

CIS mining industry in transition

by Gonzalo Oroza

In this article Gonzalo Oroza argues that the mineral industry in the world as a whole is facing a challenging period of changes as a result of the economic and political disintegration of the Soviet Union. It gives a broad overview of CIS mining industry and examines reserves, legislation, consumption production, control and international cooperation, with special reference to steel, aluminum and nickel. It was originally published by the Government Institute for Economic Research in Helsinki (VATT-research report 24, 1994) with the title *The CIS mining industry in a transition period – with special reference to Finnish mining prospects*.

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The initial and sometimes controversial reforms due to specific regional conditions of the CIS mining industry, have resulted in an unpredictable period characterised by depressed levels of output, productivity and investments.¹ Although the transition problems affect the whole CIS economy, it is especially complex in mining, concentration and smelting activities, where quality and location of the ore deposits, physical and infrastructural conditions, methods of smelting and environmental aspects vary much more widely than production conditions in manufacturing.

The restructuring of the CIS mining industry is obviously far from completion. Efforts to modernise and increase the productivity and international competitiveness of the Russian and other mines of the area, as well as of the metallurgical plants, have proved to be insufficient. Making projections on the development of metals production and consumption in the region is a very hazardous task and depends on the continuation and intensity of the reforms.

Very roughly, it might be estimated that within 2 to 5 years, efforts will be made to maintain average production levels of the 1992–1993 period for minerals and metals at whatever cost. Perhaps the strongest considerations will be the need for western currency and the possibility of rapid profits for influential local groups.

In the longer term, however, economic and geological, including environmental, legal and political considerations may restrict mining operations and significant cutbacks of capacity seem inevitable.

At present even the reduced volume of production, compared with the 1980s average is sufficient to satisfy a local demand for metals that has practically slumped. The international metal market has felt the impact of these changes in the form of large volumes of CIS exports followed by strongly unstable price levels. The mineral sector, world-wide, is facing a challenging period of changes and ob-

ligatory restructuring as a result of the economic and political disintegration of the Soviet Union.

Geological exploration

Geological research was one of the most dynamic sectors of Soviet Union co-operation with foreign countries. Before the collapse of the system, the Soviet Union had hundreds of mineral prospecting projects not only with the CMEA countries, but also in Africa, Asia and Latin America. In 1988, more than 5 000 Soviet Union geologists were employed in technical assistance projects to foreign geological services in Ethiopia, Algeria, Guinea, Ghana, Mozambique, Benin, Mongolia, South Yemen, Afghanistan, Cuba, Nicaragua, Peru and Bolivia.

Exploration and geology – both in the Soviet Union and abroad – had been for years the pride of the system. Money or technical equipment were never a problem for this activity. During the last three years of the Soviet Union system, the central government concluded contracts with a number of industrialised countries, such as Australia for co-operation in cartography, and with the Federal Republic of Germany in remote sensing the Soviet Union Cosmos system for high-resolution satellite imagery was world renowned. Certain technology for studying the earth's depths was also highly appreciated throughout the world. Seabed prospecting, in co-operation with Finland and Great Britain was one of the most advanced of that time.²

Economic and technological co-operation in the fields of geology, mining and metallurgy was an important way for the Soviet Union to maintain and strengthen economic and political ties with developing countries. Projects were based on inter-governmental agreements and were long-term and diversified. Soviet Union organisations surveyed and carried out research and development, supplied equipment, sent specialists, shared experiences, etc.

Apart from political considerations, the Soviet Union's economic and technological co-operation with developing countries was of considerable importance for the entire development of the Soviet Union mineral sector itself. It greatly increased output of industrial export goods and, at the same time, helped the research and development of new exploration, mining and metallurgical techniques and, to a lesser degree, secured the import of mineral raw materials needed for the growing requirements of the Soviet Union industries.

The basic principle of Soviet Union co-operation in the mineral sector was "to bring peoples closer to a much higher stage than ordinary promotion of trade".³ The principle was, however, largely theoretical, because in practice, co-operational conditions were as demanding as those between industrialised and developing countries, plus the political ingredient.⁴ Soviet Union co-operation in

the mineral sector was at its highest during the 1980-1986 period. At present, practically all former Soviet Union economic and technical co-operation with developing countries in the mining sector has collapsed.

A number of Russian geologists consider today that geological operations under a central control were not so efficient as reported. It is now admitted, for example, that for security reasons, the Soviet Union maps for public distribution were deliberately falsified misplacing natural features. Criticism is also and particularly directed to failures in finding new deposits to replace the declining ore grade of the Soviet Union mines and in general, to the large geological bureaucracy of those times.⁵

CIS reserves and resources

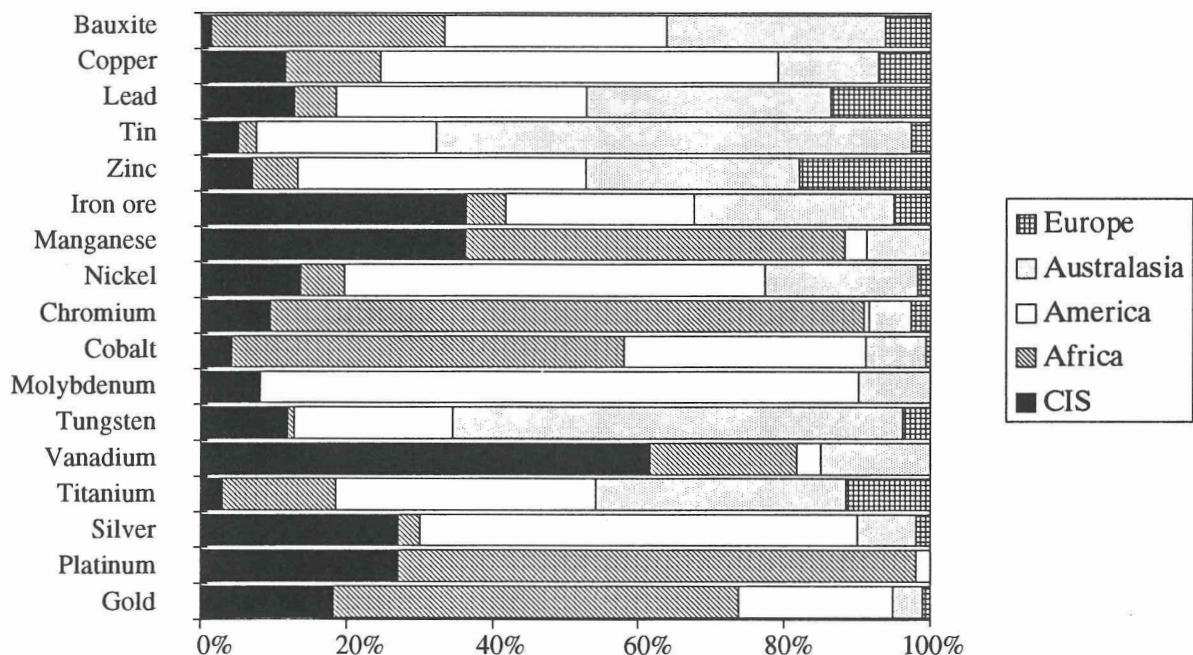
It is generally accepted that the CIS area, and Russia and Siberia in particular, contain an enormous and varied potential of

metallic minerals as well as of industrial minerals and fuels. More than 5 per cent of total world reserves of almost every important mineral – bauxite is the exception – is found in CIS territory. The countries of the CIS possesses the largest ore reserves of iron and vanadium, and a significant second or third place in world reserves of copper, lead, nickel, cobalt, manganese, tungsten, platinum, gold and silver.

World-wide, the concentration of mineral reserves is generally very strong, especially for chromium, manganese, vanadium, cobalt, platinum and gold. The dominant position of the CIS together with the Republic of South Africa in the ownership of world reserves of these metals is illustrated by the fact that around 80 per cent of the global reserves are found in these countries.

A significant share of the mineral resources of the CIS area is known for its extremely erratic location. Development

Figure 1. Distribution of world reserves of major metals and minerals 1990



Sources: World Resources: A Report by the World Resource Institute; the United Nations Environment Programme; and the UNDP; based on the US Bureau of Mines and UNESCO estimates.

Table 1. Distribution of CIS mineral reserves 1993 (per cent)

	Russia	Kazakhstan	Ukraine	Uzbekistan	Other CIS
Copper	53	29	—	12	6
Lead	34	38	—	9	19
Zinc	48	36	1	5	10
Tin	91	2	—	—	7
Nickel	95	4	1	—	—
Iron	54	12	30	—	4
Manganese	5	13	75	—	7
Chromium	3	97	—	—	—
Titanium	57	—	42	—	1
Gold	52	10	—	29	9
Silver	38	26	—	22	14

Note: Reserves are defined as being that portion of the identified resources from which the usable material can be economically and legally extracted at the time of determination.

Sources: International symposium "Mineral Resources of Russia", November 10-13, 1993, St. Petersburg; V. P. Orlov: MRR 2.93, Russian Federation Committee on geology and subsurface usage, 1993, Moscow.

operations are increasingly shifted to the sparsely populated eastern and northern areas in very harsh climatic conditions. This means increased cost of operations, working requires more time and transportation of the materials is one of the most difficult and expensive problems to be resolved. The Russian share in reserves of most minerals is superior. Exceptions are lead and chromium, the main reserves being located in Kazakhstan, and manganese reserves which are mainly in the Ukraine (table 1).

Restructuring of mineral exploration activities

The basic problem for restructuring the CIS mining sector and that of the minerals prospecting activities, is the absence of a clear concept of the laws and mechanisms of the free market economy. After the collapse of the Soviet Union, officially dissolved on the 31st December of 1991, there has been little consensus as to what the CIS' common interests are, and

a great deal of doubt as to whether the states will be able to create a co-ordinated strategy for the development of the mining industry, from minerals prospecting to the trade of metals.

As shown before, the Russian Federation is, by far the dominant country in the CIS by possessing the richest and most varied mineral resources base. However, Russia alone contains 20 republics in a situation where almost every region demands that it be the unique owner and co-partner for international negotiations concerning natural resources. As a result, particularly in those regions and republics rich in mineral resources, geopolitical tension and conflicts are emerging at CIS level and among the Russian republics and regions.

