MMSD

Mining, Minerals and Sustainable Development

November 2001 No. 110

Mining Industry and Sustainable Development in Kyrgyzstan

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Mining, Minerals and Sustainable Development is a project of the International Institute for Environment and Development (IIED). The project was made possible by the support of the World Business Council for Sustainable Development (WBCSD). IIED is a company limited by guarantee and incorporated in England. Reg. No. 2188452. VAT Reg. No. GB 440 4948 50. Registered Charity No. 800066

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Mining Industry and Sustainable Development in Kyrgyzstan

Table of acronyms and abbreviations

CBF	Community and Business Forum
CIS	Commonwealth of Independent States
EBRD	European Bank for Reconstruction and Development
ERRA	Enterprise Reform and Resolution Agency
Gosgortechnadzor	State Inspection on Industrial Safety and Technical Control
GDP	Gross Domestic Product
Jogorky Kenesh	Parliament of the Kyrgyz Republic
JV	Joint venture (with partiipation of foreign partner)
KAP	Kadamjai Antimony Plant
KBMP	Kara-Balta Mining Plant
MCMP	Kyrgyz Chemical Metallurgical Plant
KMMP	Kyrgyz Mining Metallurgical Plant
KMP	Khaidarkan Mercury Plant
JSC Kyrgyzkomur	Joint Stock Company Kyrgyzcoal
MGEP	Makmal Gold Extracting Plant
PESAC	World Bank Programme "Privatisation and Enterprise Sector Adjustment Credit"
SIMTC	State Inspection on Mining and Technical Control
TACIS	Technical Assistance for CIS
VAT	Value added tax

Introduction

The modern world economy is highly dependent on the exploitation of non-renewable natural resources. Significant change in this area, affecting the base of production and employment pyramids causes significant social upheaval. The extraction, processing and transportation of minerals have negative impacts on the environment, and the mining industry carries a considerable responsibility for the continuing deterioration of the environment in certain countries and regions, and in the world as a whole.

The social and economic development of many countries relies is heavily reliant on the export of minerals and mineral processing products. Because many of these countries lack resources, they have to resort to external assistance from transnational companies and international financial organisations, which often results in a restriction of their sovereignty and independence when deciding internal matters.

This issue is especially acute in countries with transition economies. Where there is weak legislature and state regulation, a shortage of material and technical resources, ecological and social problems, a lack of experience of cooperating with international structures and other issues – it is more difficult to reach the full potential benefits of developing the mining industry, and to prevent the negative consequences.

After gaining independence in 1991 Kyrgyzstan has experienced serious difficulties in establishing an independent economy. The collapse of the former Soviet system of governance, supply, financing and contacts led to the virtual paralysis of industrial production in the country, including the mining industry. This resulted in social and economic decline in many regions of the country, in which the mining industry played a major role in the economy. The protracted economic crisis and large external debts not only drew internal investment into the sector, but also led to the search for external investment to renew the extraction and processing of minerals, which provided the only practical way to replenish the state budget.

Special attention is given to the development of this sector in the Strategy of Sustainable Human Development approved in 1998 and the Complex Development Framework developed in 2001. Measures to prevent negative impacts of the industry were set out in the Concept of Ecological Security of the Kyrgyz Republic, approved in 1998.

This review has been prepared on the initiative of the MMSD and aims to provide information on the current state of mining in Kyrgyzstan, looking at problems and possible solutions. Similar reviews have been prepared in a number of countries with the aim of improving understanding of the state of one of the leading sectors of world economy and of finding ways to optimise its activity so that the interests of the sector do not conflict with the long-term priorities of sustainable development.

The report has been prepared by a group of specialists in geology, mining and metallurgy, and ecology, and it highlights the key issues and prospects in Kyrgyzstan's mining sector.

Part 1 provides an overview of the sector, including the history and data on reserves, distribution, extraction and the processing of the key minerals. It goes on to present an economic analysis and forecast of the sector, to look at legal regulations and licencing practice, and to consider the small-scale mining industry, the relationship of the sector with communities, the environmental and safety measures, investment, and transparency for stakeholders.

Part 2 focuses in more detail on the relationship between mining and ecology, economics and communities. In particular, it considers recultivation, the investment climate, the contribution of the sector to the wealth of the country and local communities, information distribution and stakeholder communication.

Part 3 sets out conclusions and recommendations based on a consideration of key issues.

The review is based on information from official sources and published materials. Where new research and monitoring have not been undertaken as a result of the collapse of the USSR, some of the data used date back to the Soviet time. All published material used is listed in the bibliography.

The authors hope that this review will be useful for all stakeholders and will help to promote the integration of the mining sector in the process of building a sustainable future for Kyrgyzstan.

Part I. General information

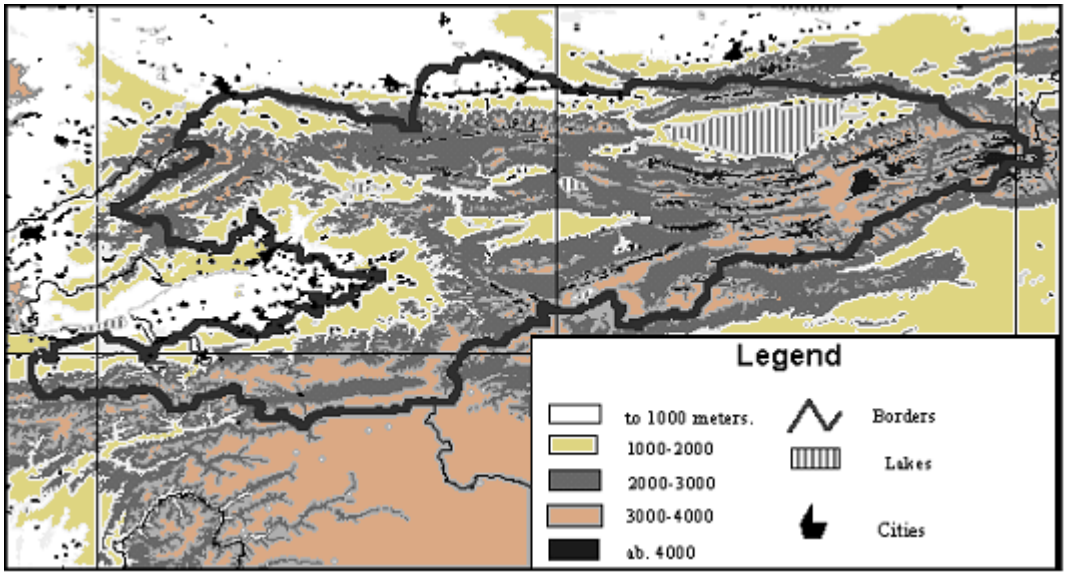
Geography

The Kyrgyz Republic (Kyrgyzstan) is located in the centre of Eurasia and has borders with China, Kazakhstan, Uzbekistan and Tadikistan. It covers a total area of 198,5 thousand km^2

It occupies the western part of the mountain system Tian-Shan and a small part of the Pamirs, which stretch across the country latidudinally. The relief constitutes a complex combination of mountain ridges and inter-mountain troughs and is characterised by sharp alpine high-altitude contrast.

High-altitude levels of Kyrgyzstan's relief

Altitudes, Meters above sea level	Altitude areas	
	In km²	**In %**
to 1000	**11800**	**5,8**
1000-1500	**14500**	**7,5**
2000-2500	**29300**	**14,7**
2500-3000	**32000**	**16,1**
3000-3500	**35100**	**17,8**
3500-4000	**32100**	**16,2**
4000 and higher	**13700**	**6,8**



Climate

The climate is sharply continental and ranges from desert-arid in valleys to arctic-humid in alpine zones, which it make difficult to run mining activities. Kumtor Gold Mine (14 km in length, total area of 70,6 km^2, 4,000 m above sea level) is located on the foothills of the Petrov glacier.

Main climatic indicators

Characteristics	Minimal	Maximum
Average annual air temperature	8°C in low altitudes	-10-13°C in high altitudes
Absolute temperatures	-53,6°C.	43-44°C
Average annual amplitude of air temperature	18°C	40°
Rainfall	56 mm (west. shore of Issyk-Kul)	150 mm in high altitudes
Total solar radiation	92, 8 kw/m^2	115,2 kw/m^2
Absolute magnitude of atmospheric pressure	950 millibar in low altitudes	600 millibar in high altitudes
Glaciation area	8047,8 km^2 (4,2% of total territory)	

Low atmospheric pressure in high altitudes reduces combustion engine power by 30-40%, significantly increasing petrol consumption. The whole territory of the country is located in a seismically very active zone (7-9 points on Richter scale), which substantially raises the price of construction.

Population

Total number of population	4,95 million people
Ethnic composition	More than 70 ethnic groups
Titular nation (Kyrgyzs)	2,5 million people
Population density	24 people on 1 km^2.
Average annual population growth	0,8 %
Urban population	51%
Labour resources	2300 thousand people
Number of economically active population (2000)	1.91 million
Literacy level of population above 15 Including with higher education	98,7% 10 %

Despite the growth in population and labour resources, employment has decreased by almost 3.7 %, and 11.5 % of the able-bodied population are currently unemployed. At the same time, the number of people employed in state sector has decreased from 74% to 27.7 %, and the number of people employed in the private sector increased to 80 % in 2000 compared with 20 % in 1993.

570,000 people are employed on farms, which equals an increase of one-third since 1990. More than 14,000 people are employed in joint Kyrgyz-foreign companies. About 10 % of those employed i.e. 160,000 people, are occupied in individual labour activities.

Kyrgyzstan gained independence in 1991 as a result of the collapse of the USSR. The directly elected head of state is a president. Legislative power is represented by Parliament Jogorku Kenesh, which consists of a Legislative Assembly (60 deputies) and an Assembly of People's Representatives (45 deputies). The government is headed by a prime-minister,

appointed by the president with the agreement of the Assembly of People's Representatives. The judicial system is represented by a Constitutional Court, a Supreme Court, a Supreme Judge and local courts.

The Kyrgyz Republic has seven administrative provinces, made up of 40 districts, 21 towns, 29 urban type villages, and 430 ayil keneshes (village councils). The administrative units of the Kyrgyz Republic are mostly divided by mountain ranges. The districts are connected mainly by road and to a lesser extent by railway, air and sea transport.

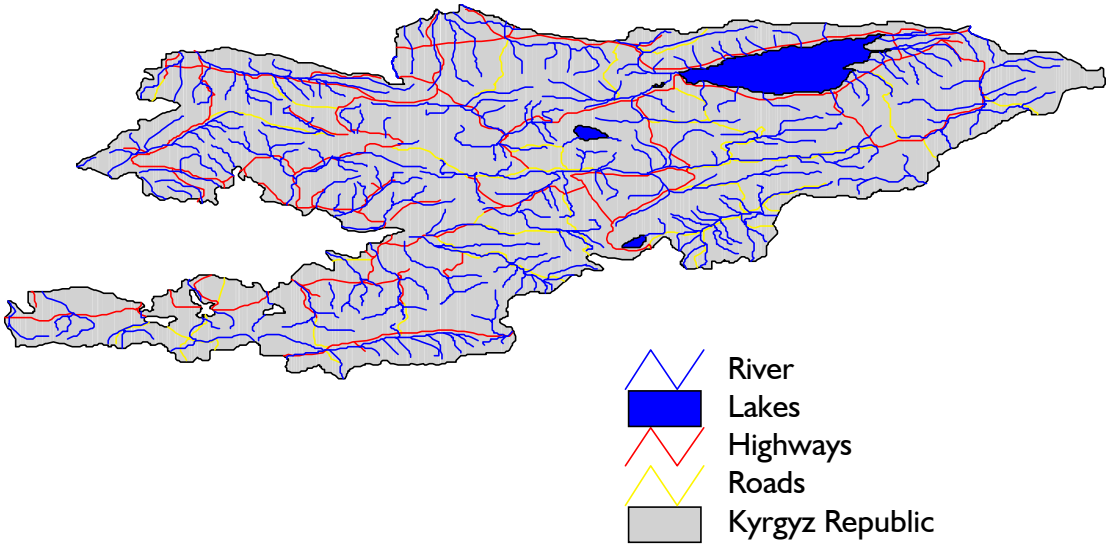
Infrastucture

Few countries are more isolated than Kyrgyzstan from sea ports. The fact that the Republic is difficult to access is a serious, but not overwhelming obstacle to the transportation of goods produced in the Kyrgyz Republic. This is because of the high value-added for the traditional products of mining (mercury, antimony, gold, rare-earth metals), which are not so sensitive to transportation expenses as bulk mineral goods.

The contribution of the mining industry to infrastructure development in rural areas of the country is significant. Roads constructed at the exploration stage are used by local populations pasturing cattle in the mountains. Sections of the state roads in the vicinity of deposits are also maintained by mining companies.

Thus, US$38 million have been spent in building and improving infrastructure and providing a power supply in Issyk-Kul and Naryn oblasts (provinces) (154 km Balykchy-Tamga 220 kwt power transmission line) during the construction of the Kumtor mine. US$6 million was spent in the reconstruction of the Barskon road (45km).

Enterprises of JS Kyrgyzaltyn have spent more than US$2 million to support social infrastructure during last five years. Because mining companies are, as a rule, located in remote and undeveloped regions, they do not damage the infrastructure. Nevertheless, there have been cases of toxic spills on roads, although the damage caused is negligible compared to the contribution made by mining companies in development of infrastructure.



Infrastructure map of Kyrgyz Republic

Roads.

There is a developed network of main roads, which connects towns and villages of the Republic. Transports routes cover up to 19,300 km, with a density of 175 km per 1000 km^2. Agency routes cover 16,000 km. Ninety-seven per cent of internal road transportation consists of trucks, and 79.3% conveys passengers. In 2001 trucks accounted for 25 million tons.

The capacity of highway roads generally meets demand, though part of the network needs to be reconstructed, particularly in mountain areas where they are damaged by mudflows, landslips and avalanches. Rehabilitation and maintenance of roads for the normal development of the national economy is carried out in accordance with the Programme on Rehabilitation and Development of State Arterial Highways (trunk roads) approved by the government. Priority areas of this programme include the following roads:

- Bishkek-Osh connecting the two largest economic regions of the South and North of the Republic. Road reconstruction is carried out through credit provided by the Asian Development Bank and Overseas Economic Co-operation Fund.
- Bishkek-Torugart connecting three regions of the Republic, with an outlet to China.
- Osh- Sary-Tash -Irkeshtam with an outlet to Kashgar city (China).
- Sary-Tash -Karamyk with an outlet to Tadjikistan.

- Talas-Taraz (Kazakhstan).
- Talas-Chaldovar (Kazakhstan) -Kara-Balta -Bishkek -Kordai village -Almaty (Kazakhstan).
- Internal: the Issyk-Kul ring road and Talas -Suusamyr.

The government is seeking low-interest credit to carry out this programme. Enterprises have to pay road tax at a rate of 0.8% of the sale price of commodity output. Ruling tariffs on internal freight transportation make up US$ 0.06-0.08 per km, and on external routes US$ 0.08-01 per km.

Railway transport

Kyrgyzstan's rail network is a part of the Central Asian railway network and consists of a Northern line - Balykchy-Bishkek-Lugovoe (Kazakhstan), and a Southern line, which connects towns Osh, Jalal-Abad and coalfields Kyzyl-Kiya, Tash-Komur and Kok-Yangak with an outlet to Uzbekistan. Through neighbouring countries these routes connect with Russia, and it is expected that they will join the Euro-Asian corridor project which is currently being developed by EBRD. In general rail transportation has decreased, and in 1999 amounted to 44.9% of the total transportation.

Length of railways	423.9 km
Density of railways	**1.8km/1000km^2**
Costs of construction for 1 km of railways	**US$ 1 million**
Leading gradient of railway construction	**From 10% to 30%**
Electrification of railways	**None**
Share of railway transportation against total volume of GDP/GNP	**Less than 2%**
Share of railway transportation against total volume of freight transportation	**2.36%**
Share of railway turnover of goods	**15.1%**

The government plans to construct North-South and West-East railway lines, which will form the basis of an independent railway network. The North-South line will connect Balykchy and Jalal-Abad, which will improve transport connections between the towns of Bishkek and Osh, and will facilitate the development of a large coalfield at Kara-Kiche.

The West-East railway line will connect Andijan (Uzbekistan) and Kashgar (China) through Osh-Kazarman-Torugart, which will provide a railway connection between Uzbekistan and China, and will eventually join the overland railway bridge between Europe and Asia.

Since the Tedjen-Serahs-Meshkhed line was put into operation, railway traffic in the East-West and North-South corridors has built up. This provides Kyrgyzstan with an exit through Turkmenistan and Iran to the Persian Gulf. This road cost US$2.6 billion to construct. At present the governments of three countries - Kyrgyzstan, Uzbekistan and China are considering the possibilities of joint construction of the road and exploitation of the East-West railway.

The share of freight and passenger transportation in the Kyrgyz Republic is very small and amounts to only 2.26% and 0.09% respectively. The main flow of freight transportation goes through Russia. Freight charges fluctuate, ranging from US$ 2.3 thousand tons for a rail-car from Moscow; US$ 2.7 thousand tons for a benzine tank truck along the internal Bishkek-Osh route; and for a similar freight-wagon US$ 1.7 thousand and US$1.5 thousand respectively.

Tariffs for railway transportation in open carriages or bays amount to US$ 0.02-0.03 per ton/km in CIS. In 1997 the Kyrgyz Republic signed the Convention on International Freight Trucking.

Air transport

There are two international airports in Kyrgyzstan – Manas airport in Bishkek and an airport in Osh. In accordance with the Air Transport Development Plan, Manas airport is being modernised with a loan from the Overseas Economic Development Fund of Japan (US$ 55 million). The airport operates regular international flights from Bishkek to Moscow, Istanbul, Frankfurt and London. Internal and international freight (Frankfurt) charges are between US$ 3 to 4.5 per kg of freight and US$2.8 per kg when in excess of 2 tons. The airports have a stock of MI-8 helicopters which can take passengers and deliver freight to any destination in the country for US$ 500 per hour of flight.

In 2001 2.4 thousand tons of air freight was transported and 196 air passengers carried.
There are airports for light aircraft in Karakol, Talas, Balykchy and Cholpon-Ata serving internal airlines. The share of sea freight transportation across lake Issyk-Kul does not exceed 0.2%, and amounted to 36.2 thousand tons in 2001.

The postal service

There are 867 post-offices in Kyrgyzstan, making 26 million mail deliveries annually. The internal postal service operates unevenly because of the dearth of transport, and is generally unprofitable and government-subsidised. In 1993 the Kyrgyz Republic joined the World Post-Service Union, and in 1995 DHL started to operate in the Republic.

Energy

Kyrgyzstan is rich in hydro-energy resources. Electricity is the most reliable amenity and is provided at a relatively low cost. The production of electricity has been on the increase since 1970 and has now reached 13 billion kilowatts. Electricity consumption has been also increasing and by 1998 was 139.7% of that in 1989. It is estimated that no more than 9% of the potential water-power (which may reach 142 billion kilowatts) is actually consumed.

There are five large and six small hydroelectric power stations in Kyrgyzstan with an overall capacity of 2950 megawatts. In addition there are several thermoelectric power stations, the largest of which is in Bishkek, which produces 678 thousand kilowatts annually.

Kyrgyzstan is connected to the energy systems of Kazakhstan, Uzbekistan, Turkmenistan and Tadjikistan and exports up to 2.5 billion kilowatts of electricity to Uzbekistan and Kazakhstan in exchange for oil, gas and coal. At present the Kyrgyz Government is considering the possibility of exporting electricity to China, Pakistan and India. Pakistan has priority and will be supplied with up to 6-10 billion kilowatts at US$ 0,05 USD per kilowatt.

The existing network of high voltage power transmission lines covers cities, towns, villages, urban-type communities and mining enterprises of the Republic. 220 kw is transmitted over 1090 km of the network; 500 kw is transmitted over 541 km; and 300 kw is transmitted over 400,000 km.

The government considers the provision of hydro-energy as a key part of the infrastructure, stimulating the flow of hard currency. There are plans to increase production to 17.5 billion kilowatts by 2005 by improving the capacity of existing power stations and constructing new ones.

- Tash-Komur Hydroelectric power station – increase capacity by 65 megawatts.
- Shamaldy-Sai hydroelectric power station – increase capacity by 25megawatts.
- Construction of Kambar-Ata hydroelectric power station with primary capacity of 360 megawatts to be increased to 1200 megawatts.

The government has undertaken an extension programme of Tash-Komur hydroelectric power station, and a similar programme is planned for Shamaldy-Sai hydroelectric power. A construction programme is planned for Kambar-Ata hydroelectric power station using credit.
The construction of electric power lines, including sub-stations, will be financed by the World Bank (US$6 million), the Overseas Economic Co-operation Fund of Japan (US$ 4 million) and the Swiss Government (US$ 10 million).

Deterioration in stations and high and low voltage transmission lines is responsible for losses of up to 20-30% of annual electricity production. The state-owned Energoholding owns the entire energy system and has exclusive rights over electricity supply. The State regulates tariffs in accordance with laws governing electricity, and according to the following principles:

- Prices should include the total cost of production, transmission and distribution of electricity;
- Price changes should not cause any unexpected economic difficulties on the part of producers and consumers, or discrimination in service provision and tariffs, including service quality;

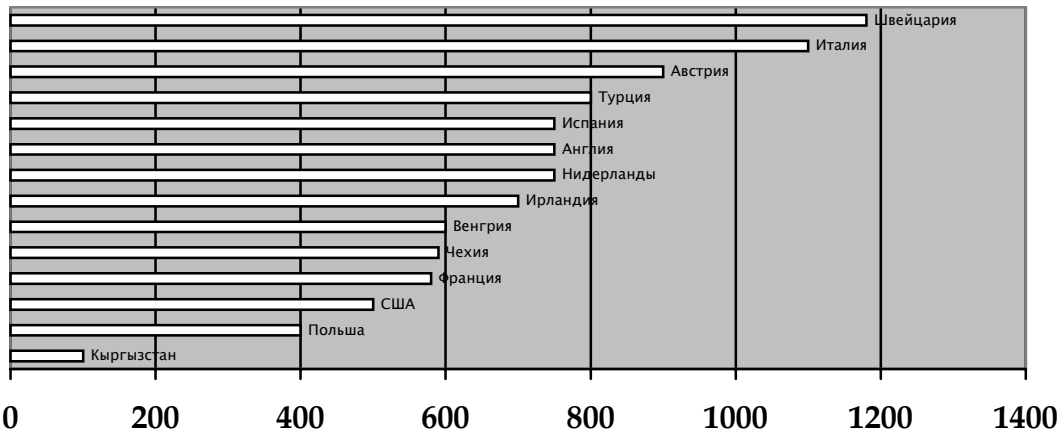
- Consumers of with similar consumption characteristics, using the same distribution company should receive the same tariffs and service.

There is a two-part tariff for industrial use of electricity, which consists of monthly payments for each kilowatt of overall power to consumers, and for each kilowatt of actual electric energy use. Industrial consumers include mines, pits, open-cast mines, oil and gas fields and drilling units.

The state Energy Agency sets the following economically justified prices and tariffs:

- Tariffs for end-consumers on the territory of the Kyrgyz Republic;
- Prices on production, identified in electricity purchase and sale agreements (between sides at the internal market);
- Payment for connection to and use of the National Energy System.

Electricity rates for industry
Kyrgyzstan index- 100
Source: Kyrgyzstan - 2000: Investment in the new millenium



The current rate paid by the population is US$ 0.4 per kilowatt/hour; by industrial enterprises US$ 0.05 per kilowatt/month and 1.6 cents per kilowatt/hour.

Compare these figures with the cost in neighbouring countries in CIS (2000):

Country	Power rate in USD/kwt hour	
	For population	For industries
Russia	0.9	1.6
Kazakhstan	2.7	2.8
Uzbekistan	0.7	0.7
Turkmenistan	0.5	0.5
Tadjikistan	0.0	0.1

Payments between different types of consumer of the electricity market are regulated by a financial accounting system. This is in turn regulated by the State Energy Agency (SEA). In future the SEA will keep social tariffs for the most impoverished categories of the population, according to one element of the government's social policy. Users of the National Electric Network are obliged to sign agreements on the connection and use of the network, approved by the SEA. Holders of licences on electricity production are entitled to provide electricity on the internal market, and once internal demand has been satisfied, to export it to other countries.

The electro-energy sector of Kyrgyzstan is currently going through significant change, which includes the division of the sector into several different companies (production, processing and distribution companies), followed by privatisation.

In 2001 the volume of gas transported from Uzbekistan by the main gas pipeline amounted to 591.1 thousand tons.

Telecommunications

The backbone of the telecommunications network in Kyrgyzstan is made up of radio relay lines with a total length of 4,629 km. There are 75 radio relay stations in the Republic (Mambetaliev, 2001). All oblast (province) and rayon (district) centres have access to automatic trunk communication.

JS Kyrgyztelecom is responsible for the development and management of telecommunications in the Republic and it manages 575 commutators (switch-boards) of step, transverse and electrical types. Besides the old coaxial cable serving international telephone communication through Moscow, Kyrgyzstan has a small INTELSAT land station with a retransmitting base in Turkey. Long-distance communication is served by 12 lines through Moscow, 30 lines through Ankara, and a direct line to Germany.

