for demand for aluminium fairly high.

Fig. 2. Estimated growth of aluminium production and consumption in the main regions of the world.

RUSSIAN ALUMINIUM

The aluminium industry is one of Russia's leading sources of replenishing federal budget and foreign exchange earnings, as well as increasing the gross industrial output. The backbone of Russian aluminium industry is formed by two companies, Rusal and Sual, Figs. 3 and 4.

Fig. 3. The largest aluminium producers of the world.

Fig. 4. Share of Russian aluminium companies in production of aluminium worldwide and in Russia.

RUSAL

RUSAL was founded in 2000 through merger of aluminium smelters and alumina refineries owned by Sibirsky Aluminium and Sibneft. The company provided itself with 40% of the raw materials used and had to import the rest. Thus, RUSAL's fundamental concern at that time was meeting its own demand for raw materials. Hence, in 2001 the company took over the management of KBK mining plant (Guinea), in 2004 acquired Boksitogorsk Alumina Refinery, in 2005 purchased a 20% stake in Australia's Queensland Alumina Ltd. (QAL), the world's largest alumina refinery, and in 2006 became a majority shareholder of Aroiama Mining Company in Guyana. Nowadays RUSAL purchases only about 28% of the raw materials used, which is twice as little as in 2000. The geography of RUSAL is illustrated in Fig. 5.

RUSAL's new strategy of business development is a matter of special interest. The corporation dubs itself as "an energy and aluminium company". Thus, its new projects in the production of primary aluminium are conceived and carried out through a consortium with

energy producers, Fig. 6. A good example of such projects is the construction of the Boguchansk Energy and Aluminium complex.

Fig. 5. Geography of RUSAL

The company has launched a number of new projects to be carried out in the next few years:

- Khakas Aluminium Smelter with an annual aluminium output of 300 000 tn. The first lot of aluminium is expected to be produced as soon as November 2006. The total investment will amount to $750 million, electric power being supplied by the Sayano-Shushensk power station. The region has an extensive network of transportation lanes: rail service (incl. the Trans-Siberian line connection) and motor highways.

Fig. 6. Rusal. The future trends of energy–aluminium strategy realization.

- An aluminium smelter in Taishet (Irkutsk region) with an annual aluminium output of 600 000 tons. It is estimated that the construction works will be initiated in 2006 and ended in 2009. The project costs may rise as high as $2.8 bln. It is noteworthy that the project involves the development of transport infrastructure, including building a freight road and revamping the Zavodskaya and Akulshet railway stations.
- On 16 December 2005 RAO "UES of Russia" and RUSAL signed "The Basic Conditions of Partnership Agreement", a document defining the key parameters of the project of building the Boguchansk Energy and Metals complex. According to the project, the first plant of an aluminium smelter in Krasnoyarsk Territory and the first launch site of Boguchansk Hydro Power Station will be commissioned as early as 2009. The annual aluminium output of the smelter will amount to 600 000 tons.

RUSAL also continues overhauling of Krasnoyarsk Aluminium Smelter (KrAS) and Sayanogorsk Aluminium Smelter (SAS), which process started in 2003. High emphasis is placed on reducing pressure on the environment. As a result of these renovations the production capacity will increase by 10% for KrAS and 5.5% for SAS.
Company's plans for 2006–2016 include remodelling of the Bratsk Aluminium Smelter (BrAS). The project aims at an output increase by 18%.

SUAL
SUAL made a somewhat earlier start. Its foundations were laid in 1994–1995 with equity investment in Irkutsk Aluminium and Ural Aluminium smelters. In 2000 SUAL Holding was formed as a management company for the Group's assets. At present SUAL fully satisfies its own needs for raw materials through launching the Timan Bauxite ore mine as well as commissioning a major mine for Severouralsk Bauxite Mines (SUBM). The geography of SUAL is given in Fig. 7.

Fig. 7. Geography of SUAL

As well as RUSAL, SUAL works through large-scale projects of building new aluminium smelters and modernization of old production facilities, and looks for new ways of cost saving. The plans for 2006–2007 include the aluminium output expansion of Irkutsk Aluminium Plant by 166 000 tons per year.