The planning and execution of geological prospecting activities was centrally controlled for more than sixty years. At present, the whole sector is undergoing a radical transformation as a result of decentralisation measures and regulations. The problems of the CIS'

geological services were intensively discussed by local geologists in an international symposium in November 1993, in St. Petersburg.⁶

Some papers presented to the symposium reflected a profound concern for the position and future of geological activities in the territory of the Russian Federation and other CIS countries. The discussions emphasised the necessity of urgent solutions to a number of problems in order to increase the mineral reserves and mineral resources base in new mineral raw material producing regions to replace those depleted. A large group of top geologists and mineral economists consider that if immediate measures to carry out the required geological exploration and prospecting works are not taken, in the year 2010 Russia will have to import most of the manganese, antimony, chromium, titanium, lead, zinc, and rare metals to satisfy its industrial needs.

Russian specialists complained that central political power in Moscow considers the mineral raw material base has been sufficiently covered in the medium term and investment in geological research should be reduced. Cuts in financing have been made for four consecutive years since 1990. It seems, however, that reductions in the geological exploration budget are probably more a result of the Russian economic situation than of neglecting the importance of these activities. The transition of the CIS' mining industries to a market economy system, where operations have to be measured on a basis of international metal market prices, has greatly reduced the balance of reserves of hundreds of mineral deposits which previously operated under complex subsidy systems.

The preparation of new resource regions such as the shelf of the northern seas and East Siberia, has practically ceased. With the reduction of geological operations the ratio of proven reserves to production has decreased, in some cases very abruptly, as is the case of gold. The share of the most valuable complex lead-

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zinc ores has also decreased and low quality resources are not sufficient to compensate depleting volumes.

Russian Federation mining legislation

By mid 1992, a draft "Law on Underground Natural Resources" and "Regulations on the Licensing Procedure for the Exploitation of Underground Resources" was confirmed by decree. There were subsequently several amendments to these laws.⁷ In December 1992, regulations on the functions and structure of the Russian Federation Committee on Geology and which defines the objectives, purposes, functions and rights of the Russian Federation Committee on Geology as the central body of the federal executive power, in co-ordination with the

Geological Survey and the State Subsurface Fund of the Russian Federation.

According to the "Regulations", geological prospecting should be financed with funds paid by producing enterprises and accumulated in an extraordinary budget. The Chairman of the Russian Federation Committee on Geology and Subsurface Usage considers that this fund can provide only 65 per cent of the 1991 volume for geological prospecting works, even in the case of 100 per cent of the deductions being collected. As a consequence, the Russian geological prospecting programme started its 1993 activities with a budget deficit in the of 40 billion roubles.⁸ In 1992, financing of currency needs to continue exploration of the oceans, as well as for the purchase of spare parts and materials for imported

equipment was cut off. Producing enterprises are not very enthusiastic about the idea of financing basic research in the geological, geophysical or geo-ecological sector which are not directly related to the exploitation and production of minerals.

Up until 1991, industrial and scientific institutions combined their efforts to form an efficient geological service, including 350 permanent field expeditions, 34 scientific and design institutes and 10 plants for the manufacture of geological exploration and prospecting equipment. The volume of work decreased by around one fourth in 1991 and by more than one third in 1992, and the number of workers in the sector was reduced by 118 000. According to the Committee on Geology⁹, field geologists, their families and

The Norilsk Nickel Enterprise in Russia produces 80–90 per cent of the nickel, over half of the copper, as well as almost all of the cobalt and platinum in the CIS.

related infrastructure personnel are in a critical situation, isolated in remote regions, without salary payments for several months and without even a basic means of survival.

Policy options and prospects

The prerequisite to facing the complex problems of the CIS geological services is to integrate the mining industry into the world mining industry. Opening the metal sector is not an automatic consequence of economic reform; it is the result of the acknowledgement that the CIS mining industry cannot be isolated from the laws and regulations of the international metal market.

There is, however, a controversial approach which needs clarification. The argument concerns certain western and CIS mining enterprises managements who often claim that opening the mining sector means the complete elimination of state control over national and foreign mining companies. In the minerals prospecting area this is incorrect. There is no country in the world claiming to be a sovereign nation, where the state has nothing to do with the mineral resources of its own territory.

A major feature of world mineral exploration is the large extent of state participation, both in developed and developing countries. Specific policies for individual national geological services differ depending on the country size and level of development. Most Western European geological institutions are financed by the State, for example the Geological Survey of Finland, one of the leading geological organisations in Europe.

The transition from one extreme to another; from 100 per cent state budget financing for geological prospecting to 100 per cent private financing has proved to be very difficult. A co-ordinated strategy for geological prospecting between public and private interests would probably result in innovative activity across the CIS territory. It will be necessary, first of all, to determine

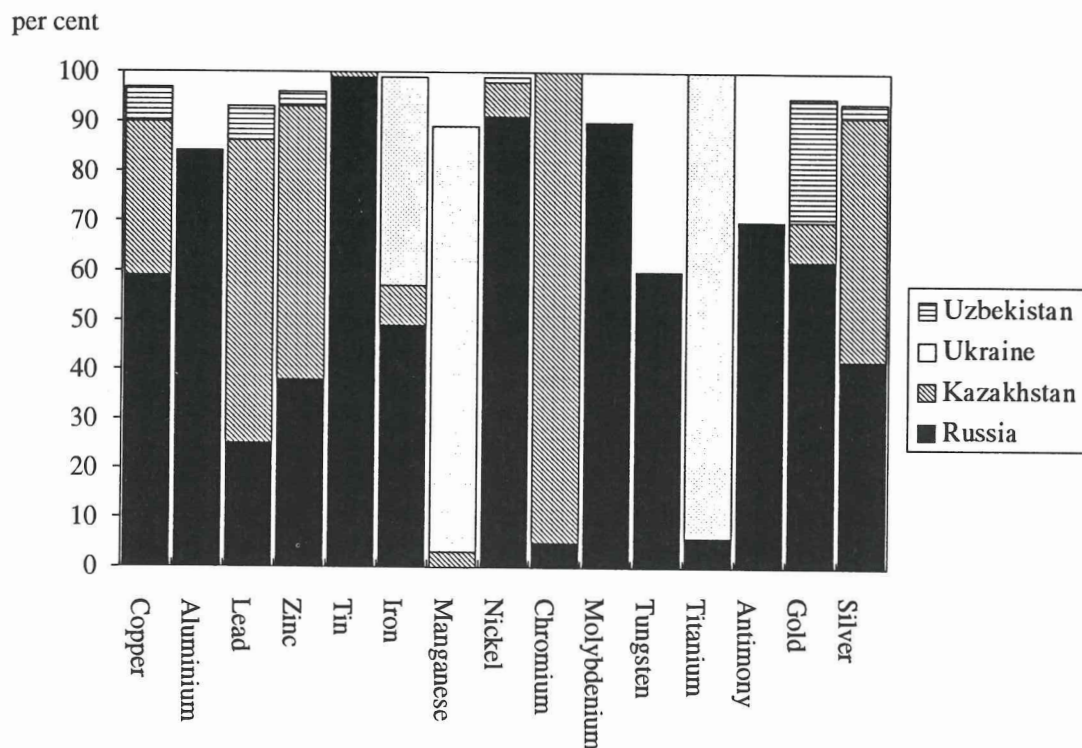


exactly the role and interests of the state in the study of the subsurface. Equally important is to determine by law the detailed conditions for the attraction of foreign investment to explore and develop the mineral deposits of the CIS.

The first attempt on the legislation of co-operation with foreign companies to explore and produce minerals in Russia has been the establishment of joint ventures according to the "Law on Under-

ground Natural Resources" and "Regulations on the Licensing Procedure for the Exploitation of Underground Resources". Later, there have been some amendments and additional regulations dealing with two new forms of co-operation: concessions contracts and production sharing agreements. The legislation does not, however, delineate clearly enough taxation and payment mechanisms for these two further forms.¹⁰

Figure 2. CIS Production of minerals and metals, 1992



Sources: International symposium "Mineral resources of Russia", November 10-13, 1993, St. Petersburg; V.P. Orlov: MRR 2.93; Development of the Mineral Raw material and fuel base should be supervised by the state, page 6-7; Distribution of iron ore production is based on UNCTAD statistics and corresponds to 1993; TD/B/CN.1/Iron ore/12, 2 August 1994; Mining Journal: Mining Annual Review, 1993.

The lack of corresponding laws – at least at the time of writing (mid-1994) may tend to discourage investment, particularly for further exploration and exploitation of potential deposits under difficult natural conditions. Concession contracts could also be used in those regions where physical and social infrastructure are not available, as well as for the exploitation of those mineral resources demanding expensive and technologically advanced methods of treatment.

International investors in the mining industry obviously compare mining legislation and investment environments world-wide. They tend to work with those companies and countries that offer a detailed and stable mining legislation and the best opportunities for a reasonable return on their invested capital.

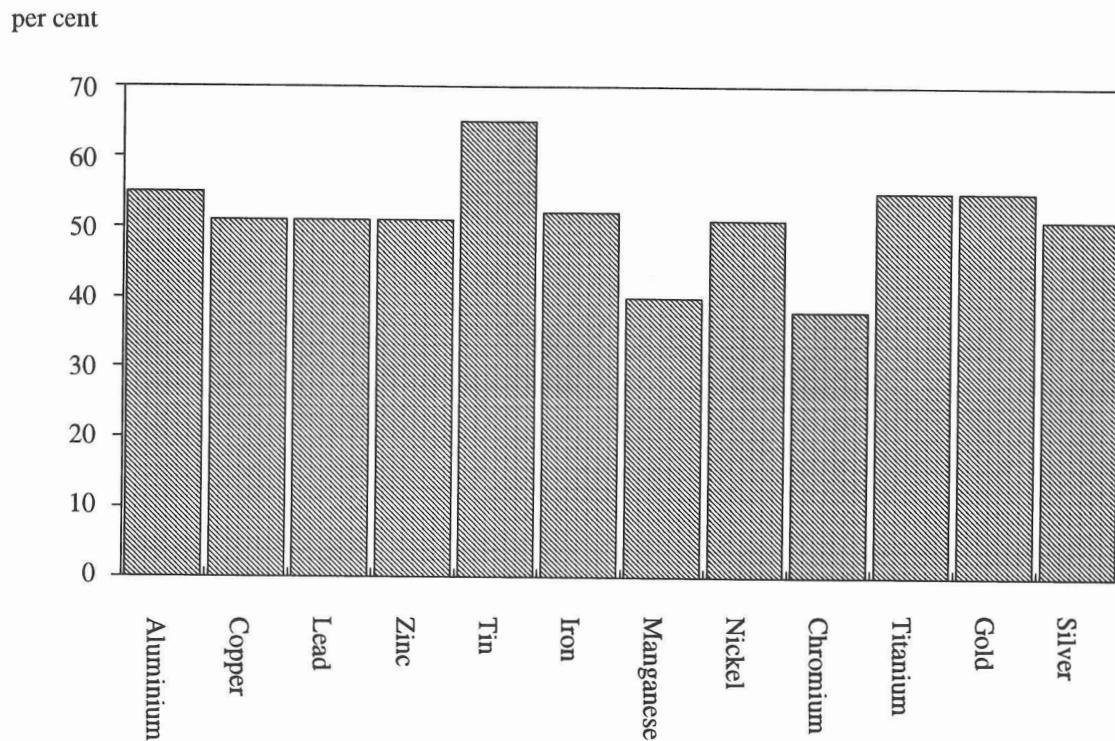
While diverse sectors of the Russian and the rest of the CIS economies are increasingly being opened, transparency principles and co-ordination policies have not yet extended to the mining industry. At this stage of the transition period a review of the progress made on the entire cycle, from geological exploration to the marketing of the finished product should be made.