The service cost to the general population is US$ 0.5-0.7 per month and to organisations US$ 1.2 per month. Long-distance calls cost US$ 0.02-0.04 per minute, and international calls within CIS from US$ 0.9 to US$ 2.7 per minute. Kyrgyztelecom has been modernising the telecommunications network by introducing 50 thousand digital lines in Bishkek, Osh and other places. There are plans to increase the capacity of microwave range stations in mineral development regions, and to either install small stations with satellite communication, or to build new stations in remote regions.

By the beginning of 2001 about 10,000 people were using mobile telephones (4,500 were using Katel, and 5,500 were using Bitel) and 5,500 people were using pagers (3000 were using Areopage; 2000 Smartpage; and 500 Heliopage).

Mobile communication is provided by foreign companies which have established joint companies with Kyrgyz partners: Mobile phones are provided by JV Katel with the American company Sprint; radio-telephone and paging services are provided by JV Smart-Com; and- internet communication is provided by ElCat.

According to surveys, by 2001 there were 6-7,000 active internet users, and a potential 20,000 users. (Turdukulov, 2001, Dudin, Saadanbekov, 2001). According to other surveys, in 2000 52,700 people browsed the internet not less than 3 hours per week. In comparison, Kazakhstan has 30,300 users which amounts to 0.8% of the adult population. In Russia there are 900,000 internet users, again 0.8% of the adult population. The cost of unlimited internet access is US$ 55-70 per month.

Broadcasting in the Republic is carried out through transmission stations and retransmitters. The first channel (Kyrgyz State Teleradio company) covers 92% of the population (Mambetaliev, 2001). The number of TV sets is steadily decreasing: while in 1993 there were 17 TV sets to 100 people, in 1999 there were 10 TV sets to 100 people (National Human Development Report, 2000).

Supply and distribution

The distribution system in the USSR was carried out by such organisations as the State Committee on Material and Technical Provision of the USSR (Gossnab), the State Committee on Oil Supply of the USSR and separate systems under each ministry. In the Kyrgyz Soviet Socialist Republic there were similar structures in each ministry. After independence 18 subdivisions of Gossnab have been transformed into joint-stock companies (mainly without state shares), and these have been working very poorly, which leads mining companies to arrange supply themselves.

Kyrgyzstan is provided with gas from Uzbekistan by gas pipeline, but it does not have internal oil and gas pipelines. Supplies of combustive-lubricating materials are carried out by railway transport. There are wholesale deliveries of combustive-lubricating materials, which are distributed at numerous filling stations.

The quality of fuel is unpredictable because of the large portion of smuggled goods. The wholesale price of diesel oil is US$250 per ton, and of gasoline US$ 240-285 per ton. The commission of Jalal-Abad Oil Proceesing Plant with an initial production capacity of 60 thousand tons, and plans to increase this to 500 thousand of benzine per year, may resolve the problems of fuel supply in two key oblasts in the south of the Republic.

The Kant Oil Processing Plant is being constructed through private foreign investment and the support of the American firm IRV, the German company Ala-trans and the joint Kyrgyz-Russian Oil and Gas company. When the plant starts operating at full capacity – 360 thousand tons of natural gas per year – it will completely satisfy the demand for fuel and liquefied gas in the north of the Republic.

The Process of Establishing Kyrgyz Independence

Before 1991 Kyrgyzstan had no real experience of being a state in its own right. During the Soviet period governance was based on the principle of centralism, which the Soviet system extended to all parts of the Union regardless of regional, ethnic or cultural characteristics. Political and economic decisions were made by the the supreme body in Moscow. Local initiatives were prohibited, and this prevented the republics from realising their economic potential. Largely as a result of this system of governance, the economy of the USSR

progressively declined, which led to the eventual collapse of the Union. Following this, Kyrgyzstan gained indepdence in 1991.

The constitution of the Kyrgyz Republic is based on the principle of democracy, and the promotion of the revival of the Kyrgyz nation, while protecting the interests of different ethnic groups. Turkey was the first country to recognise the sovereignty of Kyrgyzstan, followed soon afterwards by Russia and other post-Soviet countries, USA, Japan, Western Europe and Asian countries. To date Kyrgyzstan has established diplomatic relations with 101 states.

On March 2 1992 Kyrgyzstan was accepted as a member of the United Nations, and soon afterwards as a member of a number of other international organisations such as OSCE, OEC, CIS Organisation on Collective Security and NATO's 'Partnership for Peace'. Kyrgyzstan is one of the few countries which has been integrated into both European and Asian structures, including the OSCE, the European Bank for Reconstruction and Development, the Shanghai Cooperation Organisation, the Organisation of Economic Cooperation, the Asian Development Bank and the Islamic Development Bank.

Guided by principles of peaceful co-existence and international law, the Republic aims to become more actively integrated into the world economic system and international processes in the interest of socio-economic development and the strengthening of democratic reforms in the country.

Like a number of post-Soviet countries, Kyrgyzstan has followed a path of rapid reform, with the aim of swift adaptation to the market economy. Kyrgyzstan was the first CIS country to introduce price liberalisation (January 1992), to adopt a national currency 'som' (May, 1993) and to provide complete convertibility on current transactions. The National Bank of Kyrgyzstan has accumulated gold and hard currency reserves, which have allowed it to introduce a regime of currency rate control and to stabilise the national currency significantly. It was also the first CIS country to put in place a new Tax Code (1996), and to enter the WTO (1998). The privatisation of state enterprises has been taking place since 1993, although the mining sector was almost excluded from this process.

The decentralisation of power to the self-government of villages, urban type villages and towns began in 1996. During the Soviet period, land was in state ownership. In 1991 96% of agricultural land belonged to 740 sovkhozes (state farms) and kolkhozes (collective farms). With independence began a process of agrarian reform, in which land has been re-distributed. In 1996 an amendment was made to the Constitution, stating that land can be in state, communal, private and other forms of ownership. Since 2001 the real estate market has started to develop, following the cancellation of a five-year moratorium on the sale of re-distributed land introduced by the Parliament. The amendment (July 21, 1999) of the 'Subsoil' law allows private ownership of small deposits of common minerals, found on private allotments.

Despite the reforms since 1991, the severing of ties between the republics of the USSR badly affected the economy of the Kyrgyz Republic and resulted in a sharp decline in production. The country has not fully adapted to the democratic system, and the former

feudal ties remain largely intact. The decline in economic development has resulted in an increase in migration. In 1991 500,000 people emigrated.

While the domestic market for power engineering and agriculture is small, Kyrgyzstan is unable to meet all the demand, particularly for combustive-lubricating materials. Because of the agrarian and raw material orientation of the domestic economy, Kyrgyzstan is experiencing difficulties in becoming integrated into the world economy. However, in 1998 the volume of trade with countries outside the CIS reached the level of trade within the CIS, and by 2002 it exceeded it two-fold.

The collapse of the USSR gave rise to many problems with bordering countries regarding water allocation. This is now an urgent priority for the Central Asian region in view of Kyrgyzstan's high dependence on hydro-energy resources. The change from irrigation to energy production of Toktogul hydrosystem, has had a profound effect on the water management system of the Syr-Daria river basin, which covers large areas of water agriculture in Uzbekistan and Kazakhstan. The depletion of water resources of the Toktogul reserve in winter results in a shortage of water needed by Uzbekistan and Kazakstan during the vegetation period. This situation has led to a gradual deterioration in relations between Kyrgyzstan, Uzbekistan and Kazakhstan. Since 1992 the operation regime of the Toktogul hydrosystem has been regulated on the basis of special intergovernmental agreements, which, however, do not consider the development prospects of the system.

In 2001 Jogorku Kenesh adopted a law on Interagency Use of Water Bodies, Water Resources and Waterworks of the Kyrgyz Republic, whose main purpose is to manage and regulate the principles of water supply by Kyrgyzstan to interested countries on reasonable and mutually beneficial grounds taking into account market relations. This law has caused a negative reaction in neighbouring Uzbekistan and Kazakhstan.

The entry of Kyrgyzstan into the WTO worsened relations further, not only with Uzbekistan and Kazakhstan, who introduced custom duties of 100% on imports from Kyrgyzstan, but also with Russia. Disagreements are gradually being settled through diplomatic negotiations. In 1994 Kyrgyzstan, Kazakhstan, Uzbekistan and Tadjikistan signed an agreement on the establishment of the Central Asian Economic Union (CAEU). In 2001 CAEU was changed to the Central Asian Economic Forum, and at the beginning of 2002 was reorganised into the Organisation of Central Asia Co-operation (OCAC). In 1996 Kyrgyzstan joined the Custom Union, which was formed in 1995 by Russia, Belarus and Kazakhstan. In 2001 the Custom Union was changed to the Eurasian Economic Union.

Agreements on strengthening confidence in the military presence in border regions were signed in Shanghai in 1996; agreements on the reduction of military forces in border regions were concluded in Moscow in 1997; and agreements on the state borders were signed in Beijing in 1996 and in Bishkek in 1999. According to these agreements territorial disputes with China have been settled. Agreements with Kazakhstan are nearing completion. Though the intergovernmental Commission of Kyrgyzstan and Uzbekistan has started work, this process is still far from completion. Because of the reluctance of Tadjikistan to settle territorial disputes with Kyrgyzstan, negotiations between the two countries have not begun.

In 1998 President A. Akaev put forward the 'Revival of the Great Silk Road Ideas Doctrine' with the aim of transforming the ancient route into a zone of stability, security, cooperation and equal partnership. The doctrine has been approved by the UN.

In 2001 the government developed a national strategy entitled The Complex Development Framework of Kyrgyzstan to 2010 with two main objectives: poverty alleviation and raising the country's profile and reputation on the international arena through economic growth and democratic transformation.

The Transition economy

Kyrgyzstan has inherited the Soviet agrarian-industrial structure of production. During the Soviet time industrial enterprises were formed in the framework of common union division of labour, regardless of the scale of domestic markets, transport costs, real labour costs and supply of raw materials. A significant part of the industry of the Kyrgyz Republic was for military purposes. Because of the secrecy surrounding the defence and mining industries, reliable statistics about the Kyrgyz economy during the Soviet regime are hard to come by.

The structure of Kyrgyz industry in the Soviet period:

- Energy 1.5%
- Fuel 3.7%
- Machine building and metal working 29.1%
- Timber and wood working 1.4%
- Production of construction materials 3.8%
- Light 29.7%
- Food 20.9%

The structure of capital investments into Kyrgyz Republic during Soviet period:

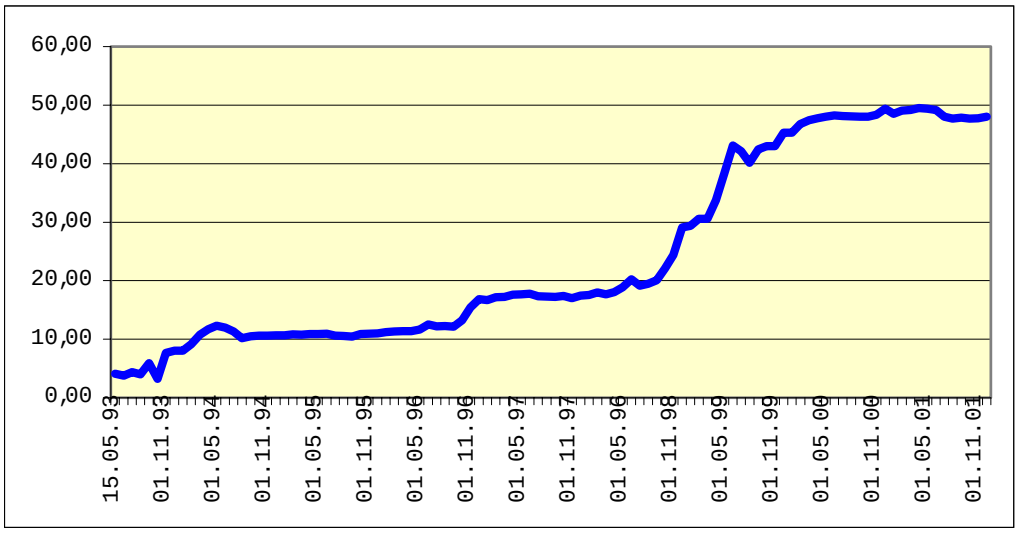
- Production sphere 75%,
- Including industry 33%
- Power industry 8.5%
- Machine-building 7.4%
- Construction 3.5%
- Transport and communication 9.6%
- Non-production sphere 24.7%,
- House-building 11.5%

A large part of local production, consumption and capital investments in Central Asian republics was supported at the expense of resources from the USSR as a whole. By the beginning of the 1990s direct central subsidies were estimated to be one-seventh of GDP for Kyrgyzstan and Kazakhstan by and one-fifth of GDP for Uzbekistan. In 1999 price

subsidies for Uzbekistan in trade with Russia were estimated at 6.5% of its GDP; for Kazakhstan 7.3% and for Kyrgyzstan 1.1%. With the collapse of the USSR all subsidies, military purchase orders, and supplies of materials and equipment immediately stopped.

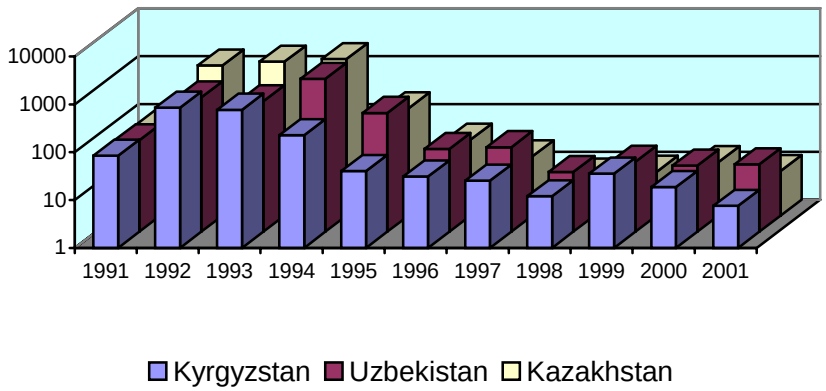
In the period between 1990 and 1995 Kyrgyzstan's GDP decreased by 50%, industrial production by 65%, agricultural production by 43%, and capital investments by 66%. The processing industry has been particularly badly affected, and the Republic has had to rely on external holdings.

Dynamics of the rate of the som against the dollar:



Kyrgyzstan is directly affected by the economic situation of its main foreign trade partners – Russia, Kazakhstan and Uzbekistan. The financial crisis of 1998 in Russia resulted in soaring inflation in Kyrgyzstan. An annual rate of inflation of 15% in 1997, had increased to 32% by the middle of 1999. The banking system was heavily undermined during this period: several commercial banks crashed, others lost the confidence of depositors.

Inflation in Asian countries of former USSR
(Dynamics of consumer price levels by end of year in %)



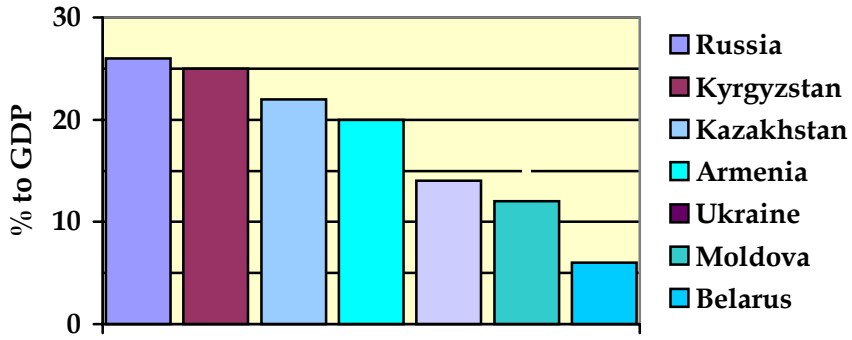
In 2000 Kyrgyzstan was classified as a country with a low per capita income by the World Bank. High social indicators inherited from the Soviet time including health care, education, life expectancy, and a well-developed infrastructure still distinguish Central Asian countries f IS from developing and developed countries. While levels of social care will remain high for some time, the achievements of socialism are very quickly being overturned.

According to official data the average rate of economic growth in Kyrgyzstan in the period between 1996 and 2000 was 5.5% per year, one of the best indicators within the CIS. In 2000 GDP amounted to 62,203.3 million som, with an exchange rate of 47.7 som to the dollar, and in 2001 it had risen to 73,889.5 million som, with an exchange rate of 48.44 som to the dollar.

Despite the improvement of macro-economic indicators, the real economic situation in the country remains unstable and depends on external assistance. The main problems are external debt which amounted to US$1.4 billion in 2001, and the decline of external trade. All this affects social indicators, which now show an increase in poverty, in income differentiation and unemployment in the social sphere which reached 7.6% in 2000. Seventy-six per cent of the population now live below the poverty line.

High taxes restrain the business activity and lead to the development of a shadow economy, which, according to the National Statistical Committee, now contributes to 25% of GDP.

Share of the shadow economy in CIS countries



Kyrgyzstan is characterised by underdeveloped external trade relations. Among CIS countries Kyrgyzstan had the lowest share of exports from industrial production. The budget deficit of 9% of GDP in 1998 was the highest among CIS countries, but it had a surplus of 40 million som in 2001.

Between 1996 and 2000 the level of direct investment amounted to only 7% of GDP, whereas in Kazakhstan it was 67%, in Ukraine 10%, and in Russia 14%. According to the results of the World Bank study on the Economic Freedom Index (EFI), Kyrgyzstan is placed 132nd among 156 transition countries. Assistance from the world community in the form of grants and credit has replaced former USSR subsidies. This serves to ease the economic situation and creates temporary well-being.

Main socio-economic indicators for Kyrgyz Republic in 2001

Categories	Unit of measure	2001	% to 2000
Gross Domestic Product	Million som	73890	105.3
Industrial production	Mln. som	46887	105.4
Mining industry	Mln. som	10904	116
Agriculture	Mln som	47782	106.8
Construction	Mln. som	7797	115.6
Volume of trade turnover	Mln. som	43728	107.1
Index of consumer prices			103.7
Budget income (+ transfers)	Mln. som	10681	122.7
Share of income in GDP			15.9
Budget expenses	Mln. som	10603	107.8
Income of local budgets (+ transfers)	Mln. som	3607.8	132.1
Expenses of local budgets	Mln. som	3600	125.8
Foreign trade turnover	Mln $	853	86.7
Trade balance	Mln. Som $	23.6	
Share of export of minerals	%	13.1	69.6
Direct foreign investments	Thosand $	64920	116.5
Minimal consumer budget per capita of population (by January 1 2002)	Som	1322.2	109.2
Average monthly salary of workers	Som	1346.6	122.4
Average monthly salary in mining industry	Som	2501.7	113.6
Average annual rate of the som to the dollar	Som per 1 USD	48.44	

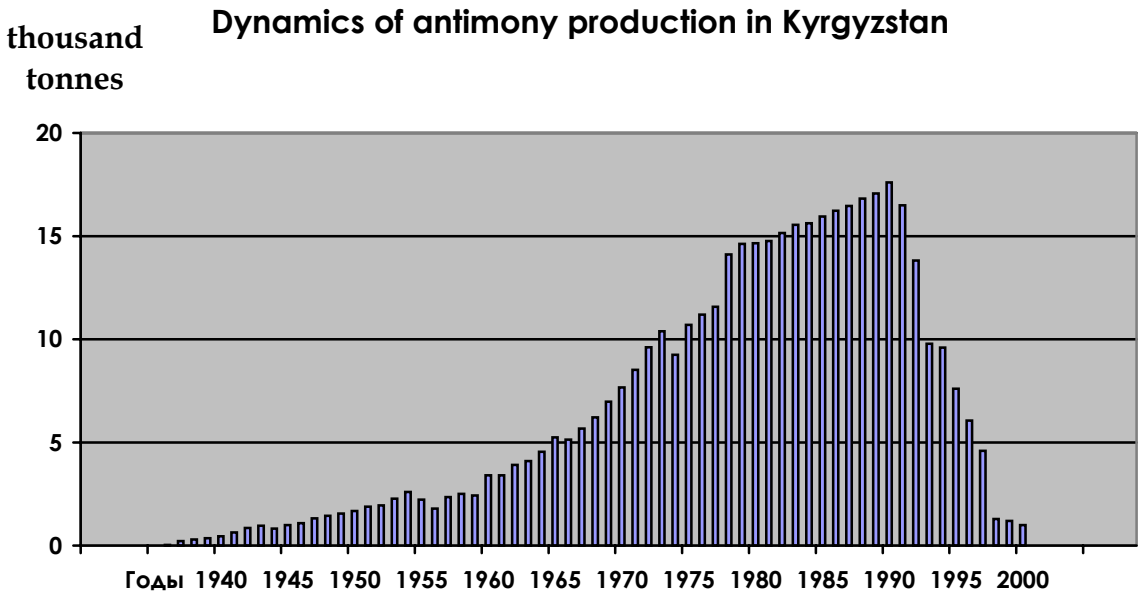
Part II. Review of the Extracting Sector

History of Development

Excavations dating to the 3rd and 4th Centuries have revealed evidence of lead, iron, copper, gold, silver, mercury, and antimony. More then 2000 ancient excavations have been recorded.

At the beginning of the twentieth century small-scale mining of coal, oil, lead, mercury, antimony, blue stone and ozokerite was taking place in the south of the country. During World War II more than 20 plants extracting lead, antimony, mercury, gold, tungsten, arsenic and coal were operating, and Kyrgyzstan were contributing 15-18% of USSR's total production of lead, 40-100% of the mercury production and 100% of its antimony production. During the post-war period three uranium mines were added and industrial production of rare-earth metals, molybdenum, rhenium, gold, fluor-spar, oil and gas began.

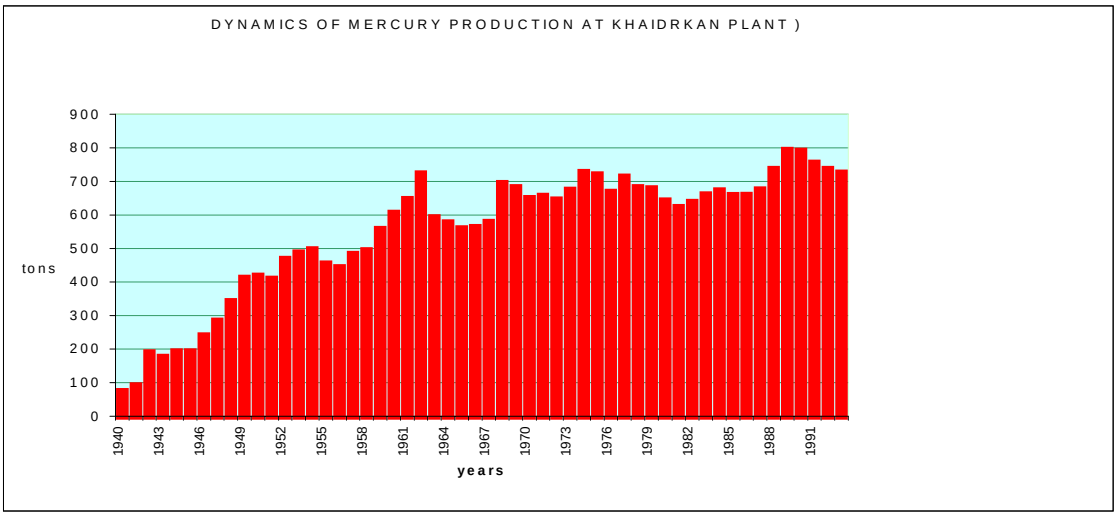
Mining and minerals



The Kadamjai Antimony Plant (KAP) was constructed in 1936 on the basis of the analogous deposit, which had been discovered in 1914. In the 1970s with an output of 18-20 thousand tons per year it was on the fourth largest producer in the world and was producing about 15% of the world production of antimony and its compounds.

In 1990 Kyrgyzstan produced 17,608 tons of antimony, taking it to 3rd place in world production after China and Bolivia. By the beginning of the 1980s the internal source of raw materials had been exhausted and was providing no more than 10-15% of production capacity; the plant changed to the processing of concentrates which were supplied from the Sokha Republic (Yakutia) of the Russian Federation and Tajikistan. A drop in supply of raw materials from these countries has resulted in sharply reduced production in recent years.

In 1914 the largest antimony-mercuric deposit in the world (after Almaden, Spain) was discovered in Khaidarkan.

