

THE MINERAL INDUSTRY OF

BULGARIA

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In 1994, Bulgaria continued to produce nonferrous metal ores and concentrates that met most of its domestic needs. Bulgaria also mined relatively small quantities of iron and manganese ores and a variety of industrial minerals that included asbestos, barite, fluorspar, gypsum, and limestone, largely for domestic consumption. However, most of the country's requirements for iron ore, steel, and mineral fuels had to be met through imports.

The transition of Bulgaria's economy to a market-based system from 1990-94 was accompanied by a declining trend in industrial production, including the production of most mineral commodities, although in 1994 some recovery was discernible in the production of copper, lead and zinc, and steel. Generally, the decline in the country's output of minerals and other industrial products has been wholly consistent with structural adjustment needed by the economy to dismantle the former system of central economic planning. Additionally, the dissolution of a guaranteed Council of Mutual Economic Assistance (CMEA)-based barter trading network, and, in a number of cases, environmental considerations also added constraints on industrial production.

The issue of Bulgaria's national income and industrial production accounts, as well as those of several other former CMEA member countries during this period, was less than clear because of the uncertainty as to whether the country's accounting system(s) fully reflected actual economic transformations that had occurred. Reportedly, the country's economy in 1993 declined by about 4% compared with that of 1992, but was expected to stabilize by yearend 1994. In 1993, Bulgaria reported the value of output of the minerals industry at about 12% of total industrial output, or about twice the output value of this sector in 1990. Activities in the country's minerals industries included the discovery of new gold deposits and plans to gradually end uranium mining.

Government Policies and Programs

In 1994, the Government of Bulgaria continued to implement social and market economic reforms that began in 1989. Issues pertaining to decentralization and denationalization of the economy, as well as the need to redress decades-long problems associated with industry-generated environmental pollution, were among those that

continued to be important elements in the Government's domestic agenda for 1994. The process of privatization mainly was carried out under the provisions of two laws: (1) "Bulgarian Law No. 215, 1991 on Conversion of State Enterprises" relating to private trade associations holding and/or using state property and their conversion to commercial companies; and (2) "Bulgarian Law on Transformation and Privatization of State-Owned and Municipal Enterprises of March 1992" pertaining to the establishment of a legally designated privatization agency, the evaluation and transformation of state-owned enterprises, the sale of shares and stocks owned by the state and municipalities, and the sale of total assets or discreet parts of state-owned enterprises.² These laws also would have direct bearing on the process of denationalization of the country's minerals industry enterprises.

Environmental Issues

Environmental pollution survey data for Bulgaria, compiled by the International Bank for Reconstruction and Development in 1994, provided environmental status reports for the cement, iron and steel, nonferrous metals, and petrochemical sectors of the country's minerals industries. According to the study, the principal pollutants generated by the cement industry were particulates and gases, such as sulfur dioxide (SO₂), nitrous oxide (NO), and carbon monoxide (CO).³ The decline in pollution generated from 1991-93 largely was the result of the decline of production (about 50% compared with 1990 output) during this period.

Modernization of the cement industry during 1991-93 reportedly was minimal. Equipment such as electrostatic precipitators and bag filters were installed during the mid-1970's to the mid-1980's and were in need of replacement. Economic dislocations during the transitional period from 1990-94 also reduced maintenance and delivery of needed spare parts to the mills. However, some improvements were made with the application of modern technology in one cement plant and the switch from coal to gas at a number of other facilities.⁴

In the iron and steel industry, the principal pollutants were ammonia, hydrogen sulfide, lead aerosols from the use of iron ores, NO_x, particulates, and phenols associated with coke ovens, milling operations, and local electric power generation. Bulgaria's steel mills at Kremikovtzi and Pernik

used domestic iron ores, which have a high lead and manganese content, in addition to the mainly imported ores and concentrates used in these facilities. The technology utilized at both steel mills reportedly was out of date and any modernization would abate the level of atmospheric pollutants emitted. Some modernization and repair and maintenance was reported in 1992-93, including monitoring equipment and new electrostatic precipitators. However, since 1990, the primary delimiting factor to increased levels of pollution has been the Government's limitation on the use of domestic iron ore to 10% to 20% of total charge used.⁵

Major point sources of pollution were associated with the country's nonferrous mining, processing, and smelting operations. The major pollutants in this industry have been SO₂ and particulates composed mainly of heavy metals. Since 1991, modernization projects that had been completed reportedly included the installation of newer and more efficient combustion units at the Plovdiv lead smelter. However, the level of investment needed by the Kurdjali zinc and Plovdiv lead smelters for actual pollution control equipment reportedly would amount to about US\$300 million.⁶

Bulgaria's petrochemical industry also was a major source of air and water contamination. In addition to particulates and SO₂ and NO_x gases generated by the industry's powerplants, pollutants associated with petrochemical processing included hydrogen sulfide, hydrocarbons, and sludge. With the exception of the Pleven petrochemical plant, little or no pollution control equipment was reported to have been installed at the major facilities in this sector since 1991.