Such an analysis would play an important role in the regulating of legislation mechanisms. Until the present, such an analysis has not been made, or at least has not been openly discussed. A comprehensive system for the assessment and forecast of the CIS mining industry should include geological exploration as a central element in promoting a balanced long-term exploitation of their mineral resources.

Production and consumption of major minerals and metals

The Russian Federation is, by far the largest producer and consumer of minerals and metals in the CIS countries, followed by Kazakhstan, the Ukraine and Uzbekistan. Very roughly, more than 80 per cent of the CIS metals is supplied by these four countries. The dominant position of the Russian Federation is illustrated by the fact that it produces more than two thirds of the aluminium, tin, nickel, molybdenum and antimony of the total CIS production corresponds to this country (See Figure 2). For the majority of minerals the Russian Federation is self-sufficient and, in turn, most of the Soviet Union republics are dependent on Russia for the supply of their energy and non-energy minerals. However, Russia was never, during the Soviet Union pe-

Figure 3. Russian share of CIS consumption of minerals and metals, 1992



Sources: International symposium "Mineral resources of Russia", November 10-13, 1993, St. Petersburg; V.P. Orlov: MRR 2.93; Development of the mineral raw material and fuel base should be supervised by the state, page 6-7; and several sources.

riod, and is still not today, self-sufficient in a number of mineral raw materials, and is still dependent on the import of minerals or metals from the other Soviet Union/CIS republics. This is particularly true in the case of manganese and titanium concentrates from the Ukraine and Georgia; chromium, lead, zinc and copper concentrates from Kazakhstan; and copper concentrates from Kazakhstan, Uzbekistan and Armenia.

Decentralisation of smelting activities started in the 1940s; while the most intensive expansion of mining occurred in the 1960s, mostly due to depletion of high quality reserves in the traditional producing centres of Russia and the Ukraine. Large metallurgical plants operate on the basis of complex inter-regional production links.

There is no official data to provide information about the Soviet Union internal distribution of concentrates and metals production and consumption before 1990; but distribution shares in Figures 2 and 3 should give a rough idea of the 1980s trend. The Russian Federation consumes about 50 per cent of major minerals and metals. In 1992, for example, total CIS consumption of aluminium was 2.15 Mt, from which Russia accounted for 55 per cent. In the case of iron ore, copper, lead, zinc, nickel and silver, the corresponding figure is around 50 per cent.

CIS metal production in the world context

In 1984, the Soviet Union ranked first world-wide in mine production of nickel,

mercury, iron and manganese as well as in the metal production of nickel, cadmium and steel. In 1993, steel production in the CIS had slumped from a traditional one quarter of the world output, when the Soviet Union was the world's largest producer, to a mere 13 per cent.

Mine and metal production of several metals decreased in 1992 and 1993 to levels that had not been seen for 15 to 20 years. Table 10 shows the development of minerals and metals production in the Soviet Union/CIS in the years 1984 and 1992/1993, their percentage of the total world production and their respective ranking in the world. With the exception of nickel, mercury and manganese ore production – the largest part being produced in the Ukraine – the CIS has lost its leading position in the world. However,

the CIS' share is still very large in most minerals.

Official data on production and consumption of minerals and metals is only partially delivered to external use outside the enterprises and in some cases it is contradictory or remains in practice as a

state secret of the republics of the Commonwealth. Unlike the Soviet Union period there are no more secrecy laws regarding relevant information on this matter. It seems, however, that lack of detailed statistics is not the result of a deliberate policy but simply because the

whole question is not considered to be seriously needed. Although the mechanisms to implement economic and political transparency in the CIS countries are being rapidly expanded, data on mineral and metal production, consumption, trade and reserves remains mostly as an unofficial estimate elaborated by local and international institutions.

In 1992, some important publications related to the international mining industry have reassessed statistics on metal production of the Soviet Union/CIS.¹¹ According to them and in the light of information so far available on past trends in the Soviet Union and current levels of mine and metal production in the CIS, figures on metals production and consumption are considerably lower than those formerly estimated in the West. This is particularly true in the cases of lead and zinc and probably copper and some minor metals. Revised figures consider that lead mine production has been less than half the yearly average of 500 000 t estimated by western institutions during the 1980s and the first two years of the 1990s. Zinc mine production could be less than two-thirds to 40 per cent of the previously estimated nearly 1 Mt. New estimates suggest that in spite of a strong policy of self-sufficiency for the centrally planned economy, the Soviet Union was not self-sufficient in mine production of copper, zinc, lead or tin.

The revised production cut backs have been far from proportional among the various metals and minerals. However, in the case of non-ferrous output figures have been revised downwards. Estimates of production during the 1970s and the first half of the 1980s may reflect what are believed to have been plant capacities rather than actual output.

Steel industry

Parallel to the deterioration of the CIS economy, steel production has been falling sharply. During the last six years the level of steel produced in the region decreased by 42 per cent and in 1993 alone

Table 2. Production of metals and minerals in the Soviet Union (1984) and the CIS (1992/1993)

Metal/mineral	Metal/ore production		Percentage of total world		World rank	
	kt 1984	kt 1992/ 1993	1984	1992/ 1993	1984	1992/ 1993
Copper	1 260	875	13.3	8.1	2	4
Zinc ¹	750	433	11.9	6.1	2	4
Lead ¹	575	342	11.1	6.4	4	5
Aluminium	3 200	3 220	18.9	16.6	2	2
Tin	18.5	13	8.3	6.8	5	6
Nickel ¹	193	190	25.4	23.3	1	1
Antimony	9.3	8.5	12.9	10.6	2	2
Cadmium	1.9	1.3	9.8	6.7	1	3
Magnesium	85	80	25.8	24.4	2	2
Silver	1.3	1	9.8	7.2	5	7
Mercury	1.2	1.2	21.6	34.2	1	1
Gold (t)	269	302	18.8	14.4	2	2
Platinum (t)	115	125	52.5	43.6	2	2
Cobalt	2.6	2.4	8.4	9.9	3	3
Iron ore (Mt) ¹	247	154	28.8	16.4	1	3
Crude steel (Mt) ¹	154	96	21.7	13.2	1	2
Chrome ore (Mt)	3	3.8	31.6	29.7	2	2
Manganese ore (Mt)	10	6.5	41.7	31.4	1	1
Molybdenium	11.2	11	11.8	9.8	3	4
Vanadium ore	9.5	9.5	28.5	27.9	2	2
Tungsten ore ¹	10	5.7	18	8.8	2	2
Titanium ore	440	430	10.9	10.7	4	4

Note: ¹ 1993 figures

Sources: Metallgesellschaft: Metal Statistics, 1982 - 1992, Frankfurt 1993; UNCTAD: Commodity Yearbook, 1994; Metal Bulletin Monthly, 1994; Mining Journal: Mining Annual Review, 1993; International Lead and Zinc Study Group, ILZSG, July 1994; UNCTAD: Tungsten Statistics, July 1994; UNCTAD: Bauxite, Alumina and Aluminium Statistics, 1987 - 1993, April 1994.

Table 3. World steel production 1984 and 1992 - 1993 (Mt)

Country/area	1984	1992	1993
FSU/CIS	154.2	116.8	95.7
Byelarus	–	0.8	0.8
Kazakhstan	–	5.7	4.2
Russia	–	67	58.2
Ukraine	–	38.4	30.5
Uzbekistan	–	0.6	0.6
Azerbaijan	–	0.4	0.2
Georgia	–	0.5	0.2
Moldova	–	0.6	0.6
Ind. market ec. countries	367.2	357.6	365.7
European union	134.5	132.2	132.5
Japan	105.6	98.1	99.6
United States	83.9	84.3	88.8
China ¹	43.5	80	89.5
Developing countries	79.8	107.6	117.5

Note: 1. Includes the Dem. People's Republic of Korea.

Sources: UNCTAD: TD/B/C.1/Iron ore/7, Rev. 1; Iron ore statistics 1981 - 1990, 17 December 1991; UNCTAD: TD/B/CN.1/Iron ore/12; Review of Iron ore Statistics 1986 - 1993, 2 August 1994.

it declined by 16 per cent. The countries of the CIS remained the world's largest crude steel producing area until 1992 with a production of 112.6 Mt. In 1993 Japan ranked first with an output of 99.6 Mt with the CIS at 95.7 Mt (see Table 12).

In terms of capacity size of production the region remains extremely important as the biggest in the world. Before the end of the centrally planned system, the Soviet Union's annual steel output of 163 Mt in 1988 represented nearly one half more than that of the United States and one third more than the production of Japan.

The Russian steel industry is the biggest of the CIS. Russian plants directly involved in production represented 60 per cent of the CIS steel output in 1993 (See Table 12). Around one million peo-

ple are employed in the sector. According to the International Iron and Steel Institute (IISI), 139 joint stock steel companies were registered in Russia on September 1993. New policies will result in the privatisation of 90 per cent of enterprises operating in the steel industry. In 60 per cent of the already privatised enterprises, the main shareholders are the workers. There are also other large enterprises such as Magnitogorsk, Lipetzk and Cherepovets, where the privatisation process has also begun, although workers' groups may not be the main shareholders. The State plans to influence the operations of the new joint stock companies by remaining a shareholder or by controlling the issuing of the shares for a period of at least three years.