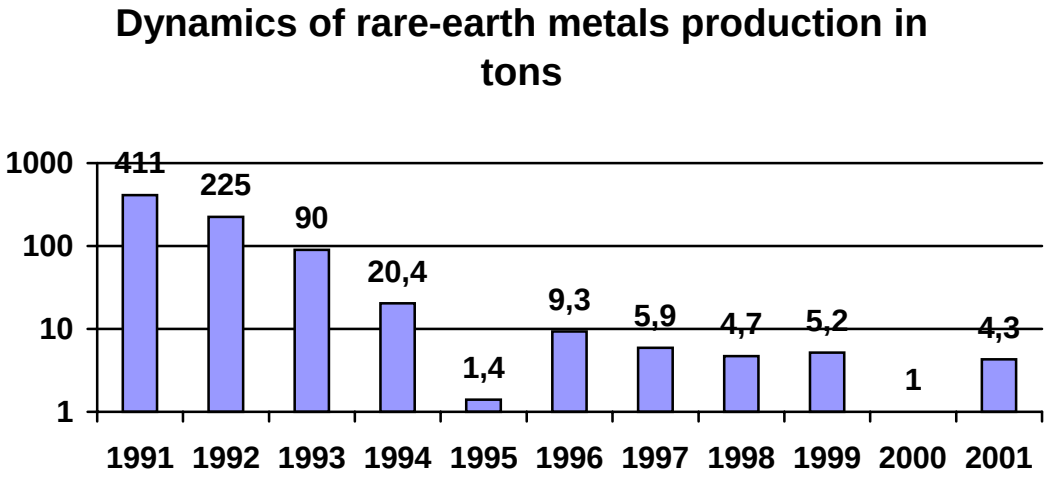


The Khaidarkan Mercury Plant (KMP) was built on the base of this deposit in 1942. It operated for 70 years. Since 1940 about 40 thousand tons of mercury have been extracted. By 1989 production of the metal had reached 793 tons, which amounted to a quarter of world production. Kyrgyzstan is the 3rd largest producer of mercury in the world. Because of the lack of metal content and difficult mining conditions the plant operated under the state subsidiary for a long time.

After the collapse of the USSR Khaidarkan Mercury Plant lost its outlets, production of mercury dropped to 200 tons and the plant was declared bankrupt. In 1994 under the patronage of the PESAC international programme the plant once again became competitive, and increased its productivity to 650 tons per year.

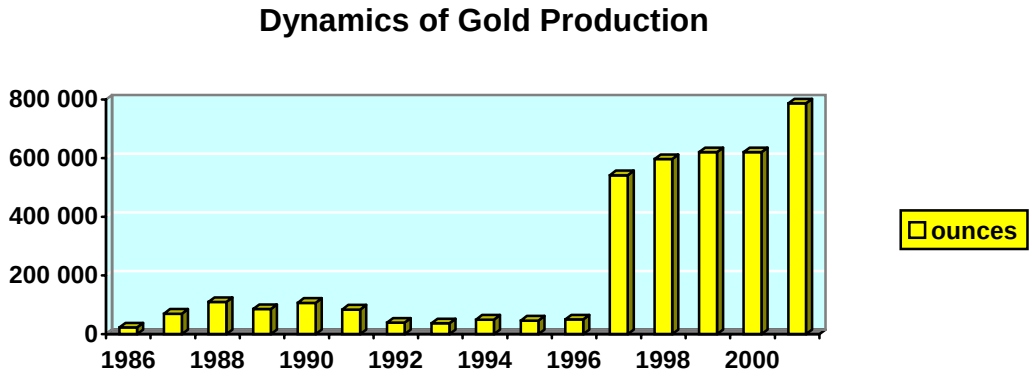
The Kara Balta Mining Plant (KBMP) was founded in 1951 as a uranium processing plant. KBMP worked six uranium deposits, two in Kyrgyzstan and four in Kazakhstan. The raw materials were later sourced from Kazakhstan and Russia, and with the fall of Soviet Union were lost altogether. At its height, the plant contributed 20% of USSR's uranium production.

Production capacity of the Kara Balta Mining Plant amounted to 3 million tons of ore per year and 2.5 thousand tons of output. The plant simultaneously produced compounds of rhenium, molybdenum, tungsten, and in recent years was refining up to 25 tons of gold and silver annually.



The Kyrgyz Mining Metallurgical Plant (KMMP) started operating during World War II (1942) on the lead deposits of Aktuz and Bordu. By 1962 when these deposits had been developed, the plant started extracting rare-earth metals on Aktuz-Kutessai II. The plant processed 14 rare-earth elements as metals, saline, alloys, luminophors, at a capacity of 600-800 tons per year. At present it is processing stored reserves.

The small-scale extraction of gold had been practised for a long time in Kyrgyzstan. In the 1960s and '70s significant gold deposits were discovered and resources were estimated at 1.5-2 thousand tons.



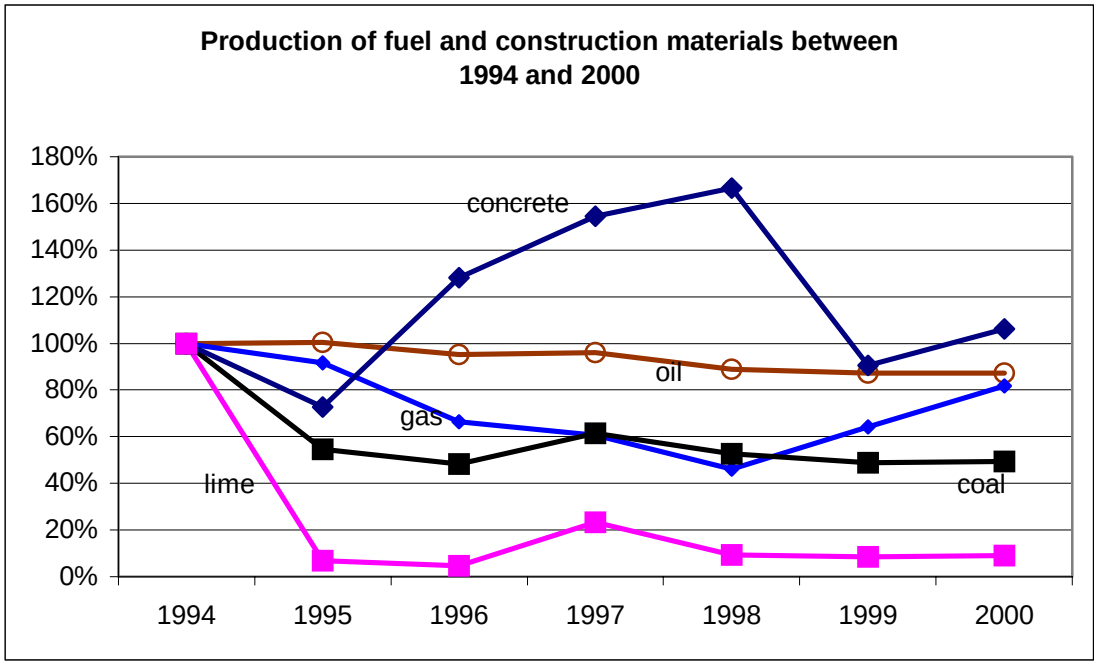
The Makmal Gold Extracting Plant (MGEP) was constructed in 1986. It had a life cycle of 12 years, produced 2-3 tons of metal per year and included open pit reserves of the deposit. In that year the development of industrial gold production in Kyrgyzstan officially began.

In 1992 'Kyrgyzaltyn', the state concern uniting all mining and mineral enterprises was founded, but in 1994 following privatisation enterprises started to sign out. Kyrgyzaltyn went on to specialise in gold mining and currently has its own deposits as well as holding shares in some enterprises with foreign capital (67% of Kumtor, 33% of the Jerui project, 49% of the Taldy-Bulak project). Today Kyrgyzaltyn is the strongest mining corporation in Kyrgyzstan.

The Fuel Industry

Oil prospecting began in the 1990s in the Fergana valley. By 1913 oil production had reached 3000 tons. Today the joint-stock company ***Kyrgyz oil and gas*** is developing seven oil fields. In 1958 oil production started to decline and went from 490 thousand tons in 1958 to about 80 thousand tons in 2000 (3.9% of demand). In 1999 oil production by the joint venture ***Kyrgyz Petroleum Company,*** founded in 1997, amounted to only 1.9 thousand tons.

Gas production has decreased by more than 20 times and amounted to 18 million m^3 in 1998 (1.5% of demand). Average productivity from drilling is extremely low, amounting to no more than 0.5 - 2 tons per day.



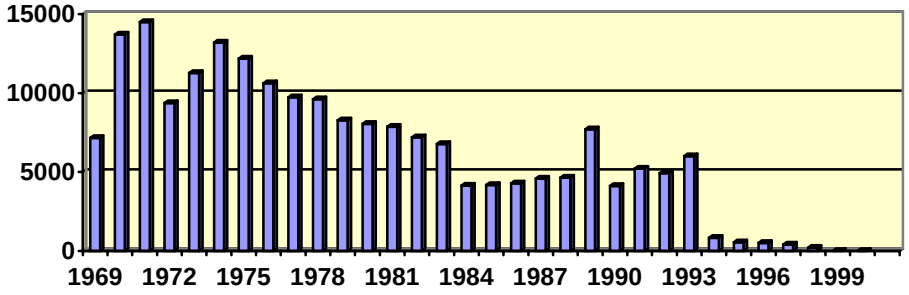
The first coal enterprises emerged in the south of the country at the beginning of the 19th century. In 1913 27 coal mines, with a total output of 100 thousand tons per year, provided almost the whole of Central Asia with coal. In the former USSR Kyrgyzstan had the 4th highest coal reserves after Russia, Ukraine and Kazakhstan.

Between the 1940 and '60s coal extraction was being carried out in seven mines and five drill cores, and in 1979 produced 4.9 million tons. The Republic consumes about 1.9 millions tons of coal annually, but production has recently decreased to 0.32 million tons. Coal production decreased more than ten-fold because of competition with Kazakh coal, a lack of financial resources, and because the best deposits had become exhausted. Today the financial conditions of coal enterprises are extremely difficult, and almost all enterprises are unprofitable.

Extraction of non-metalics for the production of brick and ceramics has been practised since ancient times. By the 1980s, the extraction of non-metallics had developed into a successful industry, supplying the construction industry and providing other republics of the USSR with non-metals, including cement (more than 1 million tons annually), brick, stone casting and facing materials. Stone-working facilities have since been put into operation.

In 1968 Khaidarkan Mercury Plant began producing a concentrate of fluor-spar which had been extracted along with mercury on the Khaidarkan deposit. Since 1986 production has amounted to 200 thousand tons, with maximum productivity in 1997 at 14500 tons. The Kara-Balta Mining Plant has produced approximately 50 thousand tons of barite concentrate from materials imported from Kazakhstan.

Dynamics of fluorite production in tons



Since 1987 the mining and minerals industry was growing at a greater rate than the economy as a whole, due to considerable investments in a number of enterprises (the Kara-Balta Mining Plant, the Kyrgyz Mining Metallurgical Plant, the Saryjaz tin plant). By the end of the 1980s Kyrgyzstan was producing 100% of USSR's total production of antimony, up to 64 % of its mercury, up to 30% of its production of rare-earth metals, up to 25% of its monocrystal silicon and up to 15% of its uranium.

After the collapse of the USSR the sector underwent a serious crisis. The Republic's only source of hard currency earnings was gold, produced by the Makmal Gold Extracting Plant. Nevertheless the sector turned out to be more resistant to the crisis than other sectors, and after undergoing significant changes maintained its viability.

In 1995 all the plants, except gold mining, started to be transformed into joint stock companies with large state shares. Foreign investment began flowing into gold mining in 1993. In 1996 JSC Kyrgyzaltin joined forces with the Canadian corporation Cameco to put into operation a world class deposit with reserves of approximately 300 tons of metal and productivity of more than 650 thousand ounces of gold per year. Two other deposits with geological reserves of 65-70 tons have since been developed. In 1999 the Israeli company 'Golden & Silver' bought 70% shares in JSC Aktuz and began development of nearby gold deposits.

Some private companies are undertaking the small-scale extraction of tin. The exploitation and bottling of mineral and drinking water from drills has also been developed since 1993

with the help of foreign investment, and there are now around ten enterprises involved. In recent years individual extraction of stream-gold and ore gold has been developed.

Key Minerals

Deposits of various kinds of minerals have been explored in Kyrgyzstan. During the Soviet era not all deposits were developed because similar areas were being exploited in other regions of the USSR.

Ore minerals

Ferrous metals.
There are no high category ore reserves ***(iron, manganese, titanium, and vanadium),*** but exploration revealed that there are five iron deposits that can be developed. It is estimated that there are around 8 billion tons of iron resources, 70% (5.4 billion tons) of which are located in the Jetum deposit in a remote part of the Republic to the east of Naryn oblast. Here there are ores of magnetite, hematite–magnetite and a type of hematite. Further exploration is needed before the deposit can be developed to its full potential, but it is thought that it has the potential for high-grade metal to be produced using ore beneficiation technologies.

Around 5 million tons of magnetite reserves, containing 38-44% of iron are to be found in the small iron ore deposits of Nadir and Gava. Because these are located in regions with a developed infrastructure, they are able to produce an output of 50-100 thousand tons of ore annually.

Bala-Chichkan in the Talas region is a unique deposit of titan-magnetite ores with 1.1 billion tons of iron resources with up to 20% Fe_2O_3 content; 237 million tons of titanium with up to 10% TiO_2 content; 4 million tons of vanadium with up to 0.1% V_2O_5 content; and 4.2 million tons of cobalt with 0.1% content. However, little is currently known about the deposit, and in order to carry out further exploration a large amount of investment is required.

Vanadium In the carbonic-silicic slates of Sary-Jaz deposit uranium-molybdenum-vanadium ores have been found, containing 90 thousand tons of reserves with a vanadium content of 0.1-1.3%.

Non-ferrous metals
Aluminium. The largest deposits of bauxite are in Akshagyl with 0.4 million tons of up to 57% alumina content and Katranbashy with 4.11 million tons of up to 58% alumina content.

Two deposits of nepheline syenites – Sandyk in the Jumgal mountain range and Zardalyk in the Sokh river basin (Alai mountain range) – are currently being surveyed with a view to development. These deposits contain 150 and 200 million tons of reserves respectively with 20-23% of alumina content.

Copper The most intensively investigated deposits for the purpose of industrial development are the Kuru-Tegerek and Bozymchak gold-copper deposits in Jalal-Abad oblast. It is estimated that these contain 550 thousand tons of copper with 1% content, and up to 100 tons of gold (up to 1-2 grams per ton). In Talas oblast copper-porphyry stockwork deposits of molybdenum and gold have been investigated. It is estimated that there are about 600 thousand tons of copper reserves with a content of 0.4% copper in ore, 60 tons of gold with 1 g/t content in the Andash deposit; and up to 500 thousand tons of copper ore with around 0.5% copper content and 50 tons of copper in metal with a gold content of up to 1g/t in Taldy-Bulak deposit; and up to 200 thousand tons of copper reserves with 0.45% copper in ore and 25 tons of gold with 1.5 grams of gold per ton in the Ak-Tash deposit.

Lead, zinc There are tens of deposits containing high-grade ores. Most of these deposits are small. Eki-Chat and Arsy are lead deposits; Keregetash a zinc deposit; and Boordy, Kyrgan and Taldybulak are lead-zinc deposits. There are residual reserves of around 1 million tons of lead and around 250 thousand tons of zinc, and forecasted resources of about 1.5 million tons of lead and 500 thousand tons of zinc. Lead content varies from 1% to 4,1%, and zinc content from 0.8% to 3.2%.

Noble metals

Gold According to estimates, there are 2.5-4 thousand tons (90.5 million ounces) of gold reserves, 1 thousand tons of which are thought to be present in gold mines already under exploration. By January 1 2000 the state resources balance had recorded 471 tons of gold in 13 main and 22 gravel deposits.

Explored reserves in various operating deposits include:

- Kumtor (288 tons) and Makmal (25.5 tons) and pending operation Taldy-Bulak Levoberejny (60.4 tons) and Jerui (74.7 tons). Forty-five deposits, resources and reserves in excess of 5 tons are to undergo further geological investigation and consequent development (Ishtamberdy – 34 tons; Altyn-Jilga – more then 30 tons; Jamgyr – 14.6 tons; Togolok – 19.6 tons; Toktozan and Bozymchak – 35 tons each; Nichkesu – 27.8 tons; Savoyardy – 12.3 tons; Chakush – 5.7 tons; Karakazyk – 6.4 tons).
- The Makmal Gold Extracting Plant has the potential to process an additional 22 tons of underground reserves of gold (up to 5 gram per ton content). In Solton-Sary deposit there are up to 20 tons of gold in ores with an average content of 6 gram per ton of gold. There are 6 tons of gold reserves in 15 gravel deposits with a gold content of 0.1-2 g/t.

Silver is contained in complex polymetallic ores along with gold, rare-earth, bismuth, and uranium, and forecasted resources of silver are estimated at 7-8 thousand tons with silver content from 2.5 g/t. to 720 g/t.

The Kumyshtag deposit in Talas oblast has estimated reserves of about 2 thousand tons with about 270 g/t of silver content. The gold-polymetallic deposit of Aktube-Karagoi in Osh oblast has 1 thousand tons of silver resources with a silver content of up to 150 g/t. In

the Betirtash deposit silver resources are estimated at 323 tons with 720 g/t. of silver in polymetallic ores.

Rare and rare-earth elements

Tin and tungsten Large explored reserves of these metals are concentrated in Issyk-Kul oblast in the region of Saryjaz-Akshyirak in the Trudovoye, Atjailo, Sarybulak, Uchkoshkon and Kensu deposits. These reserves contain 209.7 thousand tons of tin ore with an average tin content of 0.6% and 125 thousand tons of tungsten reserves with an average tungsten content of 0.45%. The Trudovoye deposit contains 149,083 thousand tons of tin and 95,571 tons of tungsten reserves. The Uchkoshkon deposit contains 60,656 thousand tons of tin reserves, and the Kensu deposit contains 25,539 tons of tungsten reserves with a tungsten content of 0.5%. In the Meliksu-Besh-Archa deposits of the Kumyshtash group explored reserves are estimated at 48.8 thousand tons, with a content of 0.35% trioxide of tungsten.

Mercury Reserves of simple mercuric and complex mercury-antimony-fluorite ores have been found in the Khaidarkan, Novoye, Ulug-Too, Chonkoy and Chauvai deposits. There are 20.17 million tons of high grade ores in the small deposits of Adyrakou, Sarybel, and Tashbulak, and in the operating deposits of Bolshoi and Khaidarkan there are around 11,590 thousand tons, with 0.31% mercury, 0.7% antimony and 13.5% fluorite.

The joint stock Khaidarkan Mercury Plant has secured long-term reserves at the expense of complex mercury-antimony-fluorite and mono-mercurial ores.

Antimony There are around 15,969 thousand tons of antimony ores found in Kadamjam, Tereksay, Khaidarkan, Novoye, Kassan, Severny Ak-Tash and Abshir deposits, amounting to 270,107 tons of antimony. The raw material base of the Kadamjay plant is currently based on reserves from the Kadamjay and Severny Aktash deposits which contain 6,298 thousand tons of ore and 94,740 tons of antimony, enough to provide the Kadamjay plant for the next 15 years. The antimony-fluorite ores of the Aktash deposit are characterised by a low content of antimony (0.51%) and are not being developed by the plant.

The raw material for the Tereksay mine is sourced from the Tereksay and Kassan deposits (768 and 1123 thousand tons respectively). The high-grade ores of the Kassan deposit, which contain arsenic, as well as high levels of antimony have not been developed given the lack of arsenic processing techniques. Despite losses incurred during the processing of oxidised and arsenic containing ore (about 280 thousand tons), the Tereksay mine will continue to be supplied for a further eight years. Implementation of technologies for processing oxidised and arsenic-containing ore will prolong the operation of the plant operation to about 20 years. Plans are also underway to process complex ores, including gold-antimony ores from the Nichkesu, Savoyargy and Abshir deposits, which contain 100-120 thousand tons of antimony with 1-5% of antimony and 40 tons of gold at 1-6g/t.

Molybdenum Ten deposits of complex ores containing molybdenum have been explored. It is estimated that there are 144.2 thousand tons of molybdenum with contents ranging from 0.02 to 0.39%. It is estimated that the Chon-Tash deposit contains around 29.1 thousand tons of molybdenum reserves with an average content of 0.52%

Beryllium The four largest deposits of beryllium ores are the Kalesay, Uzun-Tashty, Chetyndy and Tyuktu-Archa deposits, which contain 101.9 thousand tons of beryllium oxide with a content of 0.07-0.1% beryllium oxide. The most attractive deposits in terms of industrial development are the Uzun-Tashty deposit in the Talas region, containing 60.3 thousand tons of beryllium oxide with an average beryllium content of 0.125%, and the Kalesay deposit in the Kichi-Kemin river basin close to Aktyuz, which has 11.7 thousand tons of beryllium oxide with an average beryllium content of 0.127%.

Bismuth In the eastern part of the Chui valley extensive exploration has been undertaken of the Mironovskoye gold-bismuth deposit, containing 1,162 tons of bismuth with an average content of 0.254% bismuth, 1,095 kg of gold, 25 tons of silver and 6.8 thousand tons of copper.

Tantalum, niobium Eight deposits and four ore manifestations have been discovered. Niobium has been found at the Chumali and Chekendy deposits, tantalum at the Delbek and Tutek deposits and tantalum-niobium at the Jilisu deposit. Reserves are estimated as 93.5 thousand tons of Ta_2O_5, and 152 thousand tons of Nb_2O_5. In the Delbek deposit there are about 57 thousand tons of possible Ta_2O_5, with a tantalum content of 0.064% and 9.7 thousand tons of Nb_2O_5 with a niobium content of 0.11%. In Tutek deposit there are possibly 30.7 thousand tons of Ta_2O_5 with a content of 0.076%, 16.4 thousand tons of Nb_2O_5 with a niobium content of 0.075%, 2.4 thousand tons of uranium reserves with a content of 0.07% uranium, and 6.5 thousand tons of thorium reserves with a thorium content of 0.19%.

In the Chekendy deposit it is estimated that there are 13.6 thousand tons of Nb_2□$_5$ with a niobium content of 0.4%, 3.2 thousand tons of hafnium reserves with a hafnium content of 0.006% and 217,7 thousand tons of zirconium reserves with a zirconium content of 0.4%.

In the Chumali deposit it is estimated that there are 2.1 tons of Ta_2O_5 with a tantalum content of 0.003%, 59.4 thousand tons of of Nb_2O_5 with a niobium content of 0.085%, 17 thousand tons of hafnium with a content of 0.085% hafnium dioxide and 1.24 million tons of zirconium with a content of 1.64% zirconium dioxide.

Rare-earths

Three deposits and six ore manifestations have been revealed. At the Kutessay II deposit it is estimated that there are reserves of 51.5 thousand tons of the ceric and yttrium group. Ores found by the joint stock chemical-metallurgical plant Aktyuz are characterised by low concentrations (0.22-0.27%) of rare-earths.

In the Sarysai deposit there are rare-earth, rare-metallic and tantalum-niobiumic ores with admixtures of zirconium, uranium and gold. Estimated resources of rare-earths amount to 14.0 thousand tons with a content of 0.2%, 5 thousand tons of penta-oxide of niobium with a niobium content of 0.09% and 0.6 thousand tons of tantalum reserves with a tantalum content of 0.01%. In the Karajilga deposit it is estimated that there are 6.7 thousand tons of ilmeno-rutile-monazite-ferrite ores of rare-earths with a content of 0.7%, 1.1 thousand tons of penta-oxide of niobium with a content of 0.1%.

Alluvial elements
In aluminium ores beryllium, rare-earth, tantalum and niobium alluvial elements are concentrated as admixtures.

Rubidium In the Sandyk deposit of aluminium-rubidium, there are an estimated 657.4 thousand tons of rubidium with a content of 0.09% of rubidium dioxide.

Lithium Total reserves of lithium are estimated at 80 thousand tons, with a content of 0.09-0.18% lithium oxide. The largest reserves are in the UzgenTashty deposit, containing 47,98 thousand tons, and in the Jylysu deposit which contains 28.5 thousand tons, with a content of 0.19% lithium oxide.

Zirconium, hafnium Total reserves are concentrated in five deposits: Kutessay II, Chumali, Tutek, Jylysu and Chekendy. Total reserves amount to 1.48 million tons of zirconium dioxide and 20.8 thousand tons of hafnium.

Radioactive raw materials

Uranium ore was extracted for the first time in Kyrgyzstan in 1946-47 at the Jilsky deposit, and radium ore at the Tuya-Muyun deposit. At the sedimentary uranium-coal deposits of Tura-Kavak and Jilsky, and the uranium-pelitic-carbonic deposits of Mayli-Su and Shakaptar there are ores containing uranium niello, tarring and these doposits are almost completely developed.

In different parts of the Republic a number of deposits have been studied and prepared for industrial exploration. In the Kok-Maynok deposit explored reserves of easily beneficiable uranium ores (pitchblende, uranium niello) amount to 2.4 thousand tons with a metal content of 0.1%. In the Utor-Tuyuk deposit explored reserves of pitchblende-sulphide ores contain 1.3 thousand tons of uranium reserves with a uranium content of more than 0.1%.

Thorium In the Kuperlisay deposit explored reserves of thorium make up about 700 tons with a content of 0.05% thorium. An addition to thorium the ore contains rare-earths and uranium.

In the palaeogene-neogenic and quaternary alluvial deposits of Kyzyl-Ompol alluvial, it is estimated that there are 13 thousand tons of uranium reserves with a uranium content of 0.1 to 1323 g/m^3, up to 30 thousand tons of thorium reserves with a thorium content of 1.4-3,082 g/m^3, up to 400 thousand tons of zirconium dioxide with a zirconium content of up to 2,000 g/m^3 and 530 thousand tons of phosphorus penta oxide with a content of up to 700 g/m^3. Alluvial reserves can be increased at the expense of the rubbly mass of alluvials, containing up to 10 thousand tons of uranium, up to 25 thousand tons of thorium, up to 580 thousand tons of zirconium dioxide and up to 15 million tons of magnesium.