In April 2005, SUAL Group and RUSAL signed a shareholding agreement that made them equal partners in the Komi Aluminium Project aimed at building an up-to-date alumina refinery in Ukhta region. The refinery will be vertically integrated with a bauxite mine and an alumina plant, which will make it possible to carry out the complete production cycle, from recovering feed stock through producing marketable metal. The expected yearly

production volume of the enterprise will amount to 6.0 million tons of bauxite, 1.4 million tons of alumina, and 300 000–500 000 tons of primary aluminium. The construction work is to be started in 2009. The preliminary estimate of the project costs comes to $1.2 bln. Building an aluminium smelter will be possible after long-term electric power deliveries have been secured.

Another SUAL mega project, "Voskhod", concerns building a new aluminium smelter in Russia or one of the CIS-countries. A few potential building sites are shown on Fig. 8.

Fig. 8. SUAL. Possible location of a new aluminium smelter in junction with a power generation unit.

VALUE ADDED PRODUCTS

Russian aluminium companies are not mere manufacturers of bauxites, alumina and primary aluminium. The companies' structures comprise factories producing rolled aluminium, including aluminium foil, super purity aluminium, alloys, powder materials and other products as shown in Table 1. The main factor inhibiting the expansion of higher added-value product manufacturing is the limitedness of the internal market.

Table 1. Downstream business of Russian aluminium companies

RUSAL	SUAL
High purity aluminium	**Foil**
Krasnoyarsk aluminium smelter	Ural foil
Packaging Division	**Worked Products**
Armenal	Kamensk-Uralsky Metallurgical plant
Sayanal	**Powder Metallurgy**
Cans Division	Irkutsk powder metallurgy
Rostar	
Dmitrov metallurgical plant	
Extruded Products Division	
Mosmek	

BUSINESS AGGLOMERATION

Today, the matter of the coming merger of RUSAL, SUAL and Glencore is as good as clinched. According to analysts, the capitalization of the company associations will exceed $20 bln. The partners' shares will be divided as follows: ca. 64% for Oleg Deripaska (RUSAL), ca. 21% for Victor Vekselberg (SUAL) and ca. 14% for Glencore. The resulting company will be the world's biggest manufacturer of primary aluminium, its development strategy aiming at the expansion in external markets.

ENERGY

The biggest difficulty interfering with the aforementioned projects is their dependency on electric power sources. The worldwide practice is erecting aluminium smelters in immediate proximity to power sources, the latter being an indispensable prerequisite for proper performance and development of aluminium production plants.

As is known, Russia is a country of vast governmental influence. The energy matters are subject to Article 6 of Federal Law # 36 "On Special Functions of Electric Power Industry During the Transitional Period and on Introduction of Amendments in Certain Regulations of the Russian Federation in Connection with Adoption of the Federal Law "On Electric Power Industry" of 26 March, 2003. The law stipulates that starting from 1 April 2006 juridical persons are not allowed to combine purchase and sales activities with the transferring of the electric-power network. However, a later amendment "On Introduction of Amendments in

Article 6 of the Federal Law" re-established the right of industrial enterprises to develop their own power system management.

RUSAL takes steps towards building an energy and aluminium corporation. Construction of Rogunsk Hydroelectric Power Station in Tajikistan will be one of the world biggest energy projects. A superposition principle underlies the strategy. The initial stage will be construction of the first plant of Rogunsk Hydroelectric Power Station with a medium dam height and a yearly energy yield of 4.5–5.0 bln kW/h. Later on, the dam construction may be continued to the extent of building a hydro system with a storage capacity of 13.3 km^3 and a yearly energy yield of 13, 1 bln kW/h. Last December, RAO "UES of Russia" and RUSAL reached an agreement on the completion of the Boguchansk Hydroelectric Power Station. The expected project cost including the infrastructure construction costs will come to $ 4 bln, implementation term being 7 years.

CONCLUSIONS

Russian aluminium industry is a powerful up-to-date branch of Russian economics, belonging to the strongest economic systems in the world. A merger of Russia's largest aluminium companies will result in the emergence of a new world-leading manufacturer of primary aluminium. Russia is one of the most promising regions in terms of aluminium industry development. Its main factors of competitiveness are:

- Water power resources
- Low labour cost and high professional qualification level
- Internal raw materials base

The principal directions of the development of Russian aluminium companies will be:

- Building internal energy generating facilities associated with aluminium factories, or partnership in such building with most emphasis laid on hydro-electric power.
- Acquiring new sources of raw materials
- Boosting bauxite and alumina manufacturing at the existing factories
- Revamping Russian aluminium smelters, increasing the production capacity, introducing advanced technologies (such as conversion of factories to the dry anode technology) and improving the ecology.