The Russian Federation Committee for Metallurgy has drawn up a national plan

to reorganise national ferrous and non-ferrous industries, under the title of "The National Programme for the Technical Rehabilitation and Development of the Metallurgical Industry of Russia". The seven years programme was submitted to the government in mid-1993 and first estimates were as high as USD 12 billion in terms of financing needs for modernisation projects, over the period 1993-2000. The initial plan considered the following sources of financing: the enterprises' own funding, 80 per cent; users of the products, commercial institutions and foreign investors, 12 per cent; government support, 8 per cent.¹²

According to revised but still very ambitious estimates, Russia plans to spend around USD 10.6 billion in modernising its metallurgical sector, both ferrous and non-ferrous. The new figures for the programme have been approved by the government and provides for 70 per cent of the finance to come from the industry itself, 7 per cent from the government and a further 23 per cent from private and foreign investment.¹³

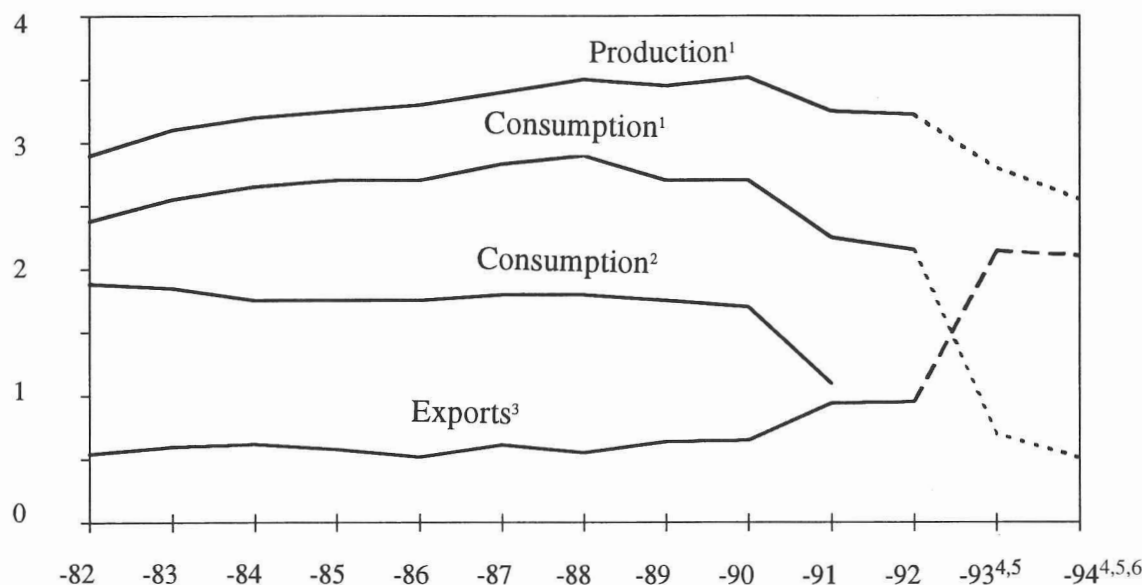
The government estimates that USD 7.4 billion of the new investment is needed by the Russian steel industry for restructuring: mainly to replace old fashioned open hearth steel production with oxygen and electric processes and to introduce a gradual increase in the use of continuous casting to around 70 per cent of the total steel output by the year 2000.¹⁴

At present almost half of the Russian steel is produced in open hearth furnaces; and although continuous casting was a Soviet Union metallurgy innovation, only one fifth of rolled steel products is, in fact, produced by this technology.

The purpose of the plan is to solve the following major problems:

- the expansion of the domestic raw materials base,
- an improvement in the quality of products and their competitiveness,

Figure 4. Soviet Union/CIS primary aluminium production, consumption and exports 1982 - 1994 (Mt)



Notes and sources:

- 1. Revised figures: Metallgesellschaft: Metal Statistics ed. 1982 - 1992 and UNCTAD: Commodity Yearbook 1994.
- 2. Former estimates: Metallgesellschaft: Metal Statistics ed. 1981 - 1991.
- 3. UNCTAD: Review of the Current Market Situation and Outlook 1982 - 1991, 11 February 1993 and UNCTAD: Commodity Yearbook 1994.
- 4. G. Volfson, director of the Russian producers group Aluminiy, at the MB Conference on CIS Metals, June 1994.
- 5. Estimate based on Russian sources.
- 6. Estimate based on metal trade publications.

- the reduction of material and energy expenditures,
- the improvement of the ecology, and
- to maintain a rational level of employment to ensure social stability at enterprise level.

The programme suggests that only 15 per cent of Russian steel producers are competitive in the international market and that practically 85 per cent of the steel mills were bankrupt by the end of 1993, bolstered only by soft loans from the Russian state. However, as a result of the continuing economic recession, termination of the subsidies has been necessary and has almost finished hopes for the promised financial aid from the government.

The Metallurgy Committee plans to raise about USD 10.5 billion in metal export revenues for the programme over the

next seven years. This means that one third of current exports value will be absorbed by the programme. In 1993 Russian metal export earnings were around USD 4 billion. The plan also considers the redundancy of 140 000 jobs in the steel sector alone by the year 2000, mostly before 1996. The targets to reduce environmental pollution, which are included in the plan, are very modest.

Aluminium industry

International organisations and metal traders are increasingly accepting that they have underestimated the Russian ability to maintain the high production levels of its aluminium industry. Already in the beginning of 1992, traders and specialists considered that the Russian and the CIS aluminium industry would collapse, mostly due to shortages of raw ma-

terials, by the end of the same year. However, CIS smelters produced around 3.2 Mt of aluminium, not too far from the industry's capacity of 4 Mt annually. Most of this capacity is located in Russia (3.3 Mt), with Tajikistan, the Ukraine and Azerbaijan accounting for the rest.

Western observers point out that it is virtually impossible to determine the real production costs of CIS aluminium. The Russians claimed, in 1992, that they produce aluminium for about 500 USD a tonne, when energy costs were heavily subsidised. However, as CIS energy costs were permitted to rise to world market levels, to meet the IMF membership requirements, some plants became uncompetitive. Compared with western costs, CIS smelters were producing aluminium for about USD 25 cents/lb, clearly below the USD 54 cents/lb aver-

age for smelters in the rest of the world for 1992¹⁵. Aluminium smelters in the western world are estimated to have continuously decreased their operating costs in 1992 and 1993 so that average costs are estimated to be USD 50 cents/lb (around USD 1 110 per tonne).

The abrupt increase of energy prices raised the operation costs of some of the CIS smelters to an estimated figure of USD 1200 a tonne, around the same level as the high-cost smelters of Western Europe and well above those in developing countries.¹⁶ However, energy prices differ sharply between European Russia and the Urals and those in Siberia and Tajikistan. The former are dependent on expensive and polluting coal energy; the latter, like Bratsk and Krasnoyarsk (the world's largest smelters) are power sourced from hydroelectric dams, which is substantially cheaper. The Urals is the region particularly badly hit, as it is dependent on

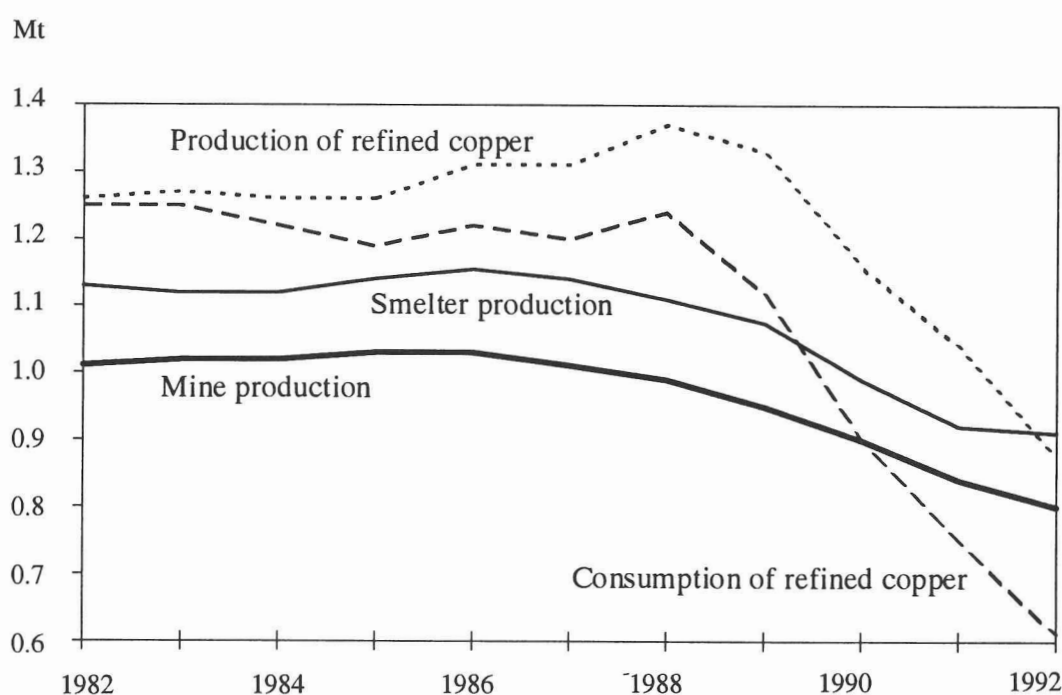
neighbouring Kazakhstan, which charges international market prices to the other CIS republics for its raw materials. As a result of the freeing of energy prices, plants such as Bogoslovsk, Volgograd and the Urals Aluminium Works might well be forced to close as they are not able to compete with the low energy costs of the Siberian smelters.

Primary aluminium production in the CIS can be expected to fall from more than 3.5 Mt in 1990 to about 2.5–2.7 Mt in 1995. There are no indications, however, that exports to the West would decline automatically by the same levels, since large amounts of metal may still be stored for transportation to the international markets and since CIS demand may decline further. Russian authorities in the aluminium industry agreed on several occasions to respect international undertakings on the reduction of aluminium production. Intergovernmental negotia-

tions between east and west were already initiated in 1993 and continued in 1994 with the aim of finding mechanisms that would reduce the excess supply of aluminium on the international market. According to the initial agreement, the rate of primary aluminium output in 1994 and 1995 will be reduced by an amount corresponding to 2 Mt annually compared to the production level at the end of 1992. Of the total, a reduction of 0.5 Mt would be undertaken by producers in the Russian Federation. The full implement of the agreed cutback should help the CIS aluminium industry to increase financial and technical assistance from the West for modernisation and restructuring of their plants.