Fuel minerals
Oil and gas The main oil and gas region is the Kyrgyz part of the Fergana field, where 14 deposits have been revealed, of which seven are oil, four gas and oil, two gas and one gas-condensate field. Of these only ten are operational, three are out of operation and one is at

the assessment stage. Explored reserves make up 99.43 million tons, of which 10.6 million have been extracted. Residual extractive reserves make up 12.1 million tons.

Gas fields with extractive industrial reserves of gas amount to 4.9 billion m^3. Because deposits of extractive reserves are small, have poor collecting properties and low strata pressure oil production is low, about 15%. Explored reserves of gas amount to 7.6 billion m^3. At the present time all operational oil and gas fields in Kyrgyzstan are small-scale. Forecasted resources of hydrocarbons in the Republic are estimated at 500 million tons of conditional fuel. However, there are no direct indicators of the oil and gas content, except in the Fergana field.

Coal In Kyrgyzstan there are 35 coal deposits with geological reserves of up to 24.4 billion tons. Approved reserves of coal make up more than 1.7 billion tons, of which 425 are for open pit processing. Twenty per cent of the reserves are under development, and 10.1% of all reserves are of coking coal.

Twenty-nine per cent of reserves are suitable for open pit operation. There are 656.6 million tons (51,7%) of reserves currently under exploration with development to follow. Eighty per cent are economic reserves and are represented by brown coal.

The main coal fields are in south and north Ferganian, Uzgenian, Kavaksky and Jergalan. Within south Fergana the following deposits have been explored: Sulukta, Shurab, Kyzyl-Kiya, Chontash, Beshburkhan, Abshir and Yatiyan with total reserves of 459 million tons of brown coal. 157 million tons of black coal are concentrated in the north Ferganian field in the Tashkumyr, Tegenek and Kara-Tut deposits. The main deposit of the Uzgen field – Kok-Yangak – contains about 70 million tons of black coal. Reserves of other deposits of this field are estimated at 400 million tons.

The most important reserves of coal are concentrated in the Kavaksky coal field. Its main deposits Kara-Kiche and Minkush have reserves for open pit production of 190 and 87 million tons, with total reserves of 439 and 117 million tons respectively.

Non-metallics

There are 154 types of non-metallic raw materials known in the Republic. These are concentrated in 2,300 deposits and divided into ten geological-industrial groups: non-ferrous stones, agrochemical raw materials and salts, glass and ceramics, raw materials for lime and cement, building stone, raw materials for claydite and agloporite, facing stone, other non-metallic minerals.

In different parts of the Republic reserves of 227 construction materials and mining and chemical raw materials have been explored. Raw material reserves for construction materials include:

- clay, loam (65 deposits) - 260,9 million m^3
- sand-gravel mixtures (83 deposits) - 751,5 million m^3
- limestones (6 deposits) - 37,1 million tons
- Building stones (14 deposits) - 90,3 million m^3

- sand (7 deposits) - 72,9 million m^3
- claydite and agloporite raw material (6 deposits) - 112,2 million m^3
- gypsum (7 deposits) - 36,7 million tons
- facing stone (11 deposits)
- marble, limestone-crag, granitoid, syenite, gabbroids, gneiss - 43,4 million m^3
- cement raw material:
- clay rocks (8 deposits) - 132,7 million tons
- limestones (3 deposits) - 466,2 million tons

Other non-metallic minerals include graphite found in the Kuylu deposit (268,5 thousand tons), muscovite in the Karavshinsky deposit (14 thousand tons), basalt in the the Sulu-Tegerek deposit (1,4 million m^3), quartz molding sand in the the Koltso-Polovinka deposit (574 thousand tons), fluorite in the the Khaidarkan deposit (619 thousand tons), the Novoye deposit (523 thousand tons), the Severny Aktash deposit (655 thousand tons) and the Trudovoye deposit (548 thousand tons). Wollastonite is found in the Karakorum-I (9 million tons) and Karakorum-II deposits (30 million tons), porcelain stone in Uchkurt (9.6 million tons) and fluxing limestone in Leninpolsky (2.4 million tons). If needed, reserves of half-studied deposits of refractory, heat- and electro insulating materials can be further explored.

Agrochemical raw materials include deposits of turf at Koltoro, Konurulen, and Kamyshanovskoye, phosphorite at Sarybulak and Apshir and brimstone at Changyrtash. Reserves and forecasted resources of green-turf are estimated at 14 million m^3, and of phosphorite ores 3.42 million tons with a content 4.7% phosphorus penta-oxide. Total reserves of brimstone amount to 255.2 thousand tons with 11.4-14.8% sulphur content.

Chemical raw materials include barium sulphate, sulphuric pyrite, and natural mineral salt. Reserves of barium sulphate are contained in the Arsy (122.8 thousand tons), Tyundyuk (116.1 thousand tons) and Tabylgata deposits (394.2 thousand tons). Reserves of sulphuric pyrite for the production of sulphur and sulphuric acid are found in the Achiktash deposit and make up 7,477 thousand tons with a sulphur content of 25-30%. Revealed deposits of mineral salts include halite (Chon-Tuz 3.7 million tons; Chon-Alay 21.5 million tons; Ketmen-Tube, section Maly Log 5.5 million tons; Tunuk-Tuz 1.2 million tons) and tenardite (Shabyrkol 117.7 thousand tons).

Precious stones include a small number of ruby, sapphire, leuco-sapphire, emerald and diamond. In the Kok-Beles deposit ruby, spinel and clinohumite have been studied. The size of crystals ranges from 2.5x2x1 to 20x18x12 mm. Crystals are semi-transparent, opaque and pink. There are around 55.6 kg (278000 carat) of forecasted resources of graded pink ruby.

Semi-precious stones Of 112 manifestations of garnet, amethyst, zircon, beryl, chrome-diopside, topaz, tourmaline, only few deposits have been explored to determine the quality, reserves and estimated resources.

Makbal - gravel deposit cherry-red almandine with 3256.7 kg of reserves, size of crystals 18-20 mm.

Archaly – in serpentinous hyperbasites and splices 2x2 sm., 6x6 sm. in size, green garnet-demantoid, forecasted resources -1440 carat.

Kokmoynok and Kokpak Verhny are deposits of amethyst in bedrocks and alluvials. Amethyst from pale-violet to violet, size of crystals 2-3 sm. Total reserves and forecasted resources – 385.7 kg.

Dolon - deposit of jewellery zircon, size of crystals from 3x3x3 to 8x5x5 mm, golden-yellow, colourless. Forecasted resources 125249 carat, average content 1. 92 carat/m^3.

Chetyndy deposit of beryl, contains crystals up to 2-4 sm. of semi-transparent bright-green emerald, transparent aquamarine in pegmatite and quartz-pegmatite veins. Jewellery transparent beryl in pegmatite formations is known in Karasu-Karavshy, Kyrk-Bulak.

Tengizbay deposit of chrome-diopside, in alkaline basaltoids contains impregnations of chrome-diopside from 2-3 mm to 5x5 sm. green, deep-green, semi-transparent and transparent. Forecasted resources of raw material 600m^3, of which 5-7% contain impregnations of chrome-diopside.

Turasu – small deposit of topaz

Sarydjaz (Suhodolskoye) deposit is the most studied among the eight tourmaline deposits. In pegmatite bodies crystals of red, blue, green and polychromatic tourmaline (rubellite, idigolite, and verdelite) have been found.

Jewellery-jobbing stones.
In 135 deposits 18 kinds of jewellery-jobbing stones have been found – rock crystal, iridescent feldspar, chalcedony (plasma), agate, nephrite, rhodonite and opal. It is estimated that there are 32.6 tons of rock crystal in a dozen deposits:

Kuru-Uchkurt – a deposit of rock crystal in quartz veins in vulcanites. Size of crystal vaults: up to 0.3x0.5x1 m, size of crystals: from 5-6 sm. to 60 sm. in length and 1-3 sm. in diameter, applicable for jewellery processing. Forecasted resources: 2.5 tons.

Unkurtash – crystal bearing nests 0.3x0.6 m in granitoids. Size of crystals 0.5x9.2 sm. in long axis, 0.3-3.8 sm. in diameter. Forecasted resources 1.5 tons.

Iridescent feldspar is known in four deposits; total reserves and forecasted resources are estimated at 1,780.2 tons.

Ottuk – deposit in dike of syenite-diorites. Size of crystal from 0.5x0.5x1 sm. to 10x20x25 sm. Iridescence from light blue to bright-blue. Raw material of highest rank. Total reserves and forecasted resources 780.2 tons.

Chalcedony is found in 10 deposits:

Jida-Bulak (Sary-Tash) – concretions and tumours of milk-white, yellowish and bluish colour, size up to 35 sm. sandy-argillaceous bunches of chalk deposits, up to 7 km long, with a capacity 5-8 m^3.

Forecasted resources of three manifestations of chalcedony (plasma) at Kara-Kiche, Ak-Kul, and Ulugtau are estimated at 100 thousand tons.

The Ulugtau deposit of chalcedony (plasma), in cherty dolomite contains lens and interlayers with a capacity of 0.2-2 m^3, size of monoblocks 5x5x5 sm. Amorphous chalcedony, milk-white, bluish, pinkish, highly-decorative veins of black silicones come across. Forecasted resources 100 thousand tons.

Nephrite is known in six deposits, with seven deposits of nephrite-like jades and rhodinhites. Forecasted resources of nephrite 1,166.1 tons. The Jaljir, Dekabrskoye and Akshyirak deposits are connected with apohyperbazit metasomatites and magnesia scarns. Gavian and other gravel deposits contain boulders and lumps of nephrite, ranging in size from 0.5m^3 to 8.4m^3.

Rhodonite is found in ten deposits, among them Beshmoynok, Sarydjaz (Muzynoye) and Mustyr. It is estimated that there are 125,245 tons.

Jobbing rhodonite of the Sarydjaz (Muzeynoye) deposit – crimson, murrey, with mirror polishing in 15x25x20 sm. blocks, forecasted resources 45 tons.

Opals are found in the Kyzylkechet deposit in marls of palaeogene, represented by tumours, of 10x15x5 sm., colour – smoky, bluish-grey, honey, fallow, reddish-grey. Forecasted resources of opal 2,250 m^3.

Agate is found in 12 deposits including Jolbars, Orus-Bulak, Tegerma-Tash and Bel-Uryu, and estimated at 7.7 thousand tons. Agate in the Bel-Uryuk deposit is found in veins of marble onyx, agate formed clouds, ranging from 5 sm. to 5 m^3 and tumours from 5-7 to 30 sm. in diameter. Colour – grey, bluish, blue, stratified, with contrast.

Jobbing stones 162 deposits and manifestations of 16 kinds of jobbing stones have been discovered. Reserves and forecasted resources of leading kinds of jobbing stones are: marble onyx – 3.3 thousand tons, hornfels – 11.3 million m^3, coloured marble – 5.7 million m^3, serpentinite – 61.5 million m^3, jasper – 5 million m^3, porcelain jasper – 8.1 million m^3, anhydrite – 1.86 million m^3, coloured gypsum – 21 million m^3, black picrite – 1.1 million m^3, ophicalcite – 15.6 thousand tons, agalmatolite – 7.5 thousand m^3, decorative varicoloured gnesis, breccia, conglomerates, tuffs, amazonites, siltstones – more than 100 million m^3.

Underground water

Fresh water 69 deposits of underground water with 16,184.48 thousand m^3/day of reserves and forecasted resources have been revealed. Water is used for drinking, industrial water

supply and irrigation. Types of water supply include free-flow, sub-pressure and occasionally head water. Composition: hydrocarbonate, calcic, hydrocarbonate-sulphate, calcic-magnesion. Mineralisation of underground water: 0.2-0.4 g/l, rarely – 0.5-1 g/l.

Confirmed exploitation reserves of fresh underground water amount to (thousand m^3/day):

- In Chui oblast (6 deposits) – 2,980.8.
- In Issyk-Kul Blast (3 deposits) – 765.0.
- In Nary Blast (1 deposit) – 4.0.
- In Osh oblast (and Batken) (5 deposits) – 473.5.
- In Jalal-Abad oblast (3 deposits) – 657.12.
- In Talas oblast (1 deposit) – 296.8.

There are examples of almost all known mineral waters and many mud cure deposits.

Mineral water 30 sites of carbonaceous mineral springs have been discovered including Ak-Suu, Kara-Shoro, Bezbelchir-Arashan and Chatyr-Kul, with estimated resources of 8.6 thousand m^3/day, and with a composition of hydro-carbonate magnesion-calcic, chloride, chloride-sodium, chalybeate and radon. The concentration of carbonic oxide varies from 1-12 mg/l to 924-2332 g/l. Mineralisation ranges from weak 0.7-1.3 g/l to moderate 4-12 g/l, to general hardness 6,2 mg/eq.

Thermal water More then 50 sites of thermal and hot underground water have been discovered including Furmanov, Alamedin, Issyk-Ata, Kochkor, Barbulak, Kara-Bulak, Pristan-Prjevalsk, Jety-Oguz, Aksu and Jala-Abad. These range from weakly mineralised 0.2-5 g/l to mineralised more then 5 g/l. Total reserves make up 9,041 thousand m^3/day, and estimated resources amount to 75 thousand m^3/day. Type: head pressure, fissure water, sub-tabular. Composition: nitric-chloride-sulphide-sodic and potassic-sodic or nitric-chloride-hydrocarbonate, nitric-radon, sometimes with admixtures of iodine and organic substances. The average temperature in weakly mineralised is 24.5°- 45°C, and in Aksu 55-60°C.

Thermo-mineral water Tens of deposits and manifestations have been discovered including Frunze, Cholpon-Ata, Jergalan, Kochkor, Maylisu, Vostochny and Izbaskent. Type: head water, fissure water. Composition: nitric, chloride, sodic-calcic. Mineralisation varies from 7-10 g/l to 21-39 g/l; The temperature ranges from 39°C to 55°C. A number of deposits have rare composition – radon, sulphide, chalybeate, bromine-iodic, etc. A number of health resorts operate with total reserves of thermo-mineral water for balneal purposes amounting to 5.312 thousand m^3/day.

Economic Analysis

Mineral and metal markets in Kyrgyzstan

Practically all the outputs of the mining and minerals sector are exported. Gold, produced by Kumtor Gold Company and the joint stock company Kyrgyzaltyn, goes to the refining factory of the Kara-Balta Mining Plant and from there to western markets.

The antimony brand 'Su-00' of the Kadamjai Antimony Plant which won a gold medal at a World Exhibition in Brusselsin 1959 is renowned throughout the world, and long served as the world standard for the highest purity of antimony. The product is sold by more than 80 companies in Russia, Belarus, Uzbekistan, Kazakhstan, Ukraine, Great Britain, Venezuela, Korea and other countries.

Mercury is exported to China, Russia, Kazakhstan, Ukraine, USA, India and France. But because of the introduction of a new law in China which prohibits the transportation of metallic mercury on its territory, mercury is brought in the form of mercury sulphide, which increases the cost.

During the Soviet period, the production of lanthanides exceeded the demands of the USSR. Some of the outputs of production were exported to Japan, South Korea, Germany, and occasionally to the state reserve, which was a subvention mechanism to support the Kyrgyz Mining and Metallurgical Plant. While this plant has stopped mining today, it continues to process small volumes of concentrates of rare-earths from the state reserve, most of which go to CIS countries. The main reason for the difficulty of selling unprocessed raw materials has been the high royalty payments demanded (12%) despite the fact that value is mainly added according to the percentage of metal content rather than extracted raw materials.

Most of the non-metallic materials produced in Kyrgyzstan are exported. Kyrgyzstan exports cement (up to 1 million tons), asbestos-cement materials, granite and marble facing stones to neighbouring countries. However the introduction of high custom fees and quotas on Kyrgyz commodities by Kazakhstan has proved a serious obstacle to the export of minerals.

Some mineral commodities are affected by anti-dumping measures taken by western countries. For example, the export of uranium from CIS countries is discouraged through the application of duties and limiting quotas.

Based on world prices, official information and forecasts on the volume of production of Kyrgyzstan's mining industry, places its value at $73 million. Coal production, amounting to 2.1 million tons at $13,88 per ton brings in $29 million.

Cost of Kyrgyzstan's extracted production in compliance with world prices of 1992

Title	Tons	Cost per unit in USD	Total price in thousand USD
Antimony	7,838	,1600/t	1,2541
Antimony oxide	5,973		
Mercury	736	3,000/t	2,208
Rare-earths	N/A	25,164,000/kg	
Molybdenum *	500	7.4/kg	3,700
Uranium oxide	900	20.00/kg	18,000
Gold	0.5	10,800/kg	5,400
Total metal production			43,849
Coal	2100000	13.88 **	29,148
Total metal and coal			72,997

Note: *Only on molybdenum export
** Reported prices of local producers

Profitability of the sector

The most profitable area of the mining and minerals sector is gold extraction. A feasibility study of the Kumtor project anticipated more than 30% IRR. The world drop in the price of gold by 30% significantly reduced IRR, but after introducing technological innovations, substituting some of the expatriate workforce by local personnel, and putting in place a number of other measures, the deposit now continues to operate at sufficient profit. The Makmal Gold Extracting Plant managed to increase the extraction of metals from ore from 86% to 91%, and IRR has increased by 70%. However, not all mining companies have succeeded in maintaining profits.

When the price of mercury dropped to less than $140 for a bottle, the Khaidarkan Mercury Plant had to introduce a complex exchange system in order to preserve minimal profitability of the plant. Low world prices of mercury, high transportation costs and low processing capacity (less than 2 thousand tons of concentrates with processing capacity of 18 thousand tons) made the formerly prosperous Kadamjai Plant non-profitable. It now has debts of over US%300 thousand, and is subsidised by the government.

Most coal extracting companies are either non-profitable, have limited profitability or survive on state subsidies.

The economic decline in the sector follows the transition from a centrally planned system to a market economy. The performance of the sector during the Soviet era was characterised as follows:

- Centralised supply solved the problem of purchase of materials and equipment, though its operation was punctuated by occasional interruptions.
- There was no need to search for markets (distributive system).
- Many towns and villages emerged and developed, thanks to the operation of mining plants. Companies were responsible for the maintenance of the whole social infrastructure of industrial communities, and this negatively affected the basic cost of the product.
- Raw materials, materials and finished commodities had fixed purchase prices.
- Prices on energy resources and electricity were the lowest in the world. Non-profitable companies (Khaidarkan Mercury Plant, Kyrgyz Mining and Metallurgical Plant) received state subsidies.
- Special funds estimated at US$40-55 million were allocated from the state budget to maintain the mineral raw material base.

After the collapse of the USSR financial and industrial conditions deteriorated sharply:

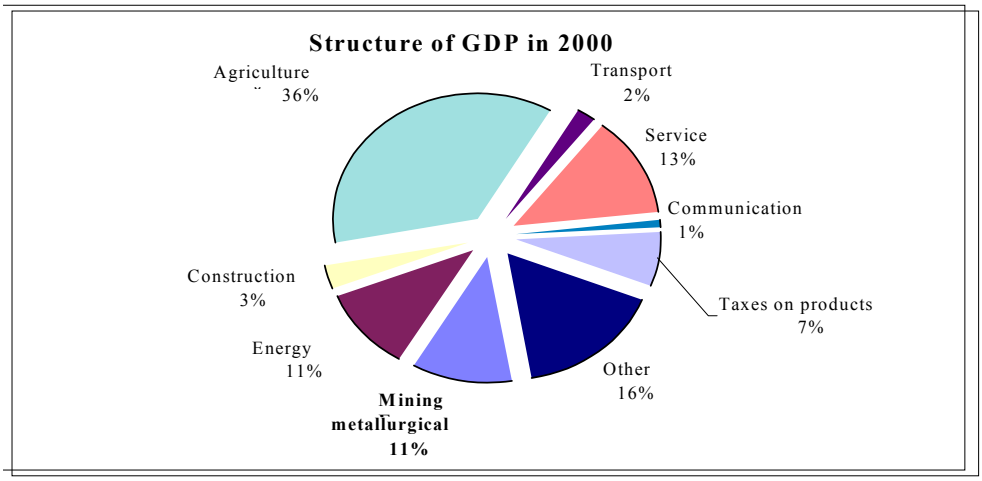
- The break up of industrial ties and supply channels.
- Prices on electricity increased four-fold, on fuel by 2-3 times and on railroad transportation by 4-6 times.
- Social infrastructure became a burden (up to 17% of prime cost and up to 37% of profit).
- The raw material base of antimony and uranium was lost, remaining in Russia and Kazakhstan.
- The legislative system, particularly taxation, hinders the development of the industry (extremely high custom fees and royalties (12% on lanthanide, mercury, and antimony, and 5% on gold)).
- The majority of raw materials and materials necessary for normal functioning of the plants are imported.
- All outputs of production were exported, and arrangements related to the sale and purchase of materials, reagents, and equipment now fall on companies, which have little or no experience in this field.
- Insolvency of product consumers on the internal market has undermined the economy of fuel sector of the industry.

After independence, subsidised plants (the Khaidarkan Mercury Plant and the Kyrgyz Mining Metallurgical Plant) immediately went bankrupt and were placed under the patronage of the PESAC programme.

Key economic indicators of the mining sector in comparison with other sectors of the economy for a period of six years

Indicators	1992	1993	1994	1995	1996	1997
Gross production (million som)						
Industry as a whole	577.6	3,423.9	6,570.1	7,126.4	9,929.9	14,670
Agriculture	366.9	3,021.2	6,995.7	9,728.4	15,506	16,200
The Mining sector	52.3	671	676	727.1	820.5	2,824.4
Specific ratio of Mining sector%:	9.1	19.6	10.3	10.2	8.3	19.3
Balance sheet profit (million som)						
Industry as a whole Mining industry :	104.1 13.98	479.7 81.7	745.3 258.5	795.5 302.8	609.1 161.6	
Specific ratio of Mining sector%:	13.4	17.0	34.7	38.1	26.5	
Export of production (million som)						
Industry as a whole: Mining industry: Specific ratio of Mining sector %:	259.1	1,710.4 423.3 24.7	3,588.8 388 10.8	3,956.6 389.8 9.8	5,662.9 529.4 9.3	8,800 629.2 31.8
Capital investments, million som						
Industry as a whole agriculture: mining sector: specific ratio of mining sector %:	25 10.3 5.04 20.2	152.7 65.6 22.3 14.6	730.4 57.8 389.8 53.4	2,477.1 47.7 2,048.0 82.7	3,814.1 47.4 2,633.0 69.0	4,168 540 13.0
Average salary (som)						
Industry as a whole:	15.81	124.8	369.1	571.3	737.7	
Agriculture :	11.69	60.1	111.7	151.9	255.0	
Mining sector:	21.8	178.3	587.2	893.4	1204.4	
Output per worker (thousand som)						
Industry as a whole:	1.9	12.7	27.2	34.7	49.9	
Mining sector:	3.48	46.5	47.6	62.8	66.2	
Profit per 1 som of GDP						
Industry as a whole:	0.18	0.14	0.11	0.11	0.06	
Mining sector:	0.27	0.12	0.38	0.42	0.20	

At present the share of marketable production of the metal mining enterprises makes up 10-11 % of total GDP.



In the mining and minerals industry, compared with industry as a whole:

- Fund-arming* (funds sufficiency) is 202 % of industry as a whole
- Income per worker is around 18.5 thousand soms, or 5 times average earnings
- Labour productivity is 30.9% higher than in industry as a whole.
- The average salary is 36% higher than the average salary for industry as a whole.

The basic funds of the mining industry amount to 15. 4% and production funds 14.6% of all funds concentrated in the industry.

These indicators demonstrate comparative sustainability of the mining sector in conditions of severe competition in the international market.

Labour capacity

There are 1.8 million economically active people in the Republic. During the Soviet time the number involved in the Kyrgyz mining industry exceeded 50 thousand, with 12 thousand involved in mineral exploration and prospecting. Extracting and processing plants of Kyrgyzstan employ many more workers than similar companies in developed countries.

At present, while wages are low in Kyrgyzstan compared to world standards, they compare favourably with those of similar producers in other countries. In Kyrgyzstan wages of those involved in the production of antimony are typical for the industry as a whole. Miners (the highest paid group of workers) earn 22 cents per hour. When additional payments are taken into account for social programmes including health care, education, housing, paid leave, etc., wages are equivalent to 33 cents per hour.

Salaries of workers at the Kumtor Gold Extracting Company are 8-10 times higher than this. The emigration of highly skilled and experienced personnel to Russia and other

countries has caused major problems. For example, the Kyrgyz Chemical Metallurgical Plant of rare-earth metals lost more than a thousand highly skilled technicians and engineers and consequently production was halted. Several other extracting and processing plants also suffer from the 'brain-drain'.

The collapse of the USSR saw the end of the system of staff retraining. In the absence of engineering and technical training, plants send young people to institutes and vocational schools in Kyrgyzstan and neighbouring republics for four-five years, followed by two-three years of practical work at the plant. Such training costs about US$500 in Kyrgyzstan and around US$250 in institutes of higher education in neighbouring CIS states.

At the Makmal Gold Extracting Plant between 1993 and 1996 840 people were trained from scratch, and 274 workers raised the level of their skills. During this period the company spent about 50 thousand dollars on personnel training and pays the university fees of people from the Toguz-Toro district. As a result, the Makmal Plant has enjoyed a decrease in staff turnover, which in 1996 was down to 10-12% compared with 32% in 1994 and 20.3% in 1995.

A number of people have been selected for study in the USA and Canada through joint venture agreements, such as the 'Oasis' programme of the Kumtor Gold Company, with the aim of replacing foreign technical and managerial specialists by local specialists.

Personnel at all levels of the Kyrgyz mining industry have a limited knowledge of economic and commercial issues required for plant management in the market economy, including the key principles of finance and management, the world mineral markets, the basics of negotiating investment agreements in the mining sector, and methods of staff management.

Operational Conditions and Forecasting

Operational conditions of the industry

The institutional structure of the industry in Kyrgyzstan is currently underpinned by state regulation, possession and exploitation of mining operation organisations. (see Fig. 1).

The **President of the Kyrgyz Republic** is empowered to regulate the executive branch of government. Economic policy is designed by the Department of Economic Policy of the President's Administration. The President sometimes makes decisions directly related to industry regulation (e.g. the Act on the obligatory sale of gold through the joint-stock company KyrgyzAltyn, applicable to all gold producers), and recommends nominees for heads of mining joint-stock companies with a state share.

The **Apparatus of the Prime-Minister** carries out policy through ministries and agencies, and in particular, influences budget-setting through the Ministry of Finance. The latter fixes the budget for the operation of the State Geological Agency, including its production (exploration) subdivisions, as well as setting the size of mineral royalties. These currently amount to 15% and are the highest in the world. Mining plants with a state share are under the jurisdiction of **the Ministry of Foreign Trade and Industry** and report to it on production and economic activities.

The role of regulating body is carried out by **the State Geological and Mineral Resources Agency**. The State Geological Agency is entitled to:

- Carry out checks of exploration projects, conducted by enterprises and organisations regardless of their institutional subordination and forms of property;
- Develop principles and methods for calculating mineral resources and reserves, and criteria for the preparedness of deposits for industrial development;
- Carry out feasibility studies, conditional projects, calculation of mineral reserves and resources and to gather geological information on deposits;
- Determine ways of applying geological information to deposits, and to authorize the use of information on deposits by third parties;
- Monitor the use and protection of subsoil by enterprises;
- Develop and approve a legal basis for geological investigation, use and protection of deposits;
- Coordinate action on improving methods of production, on deciding labour remuneration in the market economy, and on ensuring social protection of workers and members of their families;
- Approve legislation governing the process of exploration, including designing, planning and funding it; and the pricing of labour remuneration.

State Inspection on Deposit Use by the State Geological Agency involves:

- Monitoring and discussing the location of mineral extracting and processing sites, land development projects, assignments for designing deposit objects, feasibility studies and technical projects for geological investigation and exploration of mineral deposits, annual programmess (plans) on the development of exploration and mining works, standards of mineral extraction from deposits and of mineral components; making decisions on taking out exhausted, or otherwise unworkable reserves of minerals from the books of enterprises;
- Settling disputes regarding the use of deposits;
- Imposing fine sanctions for excessive losses of minerals during the extraction and processing of mineral raw materials.

The State Committee on Mineral Reserves (SCMR) of the State Geological Agency has the status of a governmental body, carrying out state monitoring on the availability, validity and calculation of explored reserves in mineral deposits. SCMR is entitled to conduct checks at any stage of deposit investigation.

The primary objectives of SCMR are to ensure that the process of approving principles underpinning the calculation of explored mineral reserves, the development of terms for mineral raw materials and the determination of preparedness of deposits for industrial development are all underpinned by rational policy.

The State Committee on Mineral Reserves:

- Oversees the process related to the approval of terms for mineral raw materials; considers, with the participation of concerned organisations and deposit users, projects to determine conditions;
- Approves documents relating to the calculation of mineral reserves, considers materials with the participation of concerned organisations and deposit users, and approves explored reserves, identifying the degree of investigation and validity of given reserves, the industrial value of deposits and preparedness for industrial development.
- In case of disagreements between SCMR and a deposit user the former has a right, with special permission of the Government, to call on additional independent expertise;
- On the resubmission of extraction companies in the case of considerable discrepancies or for other reasons, the SCMR re-approves mineral reserves;

Consideration and approval of conditions and mineral reserves should not exceed three months from the date of submission to the Commission. If the Committee declines conditions or mineral reserves, all materials submitted are returned back with minutes and conclusions of the expert Commission.

Other government organisations, which may have influence upon the extractive and minerals industry are the Ministry of Environment and Emergency (environmental aspects, state mining and technical control) and the Ministry of Finance (taxation issues).

The Ministry of Environment and Emergency has the following functions:

- It fixes limits on the use of natural resources, develops and approves licences, other forms of authorisation and grants, and cancels licences in the case of:
  - Utilisation, destruction and disposal of wastes of toxic, including radioactive materials;
  - Transportation of toxic waste;
- It collects payment for the exceptional use of natural resources, for air and water pollution, and disposal of wastes and toxic materials;
- In cooperation with agencies and companies it keeps records on the use of natural resources, air and water pollution and other environmental impacts and their sources.

The Ministry of Ecology and Emergencies carries out state inspection on control and industrial safety and mining (State Inspection on Mining and Technical Control (SIMTC)). SIMTC carries out state regulation on safety in mining, oil and gas extracting industries, geological prospecting and other mining and drilling works, the exploitation of tailings dams, and also the storage, stock-taking and use of industrial explosive materials.

State Inspection on Mining and Technical Control:

- Approves regulations and norms of safety operation, and the location and exploitation of facilities.

- Grants licenses on the following types of activities related to mining and metallurgical production:
  - designing, construction and exploitation of mining, metallurgical production, units of geological prospecting, oil and gas production;
  - the manufacture, installation and repair of drilling, and oil and gas, geological prospecting and mining facilities;
  - implementation of the work of surveyors during resource exploitation.
- Monitors safety measures in production enterprises.
- Coordinates the issue of mining documents for the development of mineral deposits.
- Verifies accuracy of safety limits for mining operations, and approves measures on the prevention and elimination of the negative impacts of mining operations on health, the environment, buildings and facilities.
- Monitors the implementation of regulations by surveyors and geological workers during the development of mineral deposits
- Approves annual plans on the development of mining and geological prospecting and controls their implementation.

State Inspection on Mining and Technical Control is entitled to:

- Give instructions (which are compulsory) on dismissal in the case of violation of the safety measures;
- Withdraw licenses, if rules and norms of safety operation are not observed;
- Impose economic sanctions on companies which do not implement safety measures, or impose fines for violation of rules and norms;
- Conduct examinations on rules, norms and technological regulations.

Thus, while many government departments and agencies are concerned with the development and implementation of policy in the mining industry, there is no unified body to carry out policy and administration.

Forecasts of operation in the mining industry

Forecasts for the operation of the mining sector of Kyrgyzstan are governed by a number of factors, including geographical location, mineral and raw material resources, world mineral prices and government policy.

Most of the output of the industry is exported. However, the benefits gained from the export of production are tempered by the unfavourable geographical location of the country, which is isolated from sea and railroad transportation routes. The ever-rising cost of transportation make it unprofitable to export all but the most valuable outputs. The cost of air transport of refined gold bullion to western markets is not prohibitive, and because of this it is likely that gold production may be increased by 30 tons per year with the addition of seven thousand jobs.

The decrease in total profit as a result of high transport can be supported by metals such as mercury, antimony, uranium and molybdenum, which have been traditionally produced in Kyrgyzstan. Of these metals only mercury has a long-term raw material base, but with poor quality ore and complex mining conditions. An increase in production of these metals is possible only by importing raw materials, with corresponding increases in the cost of transport. Consequently, the priority for producers of these metals is to maintain the existing volume of production. The processing of mercury waste products from the chemical industry of western Europe and Russia has recently started in Kyrgyzstan.

Currently under discussion are plans for Kyrgyzstan to process uranium concentrates supplied from nearby deposits in Kazakhstan with investment from Russia. In the near future gold extraction seems likely to be the most stable sector. If there is a rise in the world price of gold, and a mitigation of the tax burden as expected, it is possible that this sector might be developed through the exploration of two large deposits (60-70 tons) and a number of smaller deposits (10-30 tons).

Detailed geological study of the territory of Kyrgyzstan, including complex prospecting and exploration of minerals, has been carried out, which limits the likelihood of discovering new large mineral fields. Therefore the current prospects of the mining industry lie with the development of small and medium deposits which have been explored, and which have the potential for large outputs in production.

Kyrgyzstan has large deposits of iron (Jetym Iron-ore basin) and nepheline syenite (Sandyk deposit) for aluminium production. Furthermore conditions for production of these metals are favourable because of the large resources of water and electricity. However, the low quality of ore, the large volume of the production process, and the need for further railway construction in alpine conditions mean that development can only be realised in the long-term.

In the near future development of the non-metals sector for construction materials seems to be more realistic. History shows that with economic improvements and the growth of purchasing power, the first things to develop are the service sector, food production and the construction industry. This tendency was recorded in 1996-1997 in Kyrgyzstan, but was disrupted by the financial crisis of 1998. Signs of economic stabilisation appeared in 2001 in Kyrgyzstan and the improvement in economic indicators in neighbouring Kazakhstan has significantly increased the demand for cement, roofing slate and asbestos cement commodities produced in Kyrgyzstan, which remain competitive even after being transported for 1 thousand km, and the custom barriers imposed by Kazakhstan.

An essential factor for the development of the mining industry is government policy in the face of high prices on the world metal market. Technical-economic calculations show that a number of large deposits in Kyrgyzstan are on the verge of profitability despite the current low price of metals on the world market. If the taxation system in the mining industry becomes more favourable, the prospect is optimistic.

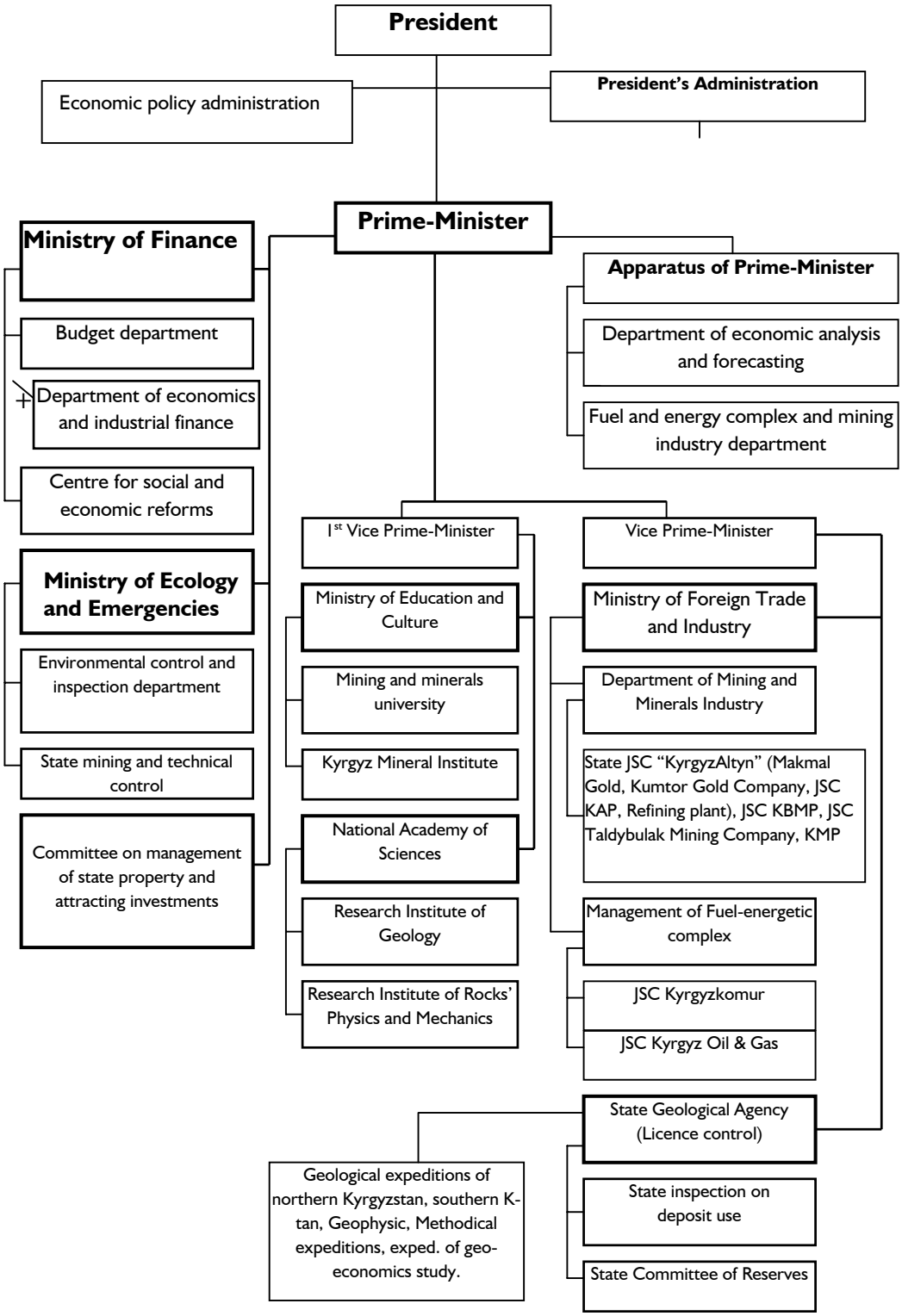
Ninety percent of the territory of Kyrgyzstan is alpine. In such conditions only the mining industry can develop the infrastructure, constructing roads, establishing an electricity

supply network and lines of communication to remote and out-of-the-way places and creating jobs for local communities. A good example is provided by the Kumtor Gold Extracting Plant located at an altitude of more than 4 thousand meters, which has created more than 1 thousand jobs.

There is a need for Kyrgyzstan to stimulate the development of the mining sector. There has been a significant decline in the world prices of metals produced in Kyrgyzstan recent years, and the cancellation of privileges for foreign investors has resulted in a withdrawal of investments from the mining sector. The government has decided to take the following measures to improve this situation:

- Simplification of the licensing procedure;
- Reduction of royalty rates by 2-3 times;
- Introduction into the Tax Code a new clause on taxing the use of subsoil, which will consider such mechanisms as accelerated amortisation, and deduction of payments for soil depletion and other stimulants;
- The establishment of an agency responsible for the management of the mining and minerals industry;
- Revision of decrees (for example, governmental decrees) in order to reduce state interference in the mining industry;
- Reduction in the state share in mining projects.

Figure 1. The system of management in the mining and minerals industry of Kyrgyzstan



The Legal Basis and Licensing Practice in Minerals Exploration

Standards

The activity of exploratory or extracting enterprises is governed by laws regulating the management of the Tax Code, the Labour Code, the Civil Code, the Land Code, etc., which do not specifically refer to the mining industry. There is also a range of laws, directly regulating relations between government and mining manufacturers. Most important of these are the laws on deposits, on coal, oil and gas, precious metals and precious stones.

The law on deposits has been developed with the participation of international consultants, and it includes a number of general measures, applicable in other countries. In particular, the law:

- Declares state ownership of deposits.
- Governs licensing of geological exploration. Anticipates licensing of other activities related to geological research and deposit development.
- Obliges deposit users to pay royalties for the right to use deposits.
- Requires that information is made available on explored, extracted and abandoned reserves of minerals.
- Governs the mandatory recovery of lands and other natural objects after the process of deposit use, for further use in compliance with standard requirements.
- The Law contains standards, positively affecting investment attraction and mining business development.
- Confers equal opportunities on citizens of Kyrgyzstan and other countries, regardless of property rights to obtain a licence to become a deposit user;
- A deposit user is entitled to use outputs of economic activity upon his/her own discretion and to liberally repatriate capital.
- Pawning of licences or their transfer to third parties is permitted with the authorisation of an appropriate government body.

The Law includes a number of articles, limiting the freedom of entrepreneurial activity, which might hinder the development of the mining industry:

- Licensing agreements allowing the development of a deposit may include requirements unforeseen by legislation.
- Mineral reserves of explored deposits are subject to the approval of government experts. Licences cannot be dispensed prior to government approval of mineral reserves.
- Government bodies monitor and prevent mineral losses in excess of the statutory limits.
- Those involved in the optional development of deposits who incur excessive losses of minerals during the extraction and processing of raw materials will be prosecuted.

In general, laws on deposits are characterised by excessive government intervention and control, inherited from the Soviet system.

Laws are specified by a number of Resolutions and Instructions, approved by the government.
The following documents within the law are currently in force:

- The Resolution on the State Geology and Mineral Resources Agency (State Geological Agency) under the Government of the Kyrgyz Republic.
- The Resolution on forms of licensing for deposit-users.
- The Resolution on the State Committee on Mineral Reserves.
- The Resolution on State Inspection of Deposit-Use.
- The Instruction on the 'forms of calculation and payment to the budget of the Kyrgyz Republic for the development and production of the mineral raw materials base.
- Several instructions on the classification of reserves of certain kinds of minerals.

In addition laws regarding commercial organisations, banking and financial activity, labour, taxation and transportation can be applied to the industry.

Licensing procedure

The State Geological and Mineral Resources Agency is the licensing body, which oversees the licensing of all kinds of deposit use and use of mineral raw materials, including underground water. Only small deposits of commonly found minerals under municipal, private or other kinds of ownership are exempt from the licensing procedure. Entitlement for deposit use is subject to competition and/or auctions, or occasionally through direct negotiations.

Upon collection of geological information, areas and objects of national importance and certain parts of deposits are put out to tender by the Selection Committee of the **State Geological and Mineral Resources Agency**. Applicants must pay for taking part in the selection process and for the package of geological information. The winner pays an additional one-time payment (bonus) for the right to use the asset in question.

The application form should include the following:

- Personal data, including professional experience, economic relations with financial and production partners;
- Certificates confirming the availability of financial, labour and technical resources to develop the asset.

On verification of the presented information, applicants are officially notified about admission or otherwise to the selection process. Refusal may follow if an applicant provides incorrect information about himself and his performance and/or has insufficient resources to develop the asset.

In Kyrgyzstan there are a number of deposits, prepared for development during Soviet time, where construction had started. Access to these deposits is granted through negotiations with the State Property Fund.

Within the timeframe set by the licensing agreement, the licensee presents proof of his ability to ensure the protection, and technical and economic safety of the deposit, as certified by the Department of Environmental Control and Inspection and the State Mining Technical Control of the Ministry of Environment and Emergency.

The licensing agreement for the development of a deposit includes the following:

- Coordinates and measurements of the land allotment area;
- The mission;
- The quantity and category of reserves;
- Details of extraction in compliance with a feasibility study;
- The programme of deposit development;
- The types of payment;
- The terms of restoration of destroyed habitat;
- Force majeur and other terms;
- Information about the licensor;
- The duration of the licensing agreement.

A licence without a licensing agreement is not valid.

Within the borders of a single geological allotment, several licensees can conduct geological investigations on different minerals. In such cases a licensor regulates relations and settles disputes. The licensee is entitled, with the permission of the government body on deposit use, to pawn the right of deposit use to a third party for supplementary funding of a mining project. Payment for the licence confers the right to use deposits is ten times the minimum monthly salary for persons with legal status, and five times the monthly salary for citizens without legal status.

Payment for taking part in competitions for tender and the cost of the package of geological information is fixed for each site, depending on its size, the degree of investigation, the volume of geological information and the costs to the licensing body.

In 1998-1999, at the request of the Kyrgyz Government to the Government of Japan, experts of the Mitsui Ltd, the Japanese Engineering Company on Mineral Development, conducted a review of the mining industry in Kyrgyzstan. They came to the conclusion that certain aspects of Kyrgyz laws served to inhibit the development of free mining activity.

These include:

- The requirement to sign a licensing agreement with a governmental agency;
- The application of tender principles, but no priority rights in getting a licence;
- The requirement to present a feasibility study and to go through the reserve approval procedure before being granted a licence;
- The priority of the state in mineral purchase;
- High royalties in comparison with other countries;
- High levels of state intervention in the activities of mining companies;

Experts of the World Bank carried out a similar review in 1994 and subsequently in 2000. While declaring a significant improvement in legislation, they noted the retention of negative factors such as:

- Over-discretionary authority and control of the government;
- A long, costly and vague process of acquiring rights to undertake geological surveys;
- The requirement of state monitoring of reserves;
- The tender mechanism for acquiring rights to the subsurface;
- The priority of the state in mineral purchase;
- High royalties compared with other countries.

The government of Kyrgyz Republic concurs with most of the expert recommendations, and there is currently an interagency commission working on correcting the legal documents regulating the mining industry.

Small-Scale and Artisanal Mining Production

In Kyrgyzstan a considerable part of the raw material base of all kinds of minerals is represented by small deposits, which, for a number of reasons, are not considered for development by large and medium-scale mining companies, including joint ventures with international companies.

Small deposits characteristically contain small quantities of ore. The size and industrial value of small deposits have not been fully evaluated, largely as a result the Soviet policy of placing priority on large deposits with high grade and easily processed ore.

In the transition to a market economy, the mining industry of Kyrgyzstan is facing difficulty in implementing large mining projects because of the lack of financial resources. This is confounded by the high capital intensity of such projects, long-term loan repayments from the beginning of the projects, unpredictable fluctuations in world mineral prices, and rising costs of electricity, equipment, materials, services, labour remuneration, etc.

In order to stimulate the development of small mineral deposits, legal requirements on obtaining authorising documents have been simplified. It is now possible to obtain

authorisation for the operation of small mining enterprises at the local level from regional administrations. This has contributed to the development hundreds of small enterprises, producing coal, tin, tungsten, various construction materials including clay, sandy-gravel mixture, limestone, jasper, hornfels, mineral forage and white salts. A number of small enterprises dealing with the exploration and extraction of underground fresh water for drinking, irrigation and mineral cures have also been developed.

The State Geological Agency has granted 49 licences on prospecting, exploration, drilling and designing operations, and 120 licences on deposit development to a number of small companies.

The extraction of gold from alluvial deposits in all parts of the country is practised widely. According to the National Statistics Committee, about 5,000 people are involved in prospecting gold. The number of workers involved in small prospecting enterprises varies from 2-3 to 50 people. Resolution No 224 issued by the government on May 10, 2001 is aimed at the regulation of gold prospecting from alluvial deposits by individuals. In line with this resolution, state regional administrations throughout the Republic provide certificates of authorisation to applicants entitled to carry out gold extraction. Payment for registration is equivalent to one-third of the minimum monthly salary in Kyrgyzstan, or about 100 soms (US$ 0.7) in 2001.

Individual prospectors (gold-panners) are entitled to use only the gravity exploration method in the extraction of gold. The use of strong toxic substances (cyanidation, amalgamation, etc.) is absolutely prohibited. Gold gridders are responsible for observing the rules of safe operation, the protection of deposits and environmental protection.

Small-scale enterprises and individual prospectors (gold-gridders) make appropriate payments and pay taxes to local and central budgets in line with acting laws. To receive gold from the state administrations, JSC KyrgyzAltyn have created gold-receiving desks, which purchase gold from gold-gridders on a commercial basis, from the vendor..

One peculiarity of small mining companies is the fact, that they are credited at the expense of private capital. According to the State Statistics Committee, the funding for small mining plants is growing from year to year, bringing tens of millions of soms into the local market. The share of production supplied by small companies to the international market is also growing in volume, and includes gold, tin, tungsten, mineral water, certain kinds of jobbing and facing and semi-precious stones. At present small enterprises play an important role in strengthening the Kyrgyz economy, in view of the following characteristics of the sector:

1. Small deposits can be developed by using comparatively inexpensive portable equipment (modules) without the need for connection to main power lines and capital roads. They do not require full development of the infrastructure of the region, which reduces the volume of inputs and terms of repayments.
2. Recultivation of small mining operations can be carried out easily and at minimal cost, and has few environmental impacts.

3. Development of small deposits creates new jobs, which is vitally important for remote regions of Kyrgyzstan, where no other types of production are available. Small mining companies can operate with low capital costs and a small workforce, and are independent and self-sufficient. Though the profit margin in such companies is not high, it is enough to stimulate the activity of small companies and maintain the commitment of the workforce.

Through the government Resolution No. 563 of 12.09.2000 local administrations are delegated the following responsibilities:

In relation to the Ministry of Environment and Emergency:

- Preparation of proposals for the development of operations and the distribution of outputs of production, and for planning and construction projects, with due consideration of the protection of communities and the environment from emergency situations;
- The formation of brigades of rescue rangers, with appropriate experience in emergency situations and rehabilitation and the implementation of measures to prevent emergency situations;
- The development and implementation of regional programmes on environmental protection and the rational use of natural resources.