The problem hinges on the fact that management boards of the Russian aluminium plants are not very enthusiastic over the cuts agreed with western producers. Local traders estimate that due to a sharp decrease from 2.4 Mt of alu-

Figure 5. Soviet Union/CIS production and consumption of copper, 1982 - 1992



Source: Metallgesellschaft

minium domestic consumption in 1990 to 0.7 Mt in 1993, whilst maintaining practically the same levels of production, exports are their only means of survival.

Copper industry

The copper output growth in the Soviet Union has been one of the most spectacular, compared with other non-ferrous metals, since the Second World War. As a result of intensive development of reserves during the 1950s, new mines and metallurgical plants were constructed. Copper output increased from 275 000 t in 1950 to half Mt in 1960 and over 1 Mt in 1970, when the Soviet Union became the second largest copper producer in the world after the United States. According to the Ninth Five Year Plan, approved in 1971, copper production was to be expanded to 1.5 Mt in 1975 and it was expected to reach the two Mt level in 1980. At present, the CIS has maintained its third position, far below Chile and

United States with an estimated output of 800 000 t in 1992 (See Table 10).

The grade of the concentrates is mostly low compared with that of the West. Larger volumes of lower grade concentrates have to be transported large distances to the smelters and this increases relative transport costs. As a general rule, copper ores are very complex and the fine dissemination of metals make the metallurgical performance of concentration plants difficult. In the Urals, copper concentrates are smelted in five large plants with a capacity of around 400 000 t annually. Copper smelting capacity in the CIS is estimated to be around 1.3 Mt. In addition, the Norilsk and the Kola nickel plants produce 0.7 Mt of copper.¹⁸ Most of the smelters were built before the Second World War and modified during the 1950–1970 period. The only modernisation programmes reported in the CIS copper smelting and refining during the 1980s, are the Norilsk plant where an

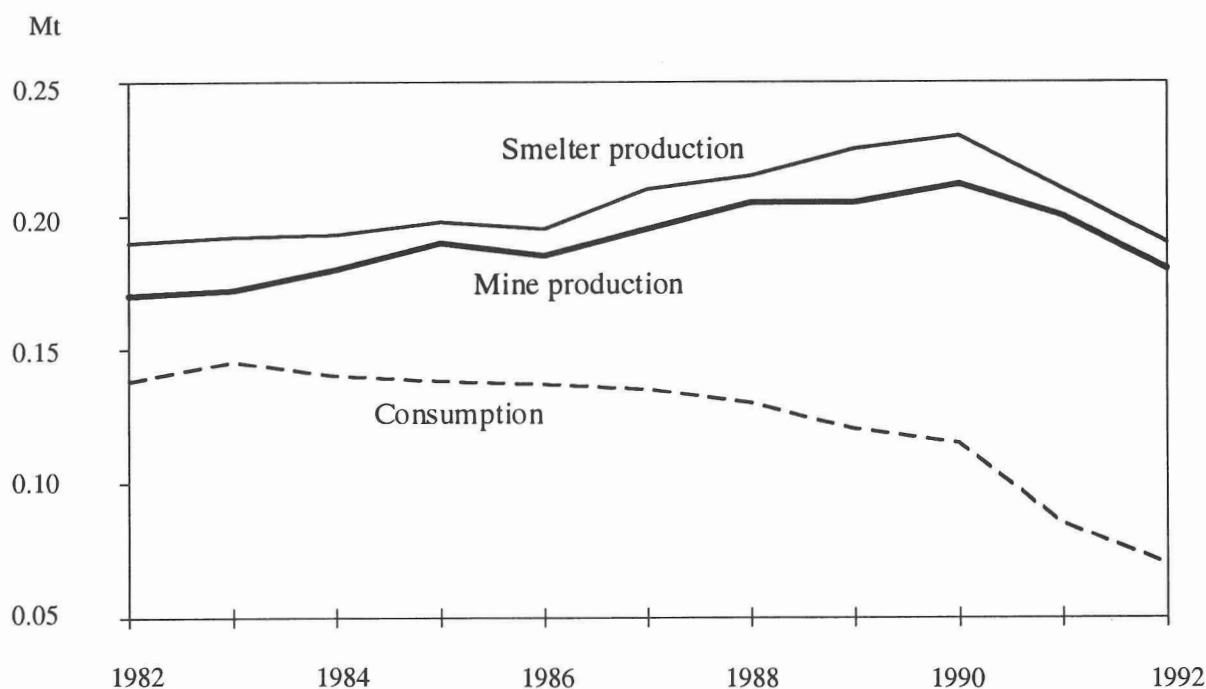
Outokumpu flash smelter was installed, and the large Almalyk smelter, in Uzbekistan, where the same system was installed.

Nickel industry

Nickel production in the Soviet Union started in 1934–1935 when a plant for treating oxide nickel ores was built in the Urals region. At the same time, large reserves of complex Ni-Cu sulphide ores were found in two northern regions; first in the Kola Peninsula in European Russia, and the second, at Norilsk, in Siberia. In the Kola Peninsula, the Severonickel smelter started operations in 1940 and in Norilsk in 1942.¹⁹ By the end of the 1970s, the Soviet Union became the largest mine and refined nickel producer in the world.

The Soviet Union nickel mine output has always been about the same as that of Canada, although refined nickel production volume is greater in Russia. The In-

Figure 6. Soviet Union/CIS production and consumption of nickel, 1982 - 1992



Source: Metallgesellschaft.

ternational Nickel Study Group, INSG, estimates that the refined nickel output was, in 1992, more than 50 per cent greater than in Canada, although CIS production has been decreasing clearly during the 1990s. Western publications are sceptical about the reported production levels of Russian officials, of around 250 000 t in 1992, at Norilsk Concern alone. A more realistic figure could be the same volume for the global CIS output. Russian officials reported that 1993 nickel output amounted to around 80 per cent of the 1992 level.²⁰ The main reasons for the slump in nickel production in the CIS area are the same as for the rest of the major metals: i.e. the slump in Russian industrial production, the breach of economic ties among the former republics of the Soviet Union, the big change in the defence industry and the insolvency of customers. Short-term forecasts of nickel production average around 200 000 t annually, which means near to 65 per cent utilisation of the CIS smelting capacity.

The largest nickel producer in the CIS is Norilsk Nickel Concern, which controls around 85 per cent of the Russian Federation total output. The concern was established in 1989 and initially declared independent of governmental control, although the Russian state has a 37,5 per cent stake in the company. Norilsk Nickel includes mining and metallurgical enterprises in the Norilsk region of East Siberia and in the Kola Peninsula. Other producers are the Ural enterprises, which include Yuzhuralnickel, Ufaleinickel and Rezhsky plants.

Russian officials in charge of privatisation planning have recently announced that the Norilsk Nickel Concern has been included in a wide privatisation programme of 62 state-owned companies.²¹ The programme was completed during the summer of 1994. According to the programme, 12 per cent of the Norilsk shares will be made public. The present government stake will rise to 50–51 per

cent for three years, after which the majority ownership will return to the Norilsk enterprise. A limited percentage of the shares will be distributed freely among the employees, while another part will be sold to them at a lower rate. Shares will be available only to Russians. The nickel industry privatisation will include the Pechenga, Severonickel, Monchegorsk and Norilsk plants.

Western sources estimate that approximately one half of the CIS nickel is consumed domestically and the other half of around 125 000 t is exported. The significant increase in Russian nickel exports over the past five years is the result of the expansion of mining operations at Norilsk and refining capacity in the Kola Peninsula, and particularly because of the abrupt decrease in Russian industrial production. It is difficult to estimate exact figures of nickel exports from the CIS to the western markets because the 1990s has seen a large illegal trade in nickel. According to Russian officials²², in 1992 around 30 000 t of nickel were exported illegally in the form of ferro-nickel, nickel scrap, and nickel alloys manufactured at ferrous metallurgy enterprises and plants which do not normally produce nickel. Another 20 000 t of nickel were exported on a barter basis or exported illegally through the Baltic countries.

In 1993, and according to figures reported by Russian officials, nickel exports amounted to 110 000 t, of which 42 per cent went to Germany, 20 per cent to Great Britain, 11 per cent to Netherlands and 11 per cent to Finland. In 1994, there has been an abrupt decrease in nickel exports to the western markets. Metal traders consider that the lack of CIS metal may be due to difficulties in production and transport, but also, however, to the impending changes in the Russian export laws. The Russian Ministry of Economic Foreign Affairs, on the initiative of the metal enterprises, such as the Norilsk Nickel Concern, is taking measures to re-

strict the number of metal trading companies. Decrees, if approved, will include most non-ferrous metals.

To maintain the nickel production levels of the 1980's, considerable investments in technical development and modernisation programmes will be required. The Norilsk Nickel Concern alone requires around USD 4 billion up to the year 2000.²³ Russian authorities consider that this money will come mostly from nickel exports.