In relation to the State Agency on Registration of Rights for Occupants:

- Settling disputes related to occupants, including land allotments;
- The preparation of proposals on the allotment of land as property and for use with limitations, fixed by the Land Code of the Kyrgyz Republic.

The state of the industry is changing against a background of:

- Decentralisation of governmental authority;
- Reduction of governmental costs for environmental protection;
- The gradual development of small and medium businesses;
- The privatisation of land.

As a result, central government is increasingly unable to resolve problems of the industry in-situ, and local government lacks the necessary experience.

Consideration of Public Concerns

Public concern has been voiced on all the key impacts of the mining industry. The mining industry is a sector of the economy which uses a natural resource, which has no direct use in its unprocessed form. Society has an interest in obtaining an end product with the least possible environmental and economic costs. Only 2-5 % of ore will be made into a useful end-product. Along with the expropriation of natural ecosystems and agricultural lands, mining operations also pollute the environment with their waste-products. Such impacts are hardly compensated by the mining industry, and the existing taxation system has the effect of shifting the costs of the environmental impacts onto society as a whole.

During the Soviet time the extractive sector of the industry developed very fast. In 1985 the share in GDP of the extractive industry in Kyrgyzstan was 5% less than that of the processing industry, but within five years, this shortfall had risen to 37%. At the present time, because of the complete decline of the processing industry, the correlation has changed in favour of the extractive industry. All the growth in industrial production in recent years has been determined by the activities of one mining plant, the Kumtor Gold Company.

In the 1980s in coal industry alone was responsible for more than 50% of the country's production, and it involved almost 60% of the whole industrial labour force of Kyrgyzstan. A number of towns and urban-type villages such as Sulukta, Khaidarkan, Kyzl-Kiya, Kok-yangak, Maily-Suu, Tash-Komur, Sumsar, Min-Kush, Kara-Balta, Orlovka, Ak-Tuz, Kadji-Sai, Jergalan, Kazarman, Enilchek and others have developed on the basis of minerals operations and attendant production companies. They have provided livelihoods for almost 2,000 people, which was significant for a country of 4.5 million people. The salary level in this sector was significantly higher than in other sectors of the industry.

The development of urban cultural centres and the formation of modern infrastructure were beneficial to the development of adjacent rural areas as villages gained stable markets for agricultural production and the opportunity to purchase diverse quality goods. Many people from rural areas had the opportunity to study in institutes of higher education, to gain specialised secondary education, and to establish contacts with the outside world, thus increasing the social mobility of the population.

Table 1, compiled with incomplete data (mid 1980s), sets out the contribution of these villages to the formation of infrastructure in different regions, most of which were remote and economically underdeveloped. During this period, villages developed other enterprises not related directly to the minerals industry, such as sewing, printing etc. Unfortunately, few of these enterprises survived the closure of the mining operations.

Institutions of service infrastructure in villages and urban-type villages connected with the minerals industry

Name	Population Thousand people	Educational	Cultural	Kindergartens	Medical	Consumer services
Ak-Tuz	2.5	1	6	1	2	2
Bordunski	1.1	1	3	2		1
Jergalan	1.7	1	2		1	+
Kadji-Sai	8,1	3	2	1	2	1
Kazarman	7.7	2	3		2	+
Kara-Balta	66.5	14	9	1	2	+
Kok-Yangak	15	8	4	+	2	+
Kyzyl-Kiya	0.8	5	4	+	2	+
Maily-Suu	9.3	11	3	+	1	+
Min-Kush	10.3	6	5	+	4	5
Orlovka	15	4	4		1	
Sulukta	5.7	10	5	+	8	+
Sumsar	5	4	4	2	2	
Tashkumyr	15	11	15	+	2	+
Khaidarkan	12.1	5	4	+	9	+

Among the educational institutions were secondary schools, vocational schools, technical schools, musical and sports schools. Cultural institutions included clubs, libraries, cinemas, theatres, museums. Medical institutions included hospitals, clinics, maternity hospitals and chemist's shops.

The economic crisis caused a reduction of the minerals industry. The Union market was destroyed, and the internal market was incapable of managing produced commodities. Small towns and urban-type villages, which were completely dependent on the mining industry, found themselves in crisis. In former times closure of mines or a reduction in production was compensated to some extent by the organisation of socio-economic re-orientation, the creation of new enterprises and the retraining of the workforce. Furthermore, highly qualified workers had always had opportunities to find jobs in other mines and related enterprises. This time, however, there were no rehabilitation measures in place, and no opportunities to find work in other regions. The lack of centralised provision following the Soviet days has become a reason for the decline of public utilities including cultural and educational, medical, trade, transport and consumer service sectors.

The closure of mining enterprises, and the discontinuation of management and supply from the Union centre, led to a number of unresolved problems, including the lack of measures to prevent subsequent environmental pollution, to rehabilitate dumps, to generate

employment, to re-settle communities and to maintain the social infrastructure. Enterprises continuing to operate can provide jobs for less than a tenth the number of workers formerly employed in the industry. The high level of unemployment, the loss of community services, and cultural, educational and medical institutions has caused impoverishment of the population and depopulation of settlements.

Mining and minerals enterprises no longer play such an important cross-linking role. The exception is the newly established gold mining plant Kumtor that employs about 1.5 thousand people, mainly from the local population. The company has put in place socio-economic policies leading to the development of infrastructure in regions bordering the mine, and support to social and business projects. However, such activities have little effect on the majority of the population in these regions. On the other hand, it is difficult to expect tangible results in conditions of such severe socio-economic decline affecting the whole country. It has to be borne in mind that Kumtor is the only mining plant which has sufficient resources to allocate money for such purposes. Other plants are hardly able to maintain production activities, let alone allocate funds to meet the socio-economic needs of the population as they did before.

In such conditions, the needs of local populations in mining areas should be met by the state from taxes received from mining companies. Unfortunately current legislation and policy do not ensure that the welfare of communities is provided for throughout the life cycle of mining operations. There are many areas of uncertainty for local communities, including the distribution of income from companies; how tax revenues are spent; and community rights. The devolvement of power to local government needs to be based on a transparent system of assigning lines of responsibility in order to avoid arbitrariness and infringement of rights of different stakeholders. There is a need for open dialogue between all stakeholders to find mutually acceptable solutions. The Kumtor mine and the Community and Business Forum have both made a start in building such a dialogue.

A proposal for a Kyrgyz Monitoring and Advisory Group was developed by Mehrdad Nazari, a principal environmental specialist at EBRD, in response to an initial scoping visit to Kyrgyzstan in September 1998 – four months after the cyanide spill involving Kumtor. This proposal was built on a similar approach, successfully used to address the concerns of NGOs and local communities regarding the ZSNP/Slovalco aluminium and carbon production factory in the Slovak Republic. The proposal was circulated to a range of organisations for comment, including Kumtor, consultants and NGOs. As a result of a tender process Fauna and Flora International, a conservation NGO based in the UK, was selected to manage the project. In September 1999 FFI made an inception visit, which provided the opportunity to clarify the role, objectives and *modus operandi* for the MAG and broader stakeholder consultation. Based upon the needs identified by the stakeholders, the issues to be addressed by the project and key words suggested by stakeholders, it was decided that the project should operate under the new name:

The Kyrgyzstan Community and Business Forum (CBF).
The mission of the CBF is to develop cross-sectoral collaboration between businesses and communities, to further encourage sustainable social, economic and environmental benefits in Kyrgyzstan.

For two years the CBF project has been supported by the European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation (IFC) with funds from the UK Government Department for International Development (DFID). The CBF project has been operating since August 1999. In 2002 the CBF was registered by the Ministry of Justice as a Republican Public Union.

Methodology and strategies:
As a result of consultations and planning with stakeholders during the inception visit, stakeholders prioritised a range of activities for the CBF. These fell into several categories:

- Information exchange (newsletter, publicity, resource centre);
- Supporting collaboration between sectors (business, NGOs and communities);
- Training and capacity building.

These main categories formed a basis for CBF strategies:

Participation:
Activities should aim to increase the number and variety of stakeholders, and increase the level to which they participate.

Participation in both planning and implementation of the project has been developed within a range of interested groups and people. The project aimed to involve different stakeholders, governmental agencies, NGOs, community-based organisations, and in particular local communities affected by mining activities. Representatives of different sectors had an opportunity to be involved in the project through the work of the Steering Committee. To date CBF has been working with more than 100 national and local NGOs and 30 community-based organisations (CBOs).

Transparency:
Activities should wherever possible be transparent and open to public scrutiny. The success of the project was expected to be measured by its impacts on the different stakeholder groups. It was therefore important that these groups play an important part in the evaluation and monitoring of the project, and hence have an important role in its ongoing development.

Regular public consultations and meetings have been organised and regular reports published (Annual Reports, newsletters).

Capacity building and Partnership Development
In order to ensure that issues raised by the project are fully addressed, it was necessary to ensure that key stakeholders have the skills and capacity to deal with them. As a result of the needs assessments, training needs were identified:

- General training in working in partnership with other sectors.
- Training for NGOs in developing and managing projects supported by international donors.

- Capacity building in NGOs to working with and monitoring businesses.
- Capacity building in local communities to increase their voice in decision-making.
- Supporting the development of NGO networks in the two rayons (districts) impacted by the Kumtor mine and facilitating technical assistance from NGOs in Bishkek where appropriate.
- Designing and implementing a small grants programme to develop models with local NGOs including business development, renewable energy, NGO centres, community environmental programmes, women's associations, newsletters and crafts.
- Participating in discussions and presentations at an international level concerning the issues raised by mining investments in transition countries using the lessons learnt from the KOC/CBF model.

CBF is a link between the mining industry, governmental structures, local communities and NGOs, which take part in discussion of issues of information distribution, support to local communities and observance of ecological requirements. A number of newsletters targeted at the general public in Kyrgyzstan and abroad have been published in Kyrgyz, Russian and English. Summaries of the Emergency Response Plan and the Annual Environmental Report of Kumtor mine have been prepared, published and disseminated in local communities and NGOs.

CBF activity promotes mutual understanding and cooperation, transparency and access to information and support to local communities. There is a general need for businesses and corporations to become more aware of the impact they have on different sectors of society and the environment, and how this relates to their social responsibility, their public image and ultimately their profits. This is particularly the case in the mining sector, where activities are often located in areas of severe socio-economic conditions in diverse and sensitive environments and cultures.

Environmental Impact and Safety Measures

Environmental impact

Because mining operations in Kyrgyzstan are located mainly in mountainous areas, which are environmentally sensitive, the environmental impacts tend to be greater than those of similar operations in flatlands. Mineral extraction often exacerbates natural processes characteristic of mountains, such as landslides, landslips, and erosion of slopes. In addition to the negative impact it has on natural ecosystems, mining can also cause a number of dangers such as subsidence of soil, under-flooding and pollution of air, water and soil, as well as devastating the aesthetic aspects of the landscape and expropriating land from other uses such as agriculture, hunting and recreation.

Kyrgyzstan is located in a catchment area of rivers which run down through the territories of neighbouring countries. As mining companies are located in the upper streams of catchment basins, their impact goes beyond the boundaries of Kyrgyzstan. Thus, the problem of old tailings dumps in Kyrgyzstan is fast turning into an international one with currently no solution.

Neither the governments nor the communities of countries affected are able to monitor tailings dumps in Kyrgyzstan, despite their concern over the possible threat of contamination to their territories. In the framework of the Interstate Council of Central Asia the government of the Kyrgyz Republic has been making attempts to form a Regional Consortium on rehabilitation of tailings dumps and rock dumps which have a transboundary impact.

At Kumtor, which is situated 4000 meters above sea level in the alpine glaciation zone, clouds of dust with residual nitrates are seen following blasting. Scientists have expressed concerns that the settling of this dust might bring about an acceleration of the glacier thawing. The transport network and geological prospecting also have significant impacts.

Consideration and control of all these impacts is limited. The recent decline of the industry resulted in the closure and reduction of many enterprises. In 1999 the Ministry of Environmental Protection recorded 58 violations on licensed mining works. Of these 33 were recorded on non-metal deposits, 16 on ground water and 9 on coal extraction.

At present there are 30 tailings dumps of radioactive wastes, which occupy an area of 35 million cubic metres and contain 50 million cubic metres of tailings. The greatest threat is presented by the Mailu-Suu village tailings dumps, some of which are in very poor condition and can be destroyed by landslides, landslips and floods. This could result in radioactive contamination of large territories of Fergana valley.

Eighteen tailings dumps of non-ferrous metals with a total area of 1.2 million m^3 and 32 million m^3 of tailings contain toxic salts of heavy metals such as mercury, lead, cadmium, arsenic and others. Unrecultived tailing dumps in Sumsar and Sovetskoe urban-type villages damage and pollute the environment.

In the densely populated Chu valley (Aktuz deposit) near tributaries of the river Chu there are dumps and tailings of the mineral plant Orlovka which, in addition to toxic elements, also contains radioactive substances (thorium). In 1964 the tailings dump was damaged by mudflows and 1.5 million m^3 of radioactive tailings spread over 20 km along the river, which resulted in contamination of the lower part of the Kichi-Kemin valley by thorium, beryllium, lead, copper, zinc and molybdenum (10-50 times the safe levels).

In total there are 44 tailings dumps and five storage areas of industrial wastes, 85 rock dumps (25 of them contain radioactive wastes which radiate 1,000 microroentgen/hour). The total area exceeds 20 million m^3. Most of the dumps do not present a serious threat, apart from the destruction of the landscape and the expropriation of land.

Twenty-three areas in Kyrgyzstan have been identified as being a risk to the environment:.

The most dangerous are:

1. Chuiski
2. Ferganski

Significant danger:

3. Issyk-Kulski
4. Son-Kolski
5. Sary-Jazski

Average risk:

6. Suusamyrski
7. Narynski
8. Chatyr-Kolski

The following relate to local territories and objects:

Most dangerous:

9. Suluktinski
10. Kyzyl-Kiyski
11. Khaidarkanski
12. Ak-Tyuzski

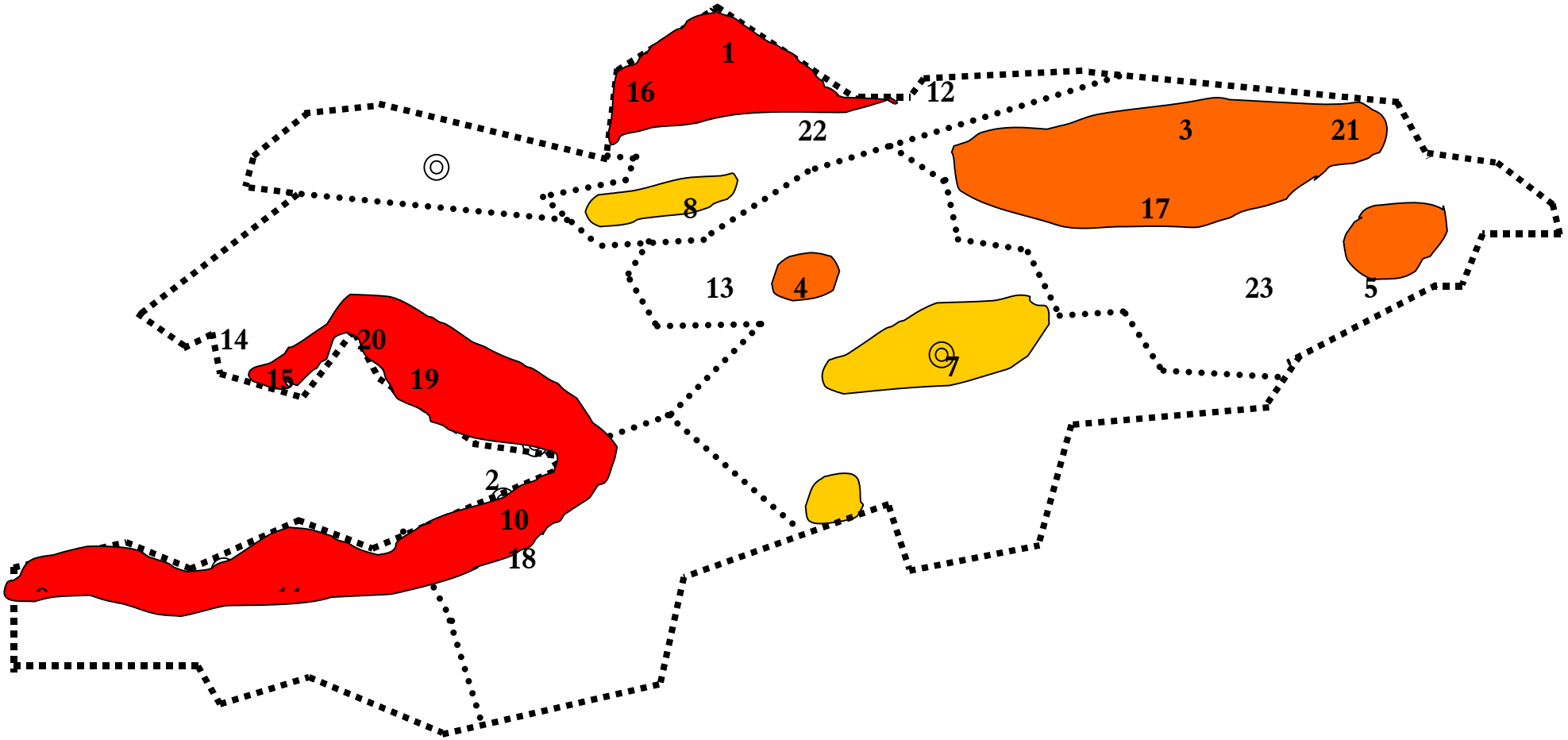
High risk:

13. Min-Kushski
14. Tereksaiski
15. Sumsarski
16. Kara-Baltinski
17. Kadjisaiski
18. Almalykski

Significant risk:

19. Mayli-Saiski
20. Tash-Kumyrski
21. Jergalanski
22. Bordunski
23. Kumtorski

Location of ecological risk areals in the Kyrgyz Republic
(The names of the areas are given in the text)



Despite the relatively poor development of the mining industry, it is nevertheless the most damaging industry with respect to the environment, causing destruction of natural ecosystems in mining regions and significant man-made changes of large territories surrounding operations, including pollution by mining waste. While mining causes demonstrable damage to biodiversity, it is often not properly taken into account and goes uncompensated. The negative impacts of mining on biodiversity are considered below:

Expropriation and degradation of natural ecosystems. There are 20 classes of natural ecosystems recorded in Kyrgyzstan. The negative impacts on the main groups of ecosystems are considered below:

Ecosystem group	Mining operations	Negative impact
Forest ecosystems	Mines in immediate vicinity	Reduction of area Deterioration of state of territories Degradation of lands for some species Decrease in number of some species and reduction of their habitats Virtual disappearance of hunting chases Extinction of Red Book species
Grasslands	Mines, production premises, settlements, open-cast mines, local methods	Reduction of area Deterioration of state of territories Transformation into bad lands and moonscape Degradation of lands for some species Decrease in number of some species and reduction of their habitats Virtual disappearance of hunting chases Extinction of Red Book species
Aquatic and boggy ecosystems	Enterprises in zones of drainage formation	Deterioration of state of territories Pollution Decrease in number and diversity of species

Forests make up 4% of the territory of the country and play a very important role in maintaining ecological stability. They contain not less than 20-30% of all species biodiversity. At least three mining enterprises have caused certain damage to alpine fir and archa forests. For instance, in the area of the Bordunski mine (Kyrgyzski mountain range), species in the neighbouring fir forests such as hare and roe, bear, lynx, and a number of plants in the Red Book of Kyrgyzstan have virtually disappeared.

Grasslands dominate and play a crucial role in maintaining ecological stability. They spread over all alpine zones, except the permafrost zone situated four thousand meters above sea level. All mining enterprises are located in areas isolated from grasslands and cause significant direct and indirect impacts. During geological prospecting there was already a tangible impact on the wildlife of the whole territory. Road construction, drilling and other activities, as well as unregulated hunting and fishing practised by those involved in the geological work, led to the depletion of many fauna and flora and the deterioration of all natural ecosystems.

Uncontrolled poaching caused a decrease in number and in some places total extinction of species including ducks, partridges, pheasants, marmots, hares, martens, roes, argali and mountain goats. Red Book species such as the snow leopard, bear, lynx, maral, Tian-Shan argali, mountain goose, birds of prey and others were affected.

Some operating and anticipated enterprises are located on the natural migration route of wild ungulate animals. For instance, the Kumtor mine is located on the traditional migration route of mountain goats and argali. Besides poaching and hunting, the disturbance and the decreased possibility of feeding on the territories has caused a deterioration in the normal life of most of animals and birds.

The extinction of many species has resulted from the degradation of natural ecosystems and their transformation into bad lands. Aquatic and boggy ecosystems are the first to suffer from pollution. In the region of Tash-Komur, the right bank of the river Kara-Suu was inhabited in the 1950s by dozens of grey giant lizards included in the Red Book. Because their habitat was destroyed, these have now disappeared.

Safety measures and communication with the public

Most enterprises in former times were put into operation without the provision of effective environmental safety measures. Most of the main enterprises were commissioned before the operation of waste disposal plants, the monitoring of pollution levels and other environmental impacts, and the assessment of impacts on biodiversity, preventative measures and compensation for negative impacts were in place.

Many plants remain neglected. The state lacks the funds to carry out appropriate closure, and to conduct research and monitoring. This creates an extremely dangerous situation, which, in some cases, impacts upon neighbouring countries, as illustrated by the case of tailings dumps with radioactive waste in Maily-Suu. Resources are insufficient to provide effective solutions.

Only recently has the dialogue between the mining sector and communities started to improve. Previously only the Mining Association dealt with mining issues. In 1998 Kumtor led the way by starting to have regular contact with communities. At present mining and community issues are discussed by the Public Ecological Expertise and the Community and Business Forum (CBF) in which leading ecological NGOs take part.

The Investment Climate

Internal investment opportunities of Kyrgyzstan's mining industry are very limited. There are many reasons for this including high capital intensity of the industry, long-term repayment (several years) and unrealistically high interest rates on credit of local banks (35-40%).

Nevertheless, the State Agency on Geology and Mineral Resources has granted several hundred licences for the development of small deposits. Most of them are developed at the expense of local private investors and in response to the needs of local communities. Small companies are involved in the production of white and forage salt, brown coal, construction materials (gypsum, loam, limestone), mineral and drinking water, rowing and super-fine mineral fibre and construction elements from basalt. The extraction of river-polished boulders to export to eastern countries where they are used as ritual stones, is an unexpected development, and there are four companies currently involved in this.

The amount of investment in such businesses ranges from one to several thousand dollars. The extraction of alluvial gold by individuals requires least investment, and the underground extraction of slate and coal the largest investment. For example, a large prospecting cartel with 150 members, set up during the Soviet time at the expense of private investments and state loans, receives hundreds of thousands of dollars in investment.

At the beginning of the 1990s an attempt was made to invest in gold extraction at a national level. At this time state owned mining companies had been given licences for the exploration of small, alluvial deposits. Investments were made from the funds of the companies involved, or loans secured by the government, and these amounted to a total of eight million dollars. However, the development of alluvial gold turned out to be non-profitable.

While Kyrgyzstan has a stock exchange, shares in mining companies are little in demand even at the lowest quotation. The stock exchange operates at a low capacity, and focuses mainly on the service sector which gives a fast return from investment. No attempt is made to collect funds from the local stock market for the development of deposits. However, one company with mixed capital and diversified production, and little knowledge of the mining industry, issues bonds on the local stock marker and expects to collect about five million dollars to develop small gold deposits.

The gold industry has the greatest potential for foreign investment. In the early 1990s when growth in gold prices was stable, and the country was showing great promise compared with other CIS countries in terms of its economic and democratic reforms, the mining industry attracted a large number of foreign investors, who were encouraged by legislation granting many privileges.

In 1994 450 million dollars was raised through a syndicate to develop the Kumtor deposit. Agreements amounting to a total investment of 200 million dollars for the joint exploration of two other deposits were signed with foreign investors. In all, around 15 million dollars have been invested in deposit development by ten foreign geological prospecting companies.

The years of 1997 and 1998, when gold prices started to decrease rapidly, were critical for international investors. Legislators cancelled privileges and guarantees for foreign investors and the political image of the country deteriorated. War with international terrorists started in the south of the country. At the same time Uzbekistan and Kazakhstan, both rich in mineral raw materials, began granting unprecedented privileges to foreign investors, thus attracting international investment away from Kyrgyzstan. The number of large gold extracting companies operating in Kyrgyzstan, and thus the volume of foreign investment decreased sharply.

Several international venture companies are currently attempting to invest up to 10 million dollars in the development of small native deposits with gold reserves of up to 10 tons. However, high taxes and fees on subsoil use are proving a serious obstacle to potential investors.

There are isolated instances of foreign investments in the non-gold extracting sector. For example, the gold company Kentor has formed Action Hydrocarbons, a joint venture with the geological subdivision of the State Geological Agency, which carries out geological prospecting of oil and gas in the Naryn depression. JS and PGS companies are looking for investors to support geological prospecting of oil and gas. Prospecting and exploration are financed from the state budget in amounts not exceeding 0.5 million dollars per year.

The government has been taking a number of measures to reduce taxes, custom fees and administrative obstacles to foreign investors. This is likely to have a positive impact in the near future.

Transparency for Concerned Parties

Information on hard currency earnings from the export of minerals held in government institutions/agencies, is unreliable. The government does not publish data on uranium oxide.

Since the 1930s the State Geological Agency has been undertaking active exploration of deposits in the Republic. Kyrgyzstan's geological database is as good as than that of many other countries, although it is not compatible with the level of modern computerized information systems. Geological maps, geo-physical and geo-chemical reviews of high quality have been prepared for most of the country. Where major drilling explorations have been carried out the quality of technical information is high, even though the technologies used in such work leave room for improvement.

During the Soviet time, most mining and minerals companies were subordinate to Union agencies located outside the Republic. Information on different activities carried out by these bodies was restricted and completely inaccessible to the general public. Furthermore little was published by the public press on activities in the sector, apart from information on the amount of extracted fuel and non-metallics. After the collapse of the Soviet Union most of the restricted information became inaccessible or was lost altogether.

Public consultation in the planning and design stages were not carried out, although this was the responsibility of planning and design organisations such as Gossplan (the State Planning Agency) and other specialised planning institutions. Over a five to seven year period, national economic development plans were approved at congresses of the Communist Party, followed by public discussion throughout the Union in all work collectives and military units. While product output was given special attention, issues related to environmental and health impacts, and the negative impacts of the industry on other sectors such as forestry and agriculture were hardly discussed at all. Issues relating to construction, operation and closure were regarded as purely industrial questions and had been discussed by specialists and management agencies of the sector, and at a party level. Information on industrial achievements was disseminated to the public via the mass media.

During the transition period one can observe a gradual move away from the former dumning down of the sector. While in the early 1990s the public was completely barred from planning, and environmental impact assessment processes, by the beginning of the 21st century some progress can be observed. This was encouraged by the increase in the interest of the public and NGOs after the accident of 1998, when a cyanide spill into the river Barskon following a truck accident, had a severe impact on the population of two villages.

Poor information distribution resulted in an inadequate response from the communities and the authorities. The scope of the accident was overstated, and became a subject of speculation by politicians, the mass media, rival companies, NGOs, affected people and neighbouring villages. The reaction of the authorities probably caused more damage than the accident itself. The whole population of the affected villages was evacuated to the other shore, and the sale of agricultural production was stopped.

The Ministry of Health Care treated the villages with chloride lime, in such large quantities that it would have been deleterious to the health of the people in the villages. Several people were harmed directly from the cyanide spill, but the misinformation caused far greater damage, not only to the two affected but also to the whole south shore of lake Issyk-Kul, as holiday-makers were deterred from spending their vacations there. The decrease in tourism to the Issyk-Kul region has caused long-term economic and psychological damage to the local population, even though the ecological damage to the lake itself was negligible.

Unlike the majority of mining companies, Kumtor carried out an extensive PR exercise, using the press, public meetings, reports, NGO group visits to the mine site, outreach to the local communities, and financial support to local programmes to win back public trust. Apart from Kumtor and JSC Kyrgyzaltyn, none of the metal mining companies, nor government agencies have a special department or person responsible for public communication. Though the law On Environment Protection (1999) stipulates the right of citizens to have access to information concerning them, it is not supported by legislation.

There is now more active involvement of the scientific community in the planning and project-design stages. Companies preparing documentation for deposit development, now frequently invite the participation of local specialists in the examination of territories for

possible development, and receive expert assessments of the expected impacts on the environment and on the community.

Public access to ecological and economic information was not improved when Kyrgyzstan signed the Aarhus (Denmark) Convention in 2000, as hoped. However, steps in this direction have been taken by the Ministry of Ecology and Emergencies of the Kyrgyz Republic with the publication in 2000 of the National Report on the Environmental Situation for 1998-1999, which amongst other things included data on the environmental impact of minerals sector. Unfortunately, the small numbers produced (300 copies) made the report practically inaccessible to the general public, and it was not widely publicised in the press. In 1999 hearings on different aspects of the environmental impact of the metal mining sector were organised with the support of the Friedrich Ebert Foundation. These were attended by representatives of government ministries and the industry as well as key environmental NGOs of the Republic. Similar issues have also been discussed at seminars and meetings of the Mining Association.

The difficulties with transparency reflect the peculiarities of the transition to democracy. While many restrictions have been removed, the system is still governed to a large extent by the political and group interests, which are not conducive to developing a climate of transparency. For example, the council recently set up to attract investment into the sector was formed without any consultation with leading specialists and few professional representatives of the sector. The lack of regular communication mean that the activities of the council are closed not only to the general public but also to specialists in the sector. Despite the crucial importance of the mining sector to the wealth of the country, conditions for optimal decision-making do not yet exist.

On January 21 1999 the President of the World Bankpresented for discussion the Complex Development Framework (CDF), which aims to determine the prerequisites for sustainable economic growth and poverty alleviation. Acceptibility of the CDF has been tested in 13 pilot countries, including the Kyrgyz Republic and two other socialist countries, Romania and Vietnam. However, there was no public discussion of the mining industry in the Kyrgyz Republic in the CDF. The main body of the document was prepared by representatives of state agencies, without consultation with the public or with key specialists of the sector.

Part III. The Mining Industry: Ecology and Economics

Problems of Recultivation and Rehabilitation of Deposits

When the Kyrgyz Republic became independent, it inherited a mining industry which had previously operated under Soviet regulations to fulfil Soviet requirements. The primary purpose of the Soviet system was the intensification of social services and the maximisation of production. Environmental safety was of secondary importance. Information concerning the operation of mining plants and environmental conditions, particularly of uranium plants, was kept secret. Along with the mining industry, Kyrgyzstan was faced with a legacy of years of inadequate safety measures and a number of mines with un-recultivated dumps and tailings.

One of the biggest problems is caused by tailings from closed plants, some of which are located close to communities, presenting the threat of widespread contamination. An audit of tailings, dumps and salt carriers which was carried out for the first time in 1994 revealed 44 tailings and 63 dumps. The majority of these have been isolated by beds of clay without polymer films and contain toxic salts of heavy metals, mercury, lead, cadmium, arsenic, flotation reagents, pitch and silicate dust and other toxic compounds.

Mercury ore sinters have been dumped without putting in place a system of mercury neutralization and impervious screening, which would prevent mercury from leaching into underground water. Thirty tailings dams with a volume of 50 cubic metres and covering a total area of 3.5 million square metres are filled with radioactive tailings. While tailings are screened (covered) with half a metre of clay material, this is often washed away by floods. Radiation safety is a key issue for Kyrgyzstan, which was the main supplier of radioactive raw materials to the former Soviet Union from 1950 onwards.

Various mines and mills located in the country supplied concentrates and materials to the Kara-Balta uranium oxide plant. These uranium mining operations have now been closed down, but they have left a significant environmental legacy. Studies of the waste rock dumps and tailings dams of former uranium mining operations have revealed significant radioactive contamination affecting the surface water and the atmosphere. Thus far, no funding has been allocated for rehabilitation of these areas.

Following the liquidation of uranium deposits, contaminated technological facilities were buried. Local communities extract buried material for sale as a secondary metallic raw material, ignoring cautions that ionising radiation sometimes reaches 16,000 microroentgens/hour. There were cases when local people used tailings for building houses and utility rooms.

According to data of the Ministry of Ecology and Emergencies, there are 23 store holders and 13 waste rocks dumps, which contain about 2 million cubic meters of tailings left from the processing of uranium ore. Some of them are located in the landslides zone and could be damaged by landslides leading to radioactive contamination of residential areas, including those in the territory of Uzbekistan. In Maily-Suu village there are 23 tailing

dumps containing 1.9 million cubic metres of uranium tailings. Fourteen are located within city areas. Though US$ 50 thousand have been spent on rehabilitation, this is insufficient.

Two other tailings dumps and rock dump sites are of particular importance: Radjy Sai on the shore of the Issyk-Kul lake and Tuyuk-Suu on the Minkush river valley. The waste dumps at Tuyuk-Suu contain approximately 765,000 tons (430,000 cubic meters) of uranium mill tailings. These are slightly radioactive and contain high concentrations of toxic chemicals and reagents. The tailings disposal area covers approximately 32,000 square meters. Floods and precipitation have washed away much of the clay cover, which may cause leaching of toxic and radioactive materials into the river. In addition, the clay tailings dam located in the creek just two kilometres south of the town of Minkush (12,000 population), was built without taking into account the seismic activity of the region.

As a result of new legislation on environmental safety, operating gold mines are generally considered safe by new government departments and NGOs. Nevertheless, the public remains concerned about the possibility of contamination. At present the processing of waste-products of mining is not carried out. However, projects are under consideration to extract uranium from a number of old tailings and on the production of nitrogen fertilizers from materials of rare-earth production.

There is an urgent need for research to assess the situation and identify the worst case scenario following the destruction of a tailings dam. However, the lack of government funds prevents adequate safety measures from being put into place and detailed and extensive monitoring from being carried out. Furthermore, despite the high level of technical skills of Kyrgyz specialists in ecology, health care and production safety, these specialists lack sufficient knowledge and understanding of sustainable development and appropriate preventative safety measures to effectively carry out their work.

Nevertheless in 1996 the Ministry of Environment and TACIS launched a 500,000 Euro project to monitor uranium storage facilities and neighbouring villages in the southern part of Jalal-Abad oblast. The project includes training Kyrgyz employees in the use of modern equipment for monitoring the territories under review, and in undertaking medical examinations of local communities living in the areas of radioactive wastes disposal.

Furthermore, the government is undertaking measures to mobilise international donor funds to treat uranium tailings dumps, thereby preventing them from causing contamination of the local environment. Studies have been carried out in most of these areas to identify the most practical and economically efficient measures to prevent accidents.

The Jogorku Kenesh (Parliament of the Kyrgyz Republic) has adopted new legislation on environmental protection and a National Action Plan, and state agencies on environment protection have been strengthened. The law on Environmental Protection requires environmental impact assessments to be carried out on new mining projects. Around 1% of the expenses of exploitation of deposits is allocated for recultivation after closure. The law on Subsoil gives authority to local administrative bodies to carry out environmental monitoring, but in reality they lack the capacity to do so. At present, the draft law on

Tailings Dumps and Rock Dumps is pending consideration by the Jogorku Kenesh. It is likely to contain the following requirements:

- maintenance of physical safety of tailings and dumps in line with the project;
- in case of emergency, immediately inform the local authorities about the nature and scale of the accident.

Operating organisations are responsible for the safety of personnel and the community, for environmental safety and for dealing with threats caused by illegal actions during the treatment of tailings and dumps. Officials who conceal information about infringements of legislation or accidents are accountable.

Citizens and public unions are entitled to take part in decision-making related to tailings and dumps disposal, as well as receiving objective and timely information about construction planning, operational duration and the selection of locations for tailings and dumps disposal.
Citizens living near tailings and dumps are entitled to receive compensation for damage caused by radiation and toxic substances, which exceed safety limits.

Attraction of Foreign Investment

The mining industry is characterised by high capital intensity, which cannot be mobilised from inside the country; hence the reliance of the sector on foreign investment. However, there are a number of obstacles to attracting foreign invesetment:

- Geographical location. Kyrgyzstan is located far from transcontinental trunk railways and does not have an outlet to the sea. This means international transportation of products to markets and import of equipment and materials needed for production is very costly.
- Transit. Because Kyrgyzstan does not produce the materials, reagents and equipment, used in mining production, they need to be imported. There is no demand for the products of mining in the domestic market and therefore, these need to be exported. The process of import and export requires transit through two to four countries, with corresponding duties levied at each stage for the transportation of freight, and this noticeably affects the costs of production.
- Obstruction from neighbours. Neighbouring countries, especially after Kyrgyzstan entered the World Trade Organization, took measures to protect their products from competition. Kazakhstan and Uzbekistan imposed 100% duties on goods imported from Kyrgyzstan. Uzbekistan, as the only producer of natural gas, raised prices to levels higher than the international average.
- International terrorism. There are a number of regions under threat of international terrorism, and a problem of poor demarcation of borders, resulting in unrest and insecurity in the region, thus preventing exploration works and mining operations from taking place.

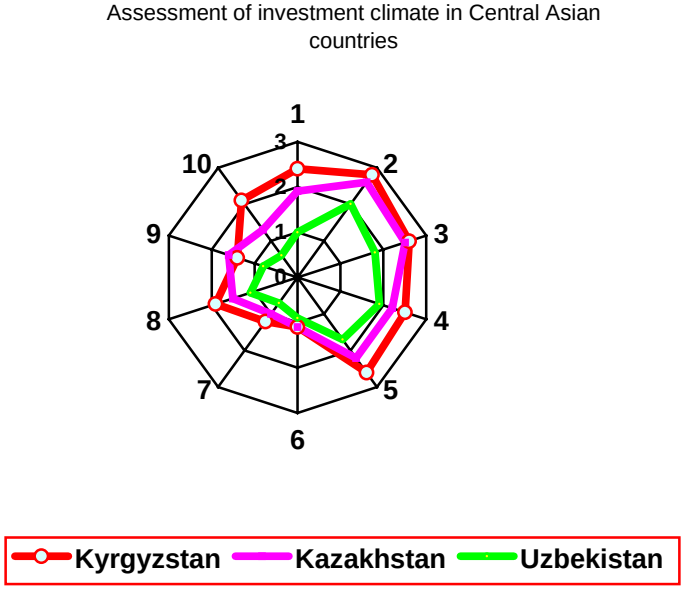
- Severe climate. The territory of Kyrgyzstan is characterized by a sharply continental climate, shifting to sub-arctic in mountainous areas. Along with high seismicity (8-9 points on the Richter scale), such a climate poses a considerable threat to construction and increases production costs.

Nevertheless, after independence Kyrgyzstan's rich gold resources attracted the attention of foreign investors. Dozens of foreign companies rushed to obtain licenses for the exploration and development of gold deposits. In 1996, in cooperation with the Canadian corporation Cameco, a US$ 452 million project was implemented to develop the gold deposit Kumtor. International tenders for projects developed in the Soviet period were also in place.

In developing countries individual investors are not prepared to bear the whole financial risk. Consequently, mining companies usually take out syndicated loans. For example, the main investors in the Kumtor project were Chase Manhattan Bank, the Canadian Corporation on Export Development, the European Bank for Reconstruction and Development and the International Finance Corporation. The confidence of investors was reinforced by political stability, moderate inflation of the national currency, fulfillment of the Kyrgyz Government's international obligations, and the successful realisation of the Kumtor project.

The Kyrgyz mining industry has attracted some of the largest mining companies in the world, including Cameco Corporation (Canada), Teck Corporation (Canada), Phelps Dodge Corporation (USA), Barrick Gold Corporation (USA) and others. By the mid 1990s foreign companies were spending up to US%10 million annually on the exploration and prospecting of gold deposits.

In 1999 the EBRD jointly with the World Bank carried out country surveys of the former USSR and Eastern Europe to determine the investment climate of these countries. (WB Report 1999). The study included interviews with company directors to evaluate the influence of each investment climate parameter on the activity and development of the mining company according to a four-point scheme. A summary of the assessment is represented in the following diagram. Along with Moldova, Kyrgyzstan had the lowest ranks and least favoured investment climate of the 20 countries assessed.



1) political instability, 2) inflation, 3) exchange rate, 4) finance, 5) taxes and regulations, 6) infrastructure, 7) judicial system, 8) corruption, 9) unorganised crime, 10) organised crime, mafia.

In 1996 there was a rapid decline in the price of gold and other metals extracted on the territory of Kyrgyzstan. To forestall the deterioration of metal market conditions, neighbouring countries introduced many privileges for foreign investors. In Uzbekistan joint ventures are exempt from all taxes, deductions and payments during the stages of geological exploration, preparation of the feasibility study, construction and the development of mining and production. Seven-year tax holidays have been introduced. In Kazakhstan royalties are ten times lower than in Kyrgyzstan, and Uzbekistan have no royalties at all. In contrast, all such privileges to foreign investors have been cancelled.

Taxes and payments in Kyrgyzstan are high, particularly the royalty for land use, which is one of the highest in the world (15% from value of sales). When reviewing the Kyrgyz mining industry, experts from the Japanese Agency on International Cooperation (JICA) compared the financial situation of two gold extraction projects on the basis of the tax systems of Kyrgyzstan, the Philippines and Argentina. They concluded that companies working on the border-line of profitability in Kyrgyzstan could work more efficiently in the Philippine and Argentinian tax systems.

The government has been promoting the idea of setting up a Development Bank in Kyrgyzstan, with the possible contribution of funds from Japanese, Malaysian and European banks, and 20% from the Kyrgyz government. It is expected that the Development Bank will provide loans for three-five year terms with annual interest rates of approx. 17%. However, at present the credit rates of local banks for hard currencies is very high (25-45%), with credit terms no more than a year, which makes financing mining projects extremely difficult.

As a result of these factors foreign mining companies have reduced their investment in Kyrgyzstan, in preference for investing in neighbouring countries. Today the total input of private companies in the Kyrgyz Republic, apart from that of the Kumtor Operating Company, is US$0.5 million. This is insufficient for the discovery of new fields and the development of new deposits.

A number of companies have expressed an interest in the exploration of gold, gold-copper, tin-tungsten, coal, oil and gas deposits in Kyrgyzstan, and have been conducting economic assessments and preparing for development. These include Oxus Resources company (UK), Normandy Mining Company (Australia), Malaysia Mining Company (Malaysia), Hemco Company (Holland-USA), Renton Group Ltd (South Korea), Golden & Silver Company (Israel) and others. These companies have been negotiating with international financial institutions on credits and flotation of shares on the stock exchanges in order to invest in deposit reserves for which they have received exploration licenses. The British Company, Oxus Resource, has collected about £8 million on the London stock exchange and continues to raise the capital for a number of deposits (including Jerui deposit in Kyrgyzstan).

In order to determine the criteria used by the companies to evaluate potential investment projects in emerging economies, including Kyrgyzstan, the World Bank with the participation of the UN, has carried out a survey of major international mining companies. In order of importance, the criteria used are:

- Good geological prospectively and mining tradition and potential;
- Availability of infrastructure;
- Clear mining rights and titles (mining legislation);
- Ownership and control of operations (mining legislation);
- Political stability and transparency of governance;

International experience has demonstrated that if governments address these issues they can and do attract significant amounts of investment. The Kyrgyz Republic has a high mineral potential, a long mining tradition and well-trained technical personnel. The country also has a reasonably good infrastructure to support mining activities, except in certain areas. However concerning the last criteria above, a significant reform programme will be required to remedy the perceived deficiencies and to comply with the expectations of potential investors.

Based on reviews of experts, the government is currently developing a programme to reduce royalties, to abolish VAT on mineral raw material exports, to ease access to entrails, simplify the licensing process, remove administrative barriers and reduce state interference in the production activity of mining companies.

The government has worked out a draft law on State Support for Direct Investments which provides considerable state guarantees for investors:

- Non-interference of state agencies into the activities of foreign investors, if there is observance of legislature by the latter.

- Non-limitation of investors' rights in using their share of authorised capital stock or shares, free transfer of capital, profit and income.
- Prohibition of state monopolies controlling commodity sales, use of price control and regulation during commodity sales.

The government of Kyrgyzstan has been working towards the establishment of a favourable investment climate. A number of appropriate amendments and additions to the Tax and Custom Codes, the law on Subsoil and other legislation related to mining and use of subsoil, have been prepared.

A Co-ordinating Council on the Attraction of Foreign Investment has been set up, headed by the President of the Kyrgyz Republic, A.Akaev. It consists of representatives of the World Bank, the American Ambassador, and representatives of mining and other foreign companies such as Cameco, Reemtsma and others.

The Integration of the Mining Sector of Kyrgyzstan into the World Economy

The economy of Kyrgyzstan cannot develop in isolation from the world market. The integration of the mining industry into the world economy can be realised in two ways: firstly, through the sale of the output of mining and minerals companies and the purchase of materials and facilities for production; and secondly, through the development of deposits by attracting foreign investment.

Because Kyrgyzstan does not have a developed processing industry, mineral raw materials make up a significant share of Kyrgyz exports. After the fall of the USSR, Russia, Ukraine and Belarus remained the main consumers of Kyrgyz mineral production. There is a stable demand for concentrates and rare-earth metals produced by the Kyrgyz Chemical-mineral Plant in CIS countries. Companies of Japan, South Korea, Western Europe and South-East Asia are also interested in long-term supplies of rare-earth concentrates and rare-earth metals and their compounds.

Metallic mercury from the Khaidarkan Mercury Plant is sold in CIS countries and China, and metallic antimony has a stable market in Russia and other countries. Tin and tungsten concentrates produced by the SaryJaz Plant and uranium and molybdenum from the Kara-balta Plant are in stable demand.

For mine exploitation facilities, materials and reagents are supplied from Kyrgyzstan, CIS countries, China, Romania, Germany, Canada, USA, South Africa and Sri-Lanka. Off-shore accounts are used for credit, payments for suppliers and other commitments of the company, according to international banking regulations on the financing of mining projects.

The drop in world prices of mineral raw materials, unfavourable geographical conditions and insufficiently developed infrastructure within the Republic, combined with isolation

from world transport links, are largely responsible for Kyrgyzstan's reliance of the neighbouring markets of the CIS countries.

The Mining Industry and Local Communities

One of the peculiarities of Kyrgyzstan is that only about 7% of its territory is suitable for agriculture and permanent settlement. About 90% of the territory is mountainous, and 60% is very rugged. Pasture is the most common type of land use, amounting to 46% of the territory (Shukurov 1991). Because of the decline in agriculture many remote pastures are not being used.

All mines and most mining and minerals companies are located in remote areas far from settlements and agricultural lands. The biggest operating mine, Kumtor, is located in a remote, mountainous part of the country, with little agricultural value. Mine pits and mine buildings are located in the permafrost zone. The sparce alpine vegetation covers less than half of the mine territory.

In the Soviet time, when the mining industry went through rapid development, companies of the sector and attendant enterprises overlapped in areas of activity. Most of the time income exceeded that previously received by local communities of the area. Towns were built, infrastructure developed, and the supply of goods and services improved. This was largely the result of the creation of new jobs and incomparably high salaries, the opportunity for education and a relatively well developed service sector. The network of schools, day nurseries and kindergartens, specialised secondary education schools, health care, cultural institutions, and the provision of public transport and communication were all included in the construction and development plans of mining companies. The high purchasing capacity of the population in mining enclaves stimulated production and the sale of agricultural and other goods produced in the country. Thus the mining industry, in addition to its direct contribution, stimulated the development of other sectors of the economy.

Unlike other countries where the mining industry resulted in the expropriation of lands of local people and forced re-settlement, the situation in Kyrgyzstan was different. The expropriation of pastures was limited, and was compensated by benefits resulting from the mining industry, and by the allocation of alternative lands. During this time, there was no private ownership of land, and public ownership was of two types: state and collective. In both cases the decisions on land allocation and re-distribution was centralised. There have been no recorded conflicts with local communities related to expropriation of land for mining companies in Kyrgyzstan.

Because of the relative remoteness of settlements (apart from those built directly on mine territory), there were few negative impacts from mining, and these did not give rise to the concern. While information on the health impact of mining companies was largely inaccessible, a number of medical and safety surveys were carried out in the communities (for example, see: Environment and Human Health; the Ministry of Health Care of Kyrgyzstan. Kyrgyz scientific-research institute of prophylaxis and medical ecology: Bishkek, volume 1, 1993, vol. 2-4 1995). Trade union organisations provided tickets for

rest-homes and sanatoriums, and children were given the opportunity to visit special summer sanatoriums.

Many mining workers had the opportunity to improve their social status, and were generally well respected. Outstanding workers were given special government prizes and awards and were nominated to lead companies, administrative and state agencies. For example, a former mine worker from Kyzyl-Kiya ('Jal' mine) T. Kulatov, was Chairman of the Supreme Council of Kyrgyz Soviet Socialist Republic from 1945 to 1978.

New mining projects in rural areas led to the influx of highly qualified specialists and the formation of new cultural centres. In such conditions, there was little cause for conflict between local communities and mining companies. It is important to note that the population of neighbouring villages also benefited from mining.

However, as the result of the collapse of the USSR and the break-down of the economy, the mining industry went into crisis, resulting in the economic and social decline of the settlements and villages surrounding the mines. Those mining companies which remained in operation, have been struggling to survive, and are unable provide the social benefits of the past. During the crisis period there was a mass emigration of qualified personnel. Mass poverty – previously unknown – resulted in the mining enclaves of the country. (Kyrgzstan, National Human Development Report for 1996-2001. Bishkek. Kyrgyzstan general country survey 1996-2001.).

The break-up of kolkhozes and sovkhoses and the sharp reduction in numbers of cattle brought about the decline of cattle-breeding. The distribution of lands worsened conditions for agriculture and resulted in a decrease in crops. Because of corruption community development programmes supported by external investments became ineffective. The first independent non-governmental organisations emerged, among them 200 ecological organisations (E. Shukurov. Ecological movement of Kyrgyzstan/ Actions of ecological organisations of Kyrgyzstan. Bishkek, 1999, Ecological Kyrgyzstan. Address directory of ecological organisations and specialists, Bishkek, 1997. E.Shukurov. Steps towards a civil society MilieKontakt Oost-Europa. Annual Report. 1998). Along with the positive aspects of NGO activity where community interests are represented, there are also negative aspects where NGOs pursue certain very narrow goals, using local communities for their own interests. (See. Planet, people, corporations, Vestnik " Zelenoe spasenie". Issue 13. Almaty, 2000; E. Shukurov. Voina do pobedi, ili peregovori? Bulletin of Moscow ISAR, #14, 2001).