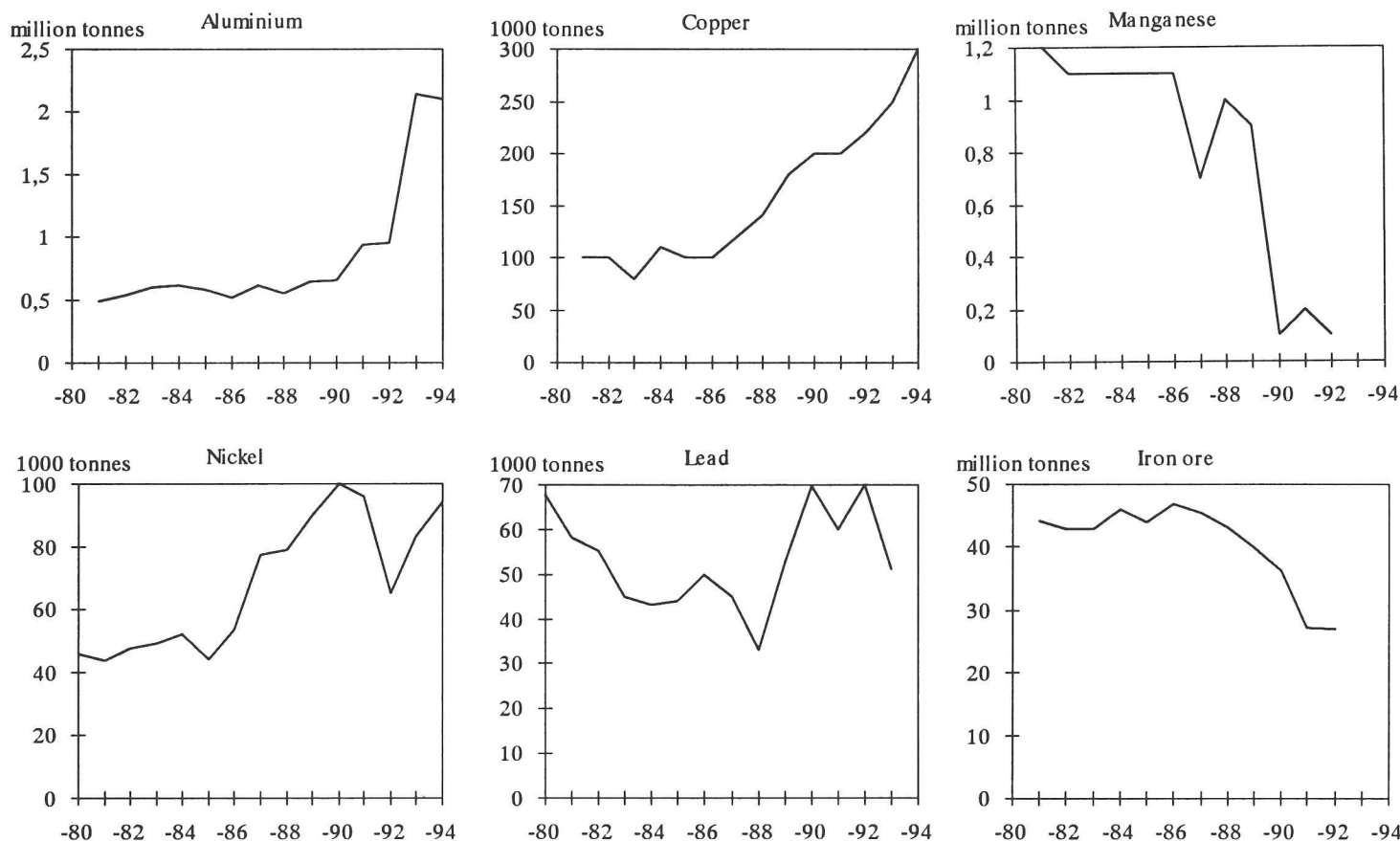
CIS metal exports

Metal exports from Russia and other members of the CIS expanded so strongly, after 1990, that the mining industry in industrialised, as well as in developing countries, considered the changing situation as a motive of tensions and the weakest link in the economic relations with the CIS. There is, however, a clear degree of uncertainty and even controversy about the real volumes and the duration and intensity of the impact of CIS metal exports on western markets. Figure 7 refers to export volumes reported by official sources.

According to estimates from Metallgesellschaft, in 1992, Russia alone exported 1.4 Mt of non-ferrous metals to a value of USD 2.5 billion.²⁴ The Russian Department of Metallurgy reported slightly smaller figures for the same year; 1.3 Mt with a value of USD 2.4 billion.²⁵ Diverse estimates made by western metal traders fluctuate between 1.5 Mt to as high as 2.6 Mt of total metal exports from the CIS. Minerals and metals export value increased from 5.3 per cent in 1989 to 9.5 per cent of CIS countries total exports in 1992 (see Figure 8).

The western mining industry has commonly described CIS metal exports as a negative and disturbing market factor. Particularly EU and United States producers and traders have been active in blaming CIS metal trade practices. From the Russian perspective, local authorities claim that the United States and EU

Figure 7. Soviet Union CIS metal exports, 1980 - 1994



Sources: UNCTAD: Commodity Yearbook, 1988 and 1994; Metallgesellschaft, 1982 - 1993 and Metal Bulletin issues 1993 - 1994; Nickel figures 1991 - 1993 and estimated figure for 1994: S. Kornejev, Noril'sk Nickel, June 1994; Zinc and lead figures 1991 - 1993, ILZSG, September 1994.

Note: Aluminium figures for 1993 and estimated for 1994: G. Volfson, Aluminy, June 1994.

countries are guilty of discrimination against CIS metal producers. In the case of steel, for example, the Russian delegation at the MB's Fifth European Steel Conference in June 1994, indicated that in 1985, steel production in the EU countries was 136 Mt from which 6.8 Mt were exported to the Soviet Union. At present, with a production of around 100 Mt the EU has imposed a quota of only 0.35 Mt of finished steel on CIS imports.²⁶ In addition, world steel production increased by 1.2 per cent in 1993, but regional differences were very marked (see Table

12). Most of the steel production growth occurred in developing countries and United States while production in the CIS area slumped.

The central point of the EU steel producers is that European steel, in the east and the west, will have to cut crude steel capacity by 70 Mt and rolling capacity by 65 Mt to balance a utilisation rate in the area of 80-85 per cent by the year 2000.

Western producers argue that steel in the CIS must be linked to restructuring and that subsidised steel in the market results in an unfair competition. In these

circumstances - according to EU countries - free trade in steel in the European market should be only gradually introduced.²⁷ Proposed solutions include such extreme models like the western European steel reductions of labour from 0.9 million workers to 0.35 million since the 1970s. Taking note that Russian steel alone employs more than 1 million persons, this would mean a workforce reduction of 0.4 to 0.5 million persons, which should also be considered as an unrealistic goal from the long-term perspective.

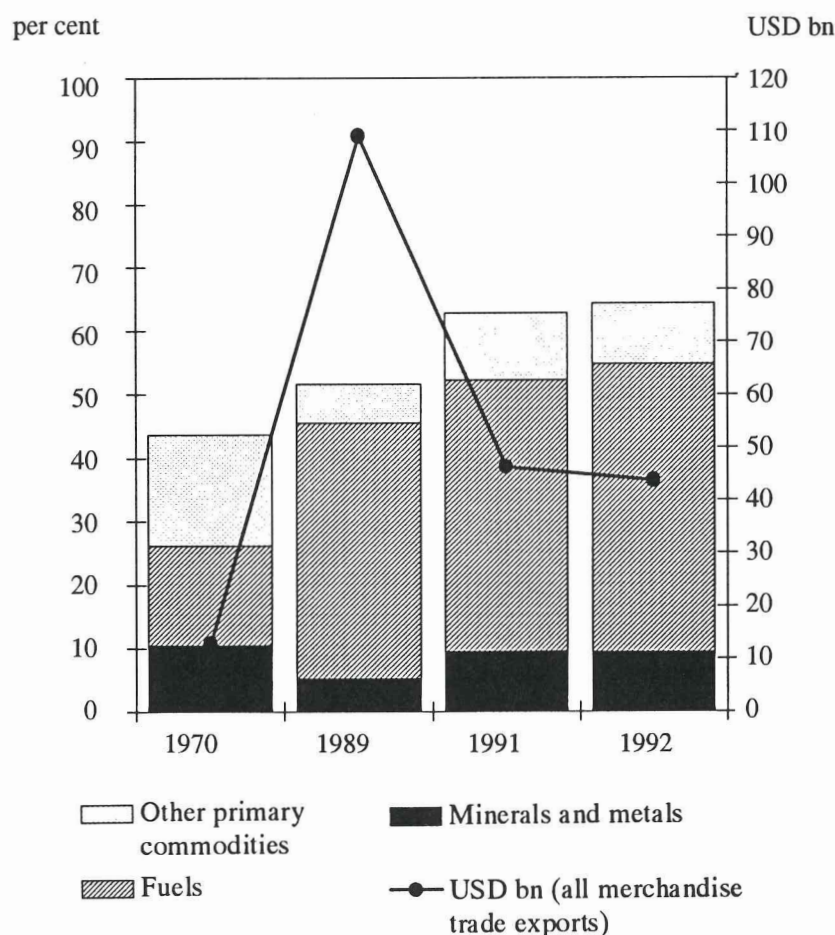
Aluminium is of great significance for the CIS metal foreign trade. As described before, unlike other non-ferrous metals which depend on domestic and increasingly unreliable feed of concentrates, the aluminium industry uses imported bauxite and alumina. CIS demand has, collaterally, revitalised raw materials production in bauxite-alumina exporting countries, through barter and toll contracts. At the same time, and despite West European producers proposed restrictions, the CIS aluminium industry has been able to maintain its export levels in the 1992–1993 period.

Large producers in the west had started to cut production in 1993. After several meetings and long negotiations, reductions intensity remains unclear. The original aim was to reduce output by 2 Mt to stop oversupply and accumulation of stocks. The main problem was to what extent CIS producers were prepared to accept any output reduction. In January 1994, Russia agreed to a conditional cut of 0.5 Mt, once western producers reduce their own output volumes. Production cutback has remained largely theoretical.

World aluminium production increased by 4.9 Mt between 1982–1992, from which CIS output has accounted for only 0.25 Mt of the global figure. Most of the increased volume (3.5 Mt) came from Canada, Australia, United States and Brazil. Russian officials have thus complained about the EU's "unilateral protectionist measures" to impose import restrictions on their aluminium (and other base metals) exports to the western markets. Low energy costs which gave a clear advantage to CIS producers in the market until 1991 are now on average comparable to those in Canada or United States and are no more an argument of "unfair competition". In fact, CIS aluminium producers are at present regarded as high-cost producers.

Restrictions on imports imposed by the Western European countries and United States are affecting a continuously decreasing number of CIS prod-

Figure 8. Soviet Union/CIS exports of primary commodities (per cent of total exports)



Sources: UNCTAD: Commodity Yearbook 1988 and 1994.

ucts. Nevertheless, there are still imports of several product categories restricted by tariff and non-tariff barriers like steel and non-ferrous metals. The central argument of the CIS mining industry is, and will continue to be, that the EU and United States must establish equal metals trade relations with the CIS as with the other countries, especially in the transit ion period.