From the 1920s state policy was directed towards settling local communities. Traditionally the Kyrgyzs led a nomadic life in small groups, ayils (villages) connected with each other by clans and tribal ties. The ayil was also an economic unit related to cattle breeding. The transition to a settled life in kolkhozes (collective farms) strengthened the ayil structure as people settled according to tribes and clans, hence the use of the word ayil for village. The land was used largely for livestock farming, with part of the population continuing to lead a nomadic life, travelling with cattle, although they had permanent houses in villages. The enlargement of kolkhozes carried out in the 1960s resulted in the destruction of the ayil based structure. Formal relationships on the administrative system started to play a more

important role leaving less room for informal relationships. Official structures began to represent local communities, which had few common interests to unite them.

Local power structures in Kyrgyzstan include local keneshes, territorial public self-government bodies, including councils and committees of micro districts, house, street, residential area and village boards. In the South they are called 'Makhalya'.

In cities all these bodies coordinate their activities with rayon (district) administrations. In villages this role is given to local government – ayil okmotu (village government). As a result of land reforms and decentralisation, the functions of ayil okmotu have been significantly extended.

Ayil okmotu bear responsibility for socio-economic, cultural and educational areas of the village. They are also responsible for redistribution of land, and decide issues related to land renting and the rational use of plough lands and natural resources; they approve the local budget, maintain local communication services, distribute salaries and allowances, and control the budget of the local infant school, club and medical points.

All ayil okmoty have been involved in the preparation of village council censuses which record data on the number of pastures, ploughs, dry lands, individual and collective (including juridical persons) land allotments, age and ethnic composition of households and families, pensioners, the number of children, mothers, migrants and refugees, unemployed and occupied and etc. The workers of ayil okmoty usually know the villagers well, and are aware of who does what. Ayil okmoty also act information points. Every morning the heads of the village cooperative farms, united farms, mini-farms and private companies come to ayil okmoty to decide everyday issues.

The head of an ayil okmotu is nominated from deputies of village councils. Candidates are then approved by rayon akim (the district administration) with the agreement of the oblast governor. Usually the head of the ayil okmotu is the chairman of the village council, which unites seven to nine village deputies. Each deputy is well known and trusted in the community. Similarly, deputies know have an intimate knowledge of the community: they not only know the budget of the ayil okmotu, but also the budgets of some farms; they are aware of their tax and credit debts, the situation in needy families, the problems of pensioners and so on.

At present villages are a mixture of ayil-clans and administrative-formal relationships, which were inherited from the regulations and the informal structures of Soviet times. Of the informal relationships the 'kyrgyzchylyk' is a special type of relationship which maintains the hierarchy of values and relations.

The presence of local independent NGOs and the sporadic attention to village communities of City NGOs is a new phenomenon. These characteristics of the transition period should be taken into account when considering the relationships of village communities with mining companies. In many cases communities are indifferent to mining companies, except where there is a possibility of improving their situation with the assistance of the mining company. For example in Talas oblast, the village communities close to an anticipated mining operation, were keen for this to start as soon as possible, in

the hope that it would create new jobs, bring in income from production and help to improve the infrastructure.

The Contribution to Local Communities and Wealth of the Country

The mining industry has always played a crucial role in the economic and social development of the Kyrgyz Republic. Six out of 22 towns of Kyrgyzstan and 14 out of 29 urban-type communities sprung up in areas of mineral mining. According to Soviet regulations these settlements, the social (schools, hospitals, kindergartens, shops and etc) and the infrastructure (maintenance of roads, energy system, communication and supply) were maintained at the expense of mining enterprises. These expenses were included in the production costs.

During the Soviet time there were 50-55 thousand people employed in the extracting industry and 12 thousand people in geological prospecting. These figures also include personnel involved in the supporting social services. After the fall of the USSR, these expenses became a heavy burden for enterprises, whose operations had become non-competitive. Social service and infrastructure expenses were transferred to municipalities, which lacked the funds to maintain these services and amenities. At the same time the workforce was reduced by 35-40%.

In the struggle to reduce the production costs the number of jobs was cut by two- or three-fold, and there were no other jobs in these communities. While the mining and minerals industry had employed 23 thousand people during the Soviet time, by 1995 the number of workers had been reduced to 10.5 thousand people. In the fuel industry, of the 12 thousand people employed during Soviet times, only 4.5-5 thousand people are employed today, with the threat of further job cuts. In the non-metallic sector, including the production of construction materials there had been 18 thousand people employed in Soviet time. Today the number of workers does not exceed 7 thousand people.

In order to support local communities during these difficult times, the government had to subsidise a number of mining enterprises, but this is not viable in the long-term. Nevertheless, compared to other sectors of the industry, the mining sector has proved to be more resilient in a crisis, and at present the mining sector makes a significant contribution to the economy of the Republic.

In 1995 the number of mine workers started to increase due to the construction of the Kumtor Gold Extracting Plant, and because of the development of private and individual mining businesses. Today there are 12 thousand mine workers. Up to January 2002, there were 215 (144 operating) registered mining companies. In 2001 production amounted to 28.4 billion som (US$585 million).

Marco-economic indicators characterising the mining sector of the Kyrgyz Republic have increased significantly. Between 1995 and 2000 the mining sector's share in GDP increased by six to seven times, and the volume of export increased by 3.2 times.

Macroeconomic indicators of the mining industry

Indices	1995	1996	1997	1998	1999
Share in GDP, %	1.5	1.1	5.6	6.6	7.7
Share in industrial production, %	12.3	9.7	34.1	41.1	42.1
Share in export, %	13.8	10.9	30.8	40.2	40.6
Share in employment, %	1.1	1.0	0.9	0.8	0.7

Production and taxation in the mining sector of the Kyrgyz Republic 1995–1999

	1995	1996	1997	1998	1999
Production					
Million dollars	80.654	75.327	354.294	420.695	367.646
Export					
Million dollars	56.246	55.225	186.127	206.495	184.235
Import					
Million dollars	13.817	16.126	55.949	46.352	74.165
Tax on Profit					
Million dollars	10.017	3.988	396	1.546	1.051
VAT					
Million dollars	3.346	2.345	3.845		
Excise tax					
Million dollars	124	15	11	40	599
Land tax					
Million dollars	24	45	136	24	36
Income tax					
Million dollars	898	778	623	473	388
Other taxes					
Million dollars	1.702	2.060	1.962	761	800
Total: taxes					
Million dollars	16.111	9.231	6.973		

Source: National Statistics Agency

Practically all indices showing growth in the mining sector are the result of gold extraction at the Kumtor mine, which started in 1997. In 2000 Kumtor processed 21 tons (675 thousand ounces) of gold to the sum of US$230 million (including hedging).This year Kumtor contributed 6% of the total GDP of the Republic, more than 35 % of the total export income and 30% of the total industrial production. As the result of the drop in gold prices income from production has been less than expected. Nevertheless Kumtor's contribution to the local as well as the national economy is still significant.

The performance of other gold mining enterprises and other mining enterprises in general are lower than that of Kumtor. Nevertheless the Kara-Balta Uranium Prosessing Plant, the Khaidarkan Mercury Plant and Makmal Gold Extracting Plant have kept their positions in the market. The Kadamjay Antimony Plant and the Orlovsky Plant hich produce rare-earth metals, have been experiencing difficulties because of the irregular supply of raw and other

necessary materials and the exhaustion of mineral resources. While some mining enterprises producing tin and tungsten, industrial building materials, coal, oil, gas, chemicals and others generate less output, they benefit from the existing infrastructure and the support of people in neighbouring villages.

The development of Kumtor revealed positive and negative impacts of mining companies on local communities. The project provided employment for 2000 workers during construction and more than 10,000 in contract construction. For the operation period 1,500 jobs with high salaries were created. More than 90% of the labour force is drawn from local communities. Furthermore, the company purchases local construction materials and agricultural products.

During the construction period between 1994 and 1996 payments to the state budget, off-budget funds and social support from Kumtor Gold Company amounted to:

- Payments to the state budget in the form of taxes US%14.2 million (total budget US$162.5 million);
- US$1 million transferred to the Regional Issyk-Kul Development Fund;
- Social support to local communities, installation of electric heating systems in schools and kindergartens US$700 000;
- Improvement (construction) of infrastructure and energy supply of Issyk-Kul and Naryn regions (154 km of 220 kW power transmission line) US%38 million;
- Reconstruction of a 45 km road near to Barskon village US$ 6 million;
- Payments to local sub-contractors (85contracts) and 455 suppliers us$55 million;
- The Canadian partner Cameco has contributed US$1.5 million to the development of agribusiness in the Issyk-Kul region. In 1995-1996 there 50,000 tons of grain crop was harvested.

During the construction period alone the Republic gained US$116.4 million. About 1,000 miners have been given high levels of professional training by western specialists, and now professional standards of local workers are on the level of workers of foreign mining companies.

Due to the demand for lime, a lime production plant was put into operation in the village of Kurmenty. In lime production coal is needed, resulting in the establishment of a coal mine in the neighbouring viallage of Jergalan. The work of local transport companies involved in the transportation of coal and lime was revived. Thus, the mining enterprise became a catalyst for developing a number of different sectors, thus providing four to five jobs for one job in mining.

The average annual salary in the Republic in 2001 was 1,346 som (US$28), and in the mining industry 2,556.5 som (US$53). There is discontent on the part of local workers that despite the same professional qualifications their wages are lower than those of expatriate staff; the Kumtor Operating Company pays expatriate staff 8-10 times more.

In spite of the alleged transparency of the company, there are rumours that Kumtor secretly extracts uranium and is involved in the disposal of radioactive waste imported from abroad. There are also cases of collective blackmail. Members of Jany-Talap village complained to Kumtor that it had poisoned a stream with mercury resulting in the deaths of 1,700 sheep. However, the government commission which examined the site concluded that mercury is not used in the mine. Last year communities living along the road leading to the Kumtor mine complained that Kumtor trucks were responsible for raising dust and damaging vegetation. KOC had to invite national experts to conduct a dust impact assessment.

Representatives of other local communities and villages around mines which have a direct environmental impact, complain that they do not get a fair share of revenues from taxes and other profits, although Kyrgyz legislation provides for significant tax payments by mining companies to the local budget. It was shown that in some cases individual political leaders and heads of local communities were simply misusing funds raised from different projects, so local communities were not benefiting from these revenues.

The government should set up mechanisms which guarantee an open process of tax revenue distribution and optimal use of these funds at the local level. In addition international organisations such as the World Bank, the EBRD and other financial institutions should ensure that communities are involved in decision-making.

Identifying local preferences through direct consultation, incorporation of indigenous knowledge into project approaches, and appropriate early use of experienced specialists are of central importance for projects affecting local people and their rights to the benefits from the use of natural and economic resources. There is a need for partnership with different organisations with complimentary skills and relationships to make this work effectively. Where mining companies lack the skills needed for community development, they should hire specific expertise or co-operate with others, such as the CBF and/or NGOs. Similarly, providing access to grants and micro-credits requires both funding (which could be fully or partially financed by a mining company) and the process of effective distribution, monitoring and collection. This process is perhaps best carried out by experts in micro-credit/community development. Village organisations have several structures which could support the environmental and social programmes of businesses, including aksakal courts, women's committees, veteran councils, youth organisations, people's squads (Kyrk Choro).

About 5,000 people were directly engaged in the illegal gold business in different regions of the Republic, until it was legalised in 2001. While this sector provides income for 20-25 thousand people from impoverished strata of the rural population, it often involves the uncontrolled use of mercury. Unbeknown to rural communities, this causes environmental problems. Furthermore, awareness raising work with villagers has been largely ineffective as they would rather put up with pollution for the sake of for material well-being. The establishment of receiving centres equipped with laboratory facilities for extracting gold might help to solve the problem.

There have been 15 thousand deposits of all kinds of minerals recorded in Kyrgyzstan. Most of them are not of interest to mining companies, but can be developed by artisanal methods. Involvement of local communities in the small-scale mining sector is not easy, but is very promising in terms of job creation in the mountain regions of Kyrgyzstan, and

might help to stem the current out-migration of workers to the industrially developed north of the country.

Historically Kyrgyz mining and metals plants situated in remote areas have taken direct responsibility for maintaining the local infrastructure and provision of social services. International companies see their contribution to local infrastructure in terms of paying taxes to national and local government, who in turn are responsible for the development of infrastructure and provision of social services. This difference has caused significant disputes between mining companies and the local and national government.

One of the most difficult issues is how far government should go in providing social support to local communities in areas where government-owned mining operations are no longer economically viable, or have closed. While the government of Kyrgyzstan has a long-term plan for the establishment of new mining enterprises in all regions of the Republic, where current operations have ceased due to the exhaustion of resources, there are currently no funds to realise this. Thus, at present the social problems related to the closure of non-profitable mining enterprises have no solutions.

Over the last few years there has been a debate regarding the levels of taxation in the mining sector. The government insists that low rates of royalties will not give a fair return from the development of deposits. Representatives of the mining sector, on the other hand, are trying to convince the government that the state will gain higher returns if royalties are reduced or abolished altogether, as high taxes mean that companies focus only on high-grade areas of deposits or abandon deposit development because of low profitability. There are dozens of explored deposits which lie on the verge of profitability given tax concessions. If the government agrees to reduce taxes, the state budget of the Republic may gain up to US$100 million annually, with the creation of up to 8.5 thousand jobs in remote areas.

Socio-economic indicators of deposit development

Deposit	Years of exploitation	Product ion output tons/per year	Permanent jobs, number of people	Commodity output Million dollars.	Investments and Expenses Million dollars.	Annual taxes and payments Million dollars.	Other positive impacts of the project
Jerui (gold)	12	5.6	600	624.26	129	5.6	High voltage power transmission line, general improvement of infrastructure of the region
Kuru-Tegerek (gold, copper)	24	Au 2.3 Cu 27500	990	110.4	110.4	14.04	High voltage power transmission line, roads, settlement
Bozymchak (gold, copper)	18	Au 1.3 Cu 15100	770	264.2	46.8	6.9	Sumsar-Bozymchak road, settlement, development of other neighbouring deposits
Nazonovskoye (gold)	14	0.9	280	145.2	32.3	1.8	High voltage power transmission line, roads, settlement
Kara-Keche (coal)	21	1.5million tons.	660	630	53	2.8	High voltage power transmission line, roads, development of other neighbouring deposits
Taldy-Bulak Levoberejni (gold)	14	5.5	800	638.7	141.9	11.4	High voltage power transmission line, roads, development of other neighbouring deposits
Trudovoe (tin, tungsten)	25	Sn 5000 Wo_3 3500	700	807.5	220	7.45	High voltage power transmission line, roads, development of other neighbouring deposits
* Toktozan (gold)	9	4.2	800	290.3	64.5	8.4	High voltage power transmission line, roads, development of other neighbouring deposits
Solton-Sary (gold)	14.8	0.5	300	483.9	107.5	1.0	High voltage power transmission line, roads, development of other neighbouring deposits

* With supplementary exploration of reserves of high class.

*Kichi –Sandyk (gold, copper)	16	Au 1.6 Cu 2860	356	309.7	68.8	4.34	High voltage power transmission line, roads, development of other neighbouring deposits
* Jamgyr (gold)	32	0.5	180	174.2	38.7	1.0	High voltage power transmission line, roads, development of other neighbouring deposits
Kurunjailoo (gold)	5	1	150	48.4	10.75	2.0	High voltage power transmission line, roads, development of other neighbouring deposits
* Taldy-Bulak Talaski (copper, gold)	8	Au 7 Cu 13124	940	967.3	215	19.25	High voltage power transmission line, roads, development of other neighbouring deposits
* Andash Talaski (gold, copper)	12	Au 8 Cu 15000	1000	1105	241.5	22.1	High voltage power transmission line, roads, development of other neighbouring deposits.
Total		Au 35.9 Cu 73584	8526	6599.56	1480.15	107.98	

Information Disclosure and Stakeholder Communication

During the Soviet time information related to mining enterprises, minerals, particularly uranium, and the environmental impacts, was heavily restricted. At present general information on mining companies, apart from commercial classified information, can be obtained from the State Agency on Statistics which is legally obliged to provide such information. Similarly, information on environmental accidents, which occurred in the Soviet period, has now been released. The current law on Protection of the Population and Territories from Natural and Man-caused Emergencies requires that the local population is provided with timely and reliable information on possible or actual emergencies and the preventative or protective measures to be taken. According to the law on Environmental Protection public unions and associations working on ecological issues have the rights to:

- timely and complete information on environment pollution and the environmental situation;
- insist on having an ecological platform in the mass media;
- organize public ecological expertise;
- participate in environmental monitoring;

All citizens have rights to:

- receive complete and reliable information on the state of the environment, the health of the population, and planned construction of industrial enterprises;
- take part in public ecological discussions;

Despite this legislation, the only company that regularly publishes reports on environmental impact and environmental safety measures is Kumtor. Other mining enterprises which may cause serious environmental problems, publish occasional reports on their activities, distributing the information only to state agencies.

Regulations on company reporting (including frequency, standards and thoroughness of data and other aspects) should be applied to all mining companies in accordance with established common procedures. It is clear from stakeholder discussion in Kyrgyzstan that public disclosure of relevant information (revenues, environmental conditions) is one of the top priorities for people affected by the mining industry.

In May of 1998, whe the Kumtor mine became a centre attention as a result of cyanide accident, a commission of Russian and Canadian international experts was formed at the request of the Kyrgyz Government, to ascertain the actual and potential damage to health and the environment. Members of the commission came to the conclusion that concentration of cyanide in the irrigation canal in the villages of Barskon and Tamga was insufficient to cause any serious health concerns. An assessment by two independent representatives from the World Health Organisation was consistent with the commission's findings, and the commission's report was made publicly available. The accident pointed out the need for greater dialogue and information sharing between the mine and the local communities.

There is a general need for industry to become more aware of the impacts it has on different sectors of society and on the environment, and how these relate to their social responsibility, their public image and ultimately their profits. This is particularly the case in the mining sector, where activities are often located in areas of severe socio-economic difficulties with diverse cultures and sensitive environments.

Part IV. The Main Problems in the Mining and Minerals Industry in the Context of Sustainable Development and Recommendations

All sectors of the economy, including mining, involve wide circles of interested parties and affect human activities in different ways. Only through a complex consideration of the issues can the benefits be maximised and the undesirable impacts minimised. Key recommendations are grouped according to stakeholders, including the state, international organisations, mining companies, local communities, NGOs, mass media and the education sector.

Subject areas include scientific studies/analysis, information distribution/transparency, cooperation/partnership, ecology/medicines/health care, decision-making structures, law, economics and institutional development.

1. The State

Key recommendations include:

1.1 The publication of a National Report on the State of the Mining Industry. Regular annual reports, accessible to the public and published according to set standards, help to promote greater transparency in the sector, improved state policies and a better understanding of the sector by the public and potential partners. They also help to identify areas of weakness and stimulate analytical reflection and policy development, as well as helping to monitor success in the management of the sector as a whole.

1.2 Organisation of regular briefings for the mass media on mining issues.

1.3 Provision of information on development projects (projected and operating). All data which are not commercially classified should be accessible to the public. It is necessary to develop an access procedure and a statement of responsibility of all parties. While the country has signed the Aarhus Convention, there are no legal documents which define concrete conditions governing the provision of information.

1.4 Creation of conditions for stakeholder interaction e.g.the publication of a directory, a mailing list and a web-page. Although each stakeholder has his/her own interest in the sector, stable profit can only be achieved through coordination of all stakeholder interests. The first step is to provide information about different stakeholders and their interests.

1.5 Support of state and public expertise.

1.6 Development and introduction of decision-making procedures involving public and independent experts. While the circle of specialists consulted has widened, participation is limited and there are no compulsory procedures to encourage public participation.

1.7 .Make the legal framework more favourable for investment in and functioning of the mining industry, the development of local communities and the observance of environmental requirements and community health.

1.8 Formation of a financial-credit system supporting business activity in the mining industry.

1.9 Assign government representatives with special communication functions to interact with representatives of the mining industry, the public and mass media. Officials with special competence in cooperation with the non-governmental sector may effectively decide many issues, in particular those related to information distribution.

2. International organisations

There are several areas in which international organisations could assist through consultation and financing.

2.1 Grant support for independent research and analysis. Besides general surveys it would be good to have more detailed studies of key issues and problems.

2.2 Organisation of consultation meetings, and familiarisation/study tours.

2.3 Sociological studies (awareness, attitude, participation etc).

2.4 Publication of independent research/analysis/assessment results.

2.5 Organisation and support to public hearings on mining sector issues.

2.6 Assistance in provision of modern technologies, especially in health care and environmental protection.

2.7 Transfer of methodology and equipment for the assessment of the nature and scale of environmental and social impacts.

2.8 Consultations on public participation.

2.9 Involvement of national experts in decision-making processes.

2.10 Consultation and grant support to improve legislation and law enforcement practice.

It is also a good idea to involve national experts in international structures studying mining issues.

3. Mining companies

3.1 Publication of concise, accessible reports on activities of mining companies. These might be placed on websites of some organisations (NGOs etc). There is little up-to-date information on activities of mining companies, except Kumtor, which has attracted attention since 1998.

3.2 Public hearings on anticipated projects.

3.3 Briefings, press releases. Information about current or emerging issues and problems can be published in the mass media. This is an important aspect of transparency.

3.4 Support to the establishment and activities of NGO structures, representing the interests of mining and the public, which can also act as intermediaries between different stakeholders.

3.5 Conclusion of cooperation agreements between mining sector companies and local communities (ayil okmotu (village government), rayon (district) administration, oblast (province) administration etc).

3.6 Direct investments into forest plantations as a compensation for environmental damage.

3.7 Concise annual environmental reports by each mining company to be publicly distributed (including through mass media).

3.8 Organisation and maintenance of health services in the region of mining operations, possibly, jointly with the state and local government.

3.9 Development of decision-making procedures involving community participation.

3.10 Organisation of opinion polls. Key issues and problems should be determined first by surveys.

3.11 Contact points, addresses, telephone numbers for public communication. Most mining and minerals companies as well as the public, lack such contact addresses, or knowledge of the existence of such contacts.

3.12 Establishment of an information centre, possibly, on the basis of existing NGO resource centres, which will receive regular information on mining companies.

4. Local communities

Local communities may have a greater interest in mining companies on their territories if they are informed, regarded as partners and given different forms of participation (including revenue distribution and development of attendant productions).

4.1 Attendant business activity (production of food, provision of services etc).

4.2 Nomination of representatives to to be included in decision-making processes.

4.3 Creation of focal groups for contacts and communication.

5. Non-governmental sector.

The main aim of interaction with the NGO sector lies in the establishment of partner relations, the use of NGO potential for sustainable development of the sector and better public understanding. The main obstacle is that the non-governmental sector has a weak structure and exists mainly in the form of separate organisations.

5.1 Carrying out independent studies/analysis/assessments. Such activity will attract qualified specialists in the drafting of unbiased reports on key issues connected with activities of the sector.

5.2 Collection and distribution of impartial information concerning the mining industry to the public and other interested parties.

5.3 Involvement of the mass media in covering issues of public and community interest.

5.4 Organisation of site-visits by representatives of the public.

5.5 Formation of and support to focus groups on cooperation, including non-govenrmental structures representing public, business and regional interests.

5.6 Facilitation of bilateral and multilateral agreements.

5.7 The undertaking, with participation by independent qualified experts, of public monitoring on the fulfilment of environmental requirements by mining companies.

5.8 Inclusion of NGO representatives and their suggestions into decision-making processes.

5.9 Organisation of NGO public surveys and contacts with other interested parties in the development of mutually acceptable decisions.

5.10 Monitoring of fulfilment of human rights requirements according to national legislation and international agreements by mining companies during operations and the preparation of development projects.

5.11 Provision of training and educational seminars to raise the legal awareness of NGOs and local communities.

5.12 Establishment of a network of organisations and public representatives for improved interaction between the NGO sector, mining companies and power structures.

5.13 Identification of contact persons, addresses, telephone numbers to provide communication with different stakeholders.

5.14 Organisation of regular meetings with representatives of different stakeholders.

6. Mass media

6.1 Regular coverage of mining activities and development plans of the mining sector.

6.2 Organisation of briefings, press-conferences, discussions and interviews.

6.3 Maintenance of regular columns on mining issues.

7. Education system

7.1 Implementation of research/surveys by teachers and students.

7.2 Joint assessment with representatives of the mining industry of the need for certain specialists.

7.3 Organisation of practical training at companies.

7.4 Involvement of specialists and experts with practical knowledge in the educational process.

7.5 Provision of courses on general and industrial ecology.

7.6 Establishment of student ecological organisations.

7.7 Participation of university/institute representatives in decision-making on the training of personnel for the sector.

7.8 Introduction of a course on the fundamentals of law in mining activity.

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