Although tensions between western and CIS metal producers have clearly lost intensity as a result of strengthening demand in the world market, there is a recognised need for fundamental changes in the industry. The dramatic rise in

CIS metal exports has to be seen as a cyclical issue. Reductions of metals production capacity, in Western Europe, United States and Japan are not the result of CIS metal exports. Cuts started long before the collapse of the Soviet Union, as a result of the construction of new mines, smelters and refineries in countries and regions economically and physically (from the viewpoint of mineral resources) more favourable. At the same time, there was an increasing need in the international mining industry to cut costs to be competitive.

As seen before, the rise in CIS metal exports has led to growing protectionist

sentiments in the west. Import controls in the EU particularly, are considered to be necessary to protect jobs. In fact, there is little evidence that such imports have contributed significantly to the problem of unemployment in these countries. The problem reflects more a situation of transfer of resources from uncompetitive industries to activities with higher productivity. However, reductions in production capacity have not been big enough to correct what has been proved to be temporary world-wide over capacity of some of the most used metals. Already a short period of high prices serves as the argument to postpone reductions planned in periods of weak demand. Aluminium and particularly steel are a good example. The European Commission's long negotiated plan to cut steel production capacity will hardly receive support from European steel enterprises at a time when they are operating at full capacity.

The protectionist actions of the industrialised market economy countries cannot be effective because CIS metal finds different channels into the international market. Large world enterprises are increasingly accepting the fact of the CIS entry into an organised system of metal trade and the need to eliminate trade barriers according to the GATT regulations. Metals export from the CIS will decline as a result of a stabilisation of production levels, stagnant and long investment lead periods, recovery in domestic demand, lower volumes of toll conversion and more severe environmental standards in the area. Not because somebody in the west tries to stop it.

Prospects of the CIS mining industry

Production, consumption and trade outlook for major minerals and metals of Russia and the other CIS countries is unprecedentedly uncertain. Forecasts even for the short-term are exceedingly difficult; first, because of the widely varying estimates concerning the probable overall economic situation and industrial ac-

tivity; and second, because of the unpredictable political course of the transition period.

Over the next years up to the year 2000, an accelerated and widespread diffusion of western modern mining technology and heavy investment into the CIS mining sector seems to be improbable. Output levels over a period of six years, are thus estimated on the basis of the foregoing discussion, although there may be significant problems of different types associated with specific metals: deterioration of geological conditions, poorer ore grades and more complex mineral bodies; increasingly remote mining locations with higher costs of infrastructure, energy, labour and transport; high capital intensity for large-scale projects; due to the particularly long investment lead times – from 5 to 10 years for "green field" expansion, inflation and exchange rates uncertainty in the region reduce viability of mining projects in the area; risks related to changing metals demand both in the international and domestic market; intensity of economic growth in the metals consuming countries; more rigorous international and local environmental standards; political uncertainty, instability of governments and mining sector authorities; particularly the policies of the republics of the Russian Federation, regarding their territories' mineral resources control of mining and marketing operations, can vary greatly. Diverse movements and conflicts in rich mining regions were reported, especially in the first two years after the collapse of the Soviet Union (the Urals, Krasnoyarsk, Cherepovets, Yakutia, South Ossetia, Checheno-Ingushetia, Yakutia, etc.)

Metals production prospects

Available information and data on mineral raw materials production, consumption, capacities, diverse factors of supply and determinants of investments in the CIS area are not definitive and cannot be considered as corresponding western

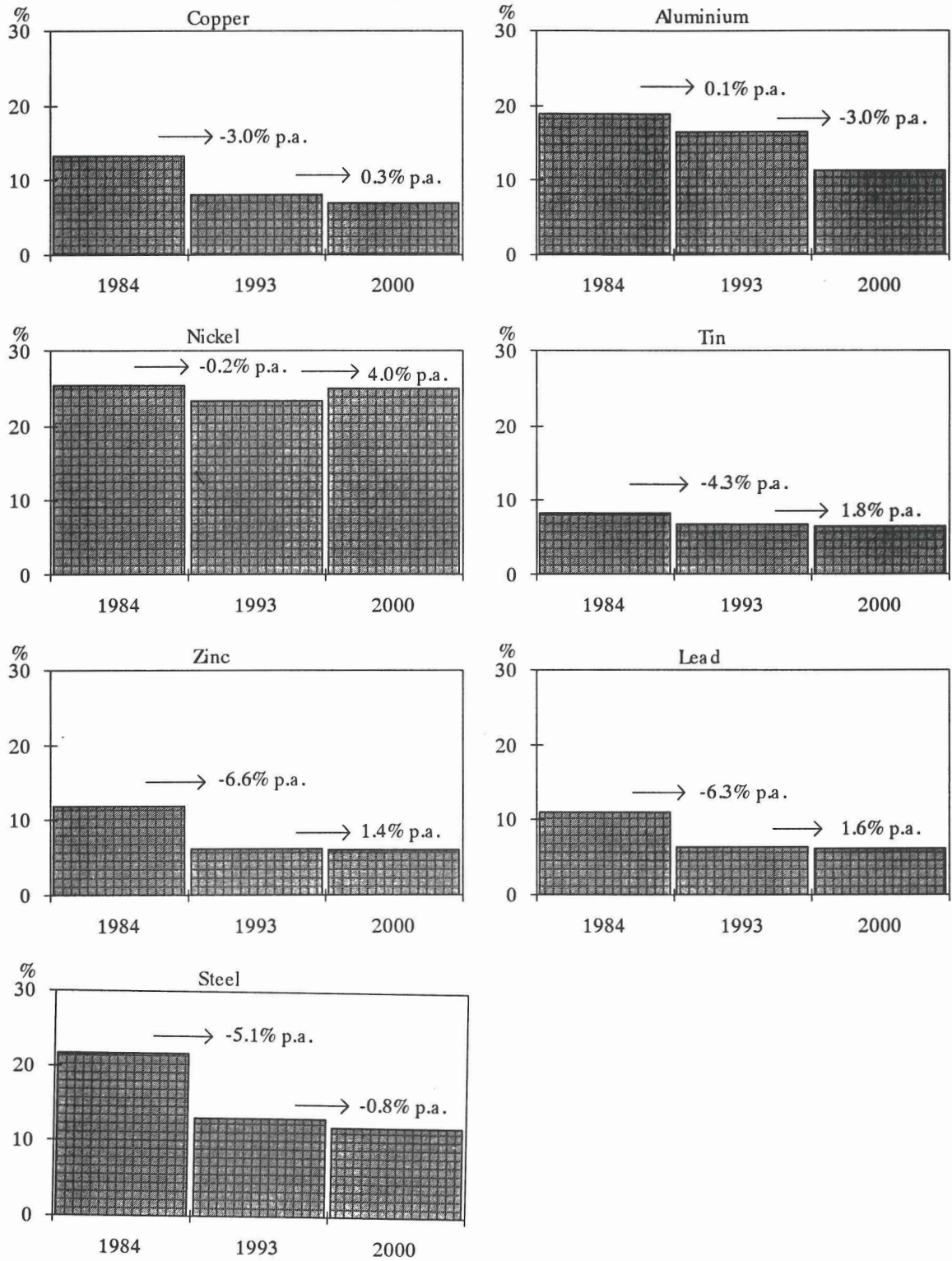
data. Collecting information on investment in mineral production directly from government or from private sources in the CIS is not feasible, at least at present. Various Russian and international institutions, study groups and specialised publications increasingly include information on a, still partial, product-by-product review, which provided the basis for the interpretation of relevant information to estimate the medium-term CIS metals production prospects (see figure 9).

Developments which took place during 1989–1994 in the CIS mining policies were caused – to a large extent – by a dramatic reduction in metals demand from the military-industrial complex. The deceleration of the global arms race which was using roughly one trillion US dollars a year during the 1980s, and the reductions of metals use for defence purposes – both in western and CIS countries – have a great significance on the prospects for metal markets. Not only because metals demand for defence industry decreases but also because metals already used in military equipment are sold in the market as scrap or as raw materials from western and eastern strategic stockpiles.

After a long period of hostile relations between western industrialised countries and the Soviet Union, improvement of the political climate and the economic relations would increasingly facilitate western access to the CIS mineral raw materials.

At the same time, the United States and West Europe dependence on CIS and developing countries mineral supplies will increase. Unlike the 1960s and 1970s, this dependence does not need to be seen as a negative aspect. A changing degree of dependence on foreign supplies of minerals will continue to be a concrete factor of the relations of all countries in the world. A complete self-sufficiency – so strongly pursued by the Soviet Union system – is impossible to achieve by any country, either physically or because it is too costly.

Figure 9. Growth rates per annum 1984 - 1993 and 1993 - 2000 and shares of CIS in world's metals production, in 1984, 1993 and prospects in 2000



Sources: World Bank and Metallgesellschaft, (actual); VATT (projected).

In the light of recent developments in the world-wide internationalisation of the mining sector the possibility for a turn-back to future isolation of CIS mineral and metal industry appears weak. Whatever political economy for the CIS mining sector these countries implement, they cannot escape competition in the international market.

CIS and developing countries – a comparative view

Before the disintegration of the Soviet Union, three country groupings in world economic analysis were usually made: industrialised market-economy countries, socialist countries and developing countries. In terms of economic growth, socialist countries had been trying for decades to catch up with the first category, while developing countries had been trying to find a place of their own. At present, and according to a classification of economies by income and region used by international institutions²⁸, more than 30 developing countries have already reached a higher stage of growth than the CIS lower-middle income economies.

From the mining sector perspective, the basic characteristics of these three groups are: very roughly around two thirds of the mineral reserves in the industrialised market-economy countries are located in United States, Canada, Australia and South Africa. The largest share of lead, zinc, gold and chromium reserves are held by these countries. The predominant part of developing countries mineral reserves are held by a limited number of countries. Very roughly around two thirds of these countries do not possess economically significant resources; the largest share of world reserves of copper, bauxite, tin, nickel, cobalt, tungsten, and antimony are found in developing countries. The Soviet Union and now the CIS is nearly self-sufficient in most major minerals with the very important exception of bauxite, and probably in the case of tin, silver and tung-

sten. The concentration of CIS mineral resources in the Russian Federation area is very marked. The group of industrialised market-economy countries is the world's largest producer of major base metals with the exception of tin. At the same time, the group produces only around three quarters of their metal needs (81 per cent in copper, 87 per cent in aluminium) in spite of large surpluses of production over consumption in Australia (Al, Pb, Zn, Fe, Ni) and Canada (Al, Zn, Ni.) The characteristic trend may be a declining production share of practically all major metals and minerals in the 1990s, although the decrease will be far from the dramatic figures forecasted in the 1970s.

The dominant trend for the 1980s in the minerals and metals global supply was an increase in the developing countries' share. This rise, however, was not as significant as it was generally anticipated in the 1960s and the 1970s, but may be predicted to be faster in the 1990s. In the case of CIS countries, new forecast figures are clearly different from those in the 1950–1979 period. Their share in the global supply of most minerals and metals will decline slightly, although a decrease in steel and aluminium may be significant. The economies of the CIS countries (increasingly) and those of the developing countries (decreasingly), are dependent on mineral raw materials and refined metals exports.

International co-operation

The main factors affecting global affairs in the post-war period reflected mostly East-West competition to achieve geopolitical and military objectives. Developing countries were regarded as some kind of stage for the extension of the economic and ideological conflict of the super-powers. The East-West competition also affected the intensity and the objectives of the international co-operation. Distribution of international aid depended to a large extent on the ideological orientation of developing countries'

governments, for large-scale economic and technical assistance including their mining industry. In the 1990s a number of the CIS members and the majority of the heterogeneous group of developing countries are increasingly being classified as "politically safe" for external assistance and co-operation in their process of structural reform toward a market oriented economy. As a result, new trends are emerging in the character of mining agreements to better balance the local or national requirements of host countries, international mining enterprises and banks. The adjustment process, however, follows a more rapid schedule in developing countries than in the CIS area.

Improvement in the relations between partners in mining ventures in developing countries – host countries private and public mining sector and international mining enterprises and institutions – has favoured investment finance for diversification projects in non-ferrous as well as in precious metals.

On the contrary, foreign investment in the CIS mining and metals industry has been limited. Around three quarters of the projects negotiated are in the gold exploitation in regions where an appropriate infrastructure already exists. This trend could reflect two main influences: a shorter payback period associated with gold mining and the ease of transport by air or other means compared with the large volumes of ferrous and non-ferrous ores and metals which need massive means of transportation. International investment for diversification projects in the CIS mining industry require improvement in the supply of information. The growing interest of possible partners in mining-ventures is to increase competitiveness of diverse metals, in addition to gold, and exploit the comparative advantages of the CIS mining sector.

Control over mineral resources

The political concept of "permanent sovereignty of developing countries over their natural resources", as used in

The military industry used to be a major metals consumer in the Soviet Union. A sharp reduction in the industry's consumption has resulted in growing metals stocks in the CIS.

United Nations' forums in the 1960s and 1970s, has been transformed over three decades. In most mineral rich developing countries, parallel to privatisation processes, the concept has been stripped of all its connotations of economic independence or social claims and it is no longer considered as an obstacle to foreign investment expansion.

In many of the CIS republics, especially during the first years of the 1990s, governments – at local or national level – were convinced that they possess sufficient technical and financial resources to make the necessary adjustments in mining industry without external co-operation. The establishment of an appropriate atmosphere for foreign investment encouragement in the CIS countries is a very recent trend and it is still marked by sometimes strong nationalism.

State mineral enterprises

The mineral policy of the Soviet Union was based on the principle of maximum self-sufficiency at any price. The actual cost of production was not a significant factor in the selling price of the ores and metals on the domestic or international market. The centrally planned economy system enabled any price level suited to meet political and economic requirements. From the Soviet Union perspective, mining and metallurgical centres were kept in operation with government subsidies because the value or potential value – social, political, or strategic – exceeded the expenditure, and this relationship was expressed as a profit.

State mineral enterprises in developing countries²⁹ often had a complex and multiple goal structure, which may have involved a variety of social responsibilities including considerations on national employment, income distribution, regional development national sovereignty, etc. They operated under lower pressure to minimise costs. Corporacion Minera de Bolivia (Comibol), for example, was for several decades (1952–1992) that country's most important company



generating foreign earnings, due also to its social impact on the whole nation. Comibol, however, often made losses, and sometimes for long periods. The company was seen – internally and internationally – as a drag on the national economy, with a reputation of being over-staffed and under-efficient. Depending on the perspective of the observer, Comibol was either proof of the inherent inefficiency of the state mineral enterprises or a standard bearer of the public sector enterprise which made the best out of poor financial and technological circumstances. From a world-wide perspective, I. Dobozi³⁰ argues that it is not possible "to take the stand that all state mineral enterprises engaged in non-commercial objectives must necessarily be financial disasters, but it would be too simplistic to assume that financially profitable SMEs are necessarily socially oriented."

Criticism on the SMEs in developing countries was not made by industrialised market economy standards alone. In the Soviet Union, it was considered necessary for developing countries to develop a rational and integrated system of effi-

ciency criteria for the state sector which would identify the socio-economic and financial aspects of the state enterprise performance.³¹ The same criticism would be valid for the mining sector in the Soviet Union, too. From the western perspective, a large number of mining and metallurgical operations in the centrally planned system of the Soviet Union and state mineral enterprises in developing countries would have been uneconomic by market economy standards. Mining in the CIS and in several developing countries have their own specific characteristics, but one common challenge for the immediate future: how to implement structural changes to make their mining enterprises competitive apart from non-commercial, political and social considerations.

Environmental aspects of mining

The mining industry has an immense environmental pollution effect world-wide. Mining operations strip 28 billion t of material yearly, which means more than that removed by all the rivers in the world. Mining generates 2.7 billion t of waste, partly hazardous, which is far

more than the world's total accumulation of municipal garbage. The mines and smelters use every year up to one tenth of all the energy used by mankind and pump 6m t of sulphur dioxide into the atmosphere, a major cause of acid rain.³²

Mining, throughout history, has severely harmed the environment in industrialised and developing countries. Increasing pressure of public opinion has resulted in stricter regulations on mining operations world-wide. Serious efforts towards the solution of environmental problems resulting from mining and processing started in the early 1970s. Initially, actions to alleviate pollution were concentrated in the industrialised market economy countries. Increased processing of minerals in developing countries and the subsequent aggravation of pollution problems made priority tasks of analysing the situation and the environmental effects of mining there. Rich mineral resource countries (Malaysia, Indonesia, Chile, Thailand, Bolivia, etc.) undertook comprehensive methods to safeguard the environment as early as the beginning of the 1980s. Governments and mineral enterprises from the large metals consuming countries had and still have special responsibility for ensuring that new environmental damage is kept to a minimum.

Western European governments have made clear their profound concern about pollution caused by mining operations in the CIS. It can also be expected that the knowledge of the immense costs of pollution as a result of smelting and refining operations in the area, increases the concern of CIS mining enterprises with regard to this problem.

In the case of the CIS mining industry, the environmental impact of mineral operations along the whole production chain should be emphasised: exploration, development, extraction, concentration, smelting, further processing and abandonment. All these stages produce some form of pollution of differing intensity from mineral to mineral and location to location. Data on pollution control costs

are non-existent in the CIS countries. They have to be derived from similar operations already implemented in industrialised and developing countries. Pollution control technology used in developing countries may also be properly utilised in future environmental control measures in the CIS due to more or less similar infrastructural conditions. However, to meet international environmental standards of mining operations in the CIS countries requires far larger investments and much more time, since the over-all pollution levels in this area are clearly more serious than they were in developing countries. The international community should help in providing an environmental legislation and the so hardly needed mechanisms for the CIS mining and metal industries, before the environmental damage becomes irreversible from a world-wide perspective.

Notes

1. The Commonwealth of Independent States, CIS, comprises twelve of the former fifteen soviet republics. The new states are: Russia, Kazakhstan, Ukraine, Uzbekistan, Armenia, Azerbaijan, Byelorussia, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan and Georgia.

2. Rauma Repola, from Finland, delivered two deep-sea vessels to the Soviet Union, designed for research and exploration of the ocean floor. The vessels were capable of working at depths of more than 6000 metres. It means that they had access to 98 per cent of the world's ocean floor.

3. L.I. Brezhnev at the 25th CPSU Congress, 1975.

4. As a former executive of the Bolivian State mining Corporation, the author had the opportunity to discuss the terms of two large mining projects with soviet specialists, during 1966 – 1968 period.

5. Russian geologists at Vniizharubeshgeologia (All-Union Research Institute of Geology) Moscow, at the UNRFNRE's 5th Annual Informal Consultative Meeting, Espoo-Finland, 14–16 November 1991.

6. The Second International Exhibition and Symposium "Mineral Resources of Russia" took place on October 25–29, 1994, also in St. Petersburg.

7. J. Hill, *Russian Mining Law from the perspective of a private enterprise Mining Geologist*, paper presented at the First International Symposium on "Mineral Resources of Russia", November 9–13, St. Petersburg.

8. V P Orlov, *MRR* 2.93, Russian Federation Committee on Geology and Subsurface Usage, Moscow 1993.

9. VSGEI, All-Russian Geological Research Institute.

10. L. Berri (editor), *Planning a Socialist Economy*, Volume 1, page 261.

11. Metallgesellschaft, Commodities Research Unit, Lead and Zinc Study Group.

12. L. Antonenko at the 27th IISI Conference, paper cit.

13. *Metal Bulletin*, 10 February 1994.

14. *Metal Bulletin*, 17 February 1994.

15. UNCTAD, *Market situation and outlook for bauxite, alumina and aluminium*, TD/B/CN.1/RM/Bauxite/2, 2 March 1993.

16. UNCTAD, *Market situation and outlook for bauxite, alumina and aluminium*, TD/B/CN.1/R/M/Bauxite/6, 22 February 1994.

17. A. Sutulov, op.cit.

18. IMF, World Bank, OECD and EBRD, *A Study of the Soviet Union Economy*, page 246, February 1991.

19. A. Sutulov, op. cit.

20. World Bank, *Market Outlook for Major Primary Commodities, Energy, Metals and Minerals*, February 1994.

21. Speech by the Head of the Russian Federation delegation at the 4th General Session of the INSG, April 1994.

22. Speech by the Head of the Russian Delegation, op. cit.

23. World Bank, *Price Prospects for Major Primary Commodities, 1990–2005*, Volume 1, Energy, Metals and Minerals, March 1991.

24. *Metal Bulletin Monthly*, December, 1993, page 22.

25. Russian Department of Metallurgy statistics, published in *Metal Bulletin*, 24 May 1993.

26. O Smirnov, *Promsyrjoimport*, at the MB's Fifth European Steel Conference, Metal Bulletin, 10 June 1993.
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