Production

Factors contributing to the largely negative trend in the country's output of mineral commodities from 1989-94 remained in effect in 1994; namely, a structural reformation of Bulgaria's economy from a centrally planned to a market-based system and the adjustment of Bulgaria's foreign trade towards the world market. Although the steep decline of production of most mineral commodities (1989-91) appeared to have somewhat abated during 1993, some uncertainty still remained about the future viability of the country's minerals industries. The tension between the social cost associated with widespread and hazardous environmental pollution and that associated with widespread and extended unemployment that would arise from a rapid large-scale closure of mineral industry facilities apparently had not been resolved by 1994. Bulgaria continued to experience serious shortages of capital needed for both pollution containment and facility modernization to increase efficiency and competitiveness. (See table 1.)

Trade

Until 1989, the largest share of Bulgaria's foreign trade was conducted within the CMEA barter-based trading system. Since 1989, Bulgaria's foreign trade was expanded to include Western Europe and other regional markets. However, with respect to mineral trade, former CMEA countries, especially the former republics of the U.S.S.R., were Bulgaria's principal sources of mineral raw materials and mineral fuels. Ferroalloys, steel, and metal ores and concentrates were important mineral commodities that Bulgaria continued to trade with former centrally planned economy countries of Europe, but regular imports of natural gas and petroleum from Russia and other republics of the former U.S.S.R. remained critical to Bulgaria's economy. To underscore the continued importance of mineral trade with former CMEA countries, in 1993, Bulgaria projected trade losses by its metals industry to amount to about \$65 million in 1993, solely from the trade embargo imposed on Serbia and Montenegro in 1992 by the United Nations.⁷

Structure of the Mineral Industry

Table 2 lists the administrative bodies as well as subordinate production units of the main branches of the country's mineral industry in 1992. (See table 2.)

Commodity Review

Metals

Copper.—Bulgaria's mineral industry produced copper from ores mined at the Asarel-Medet, Burgas, and Elatzite mining complexes. Recently, the Chelopech mining and processing operation was closed for environmental reasons stemming from hazardous levels of arsenic in the ore. About 95.7% of the country's copper ore was mined in open pit mines and 4.3% in underground mines. Underground copper mining was done by sublevel stoping (64%), cut-and-fill stoping (22%), and longwall stoping (12%).⁸

Gold.—At yearend 1993, Navan Resources Plc. of Ireland concluded an agreement with Bulgaria's state-owned Chelopech Ltd. to develop the arseniferous gold-copper deposit at Chelopech. Reportedly, Bulgaria's Parliament approved the agreement, which would give Navan Resources a 40% equity stake in the joint venture in return for Navan's investment to provide a bacterial-leaching plant. Additionally, a Navan Resources spokesperson indicated that the company may be willing to increase its equity to 68% by increasing its investment in the project. Resources at the Chelopech deposit were determined to contain about 62 million metric tons (Mmt) of ore grading 0.98% copper, 2.48 grams per metric ton (g/mt) gold, and 6.72 g/mt of silver.⁹ Facility expansion at Chelopech began in 1994 and would

take approximately 2 years to complete; however, initial mining operations were expected to begin in November. Production at Chelopech in 1995 was anticipated to yield 60,000 troy ounces (1.87 million grams of gold) and 5.4 metric tons (mt) of copper.¹⁰ In the first one half of 1994, exploratory drilling in eastern Bulgaria, near Zidarovo, had discovered a 400,000 to 500,000 mt-gold ore deposit grading about 2 to 3 g/mt gold. The Zidarovo ore body also was found to contain some silver and small amounts of copper.¹¹

Iron and Steel.—The Kremikovtsi Iron & Steel Works, the country's largest steel producer, reported completing the overhaul and modernization of the plant's electronic facilities. The operation of the No. 3 blast furnace, which was taken off line during the modernization work, was resumed.

Lead and Zinc.—From an environmental standpoint, Bulgaria's lead and zinc industry continued to have difficulties. Limitations on output from certain operations at mining and beneficiation complexes were expected to continue until the environmental damage was rectified. In 1994, the country's lead and zinc producer in Plovdiv, KCM SA, reported that the company's production of lead and zinc during the year would be measurably below the plant's capacity because of limits placed on its operations by the Government's Ministry of the Environment.¹²

Industrial Minerals

Bulgaria produced a variety of industrial minerals that included bentonite, dolomite, fluorite, gypsum, kaolin, marble, and perlite, largely for domestic consumption. Industrial minerals were expected to obtain a greater prominence in the country's economy owing to the eventual needs of the construction materials and chemical sectors to meet the country's requirements for a modern infrastructure.

Mineral Fuels

Following the closure of Bulgaria's uranium mines because of high operational costs, the remaining uranium concentrate (500 mt) that had been produced from domestic mining operations had been stockpiled for possible future use. However, because of the environmental hazards associated with the continued storage of this material, and the lack of domestic technology needed to process the concentrate into fuel, the Government of Bulgaria decided to sell the stockpiled uranium concentrate at world market prices.

Reserves

In view of Bulgaria's effort to transform its economy to a market-based system, the country's mineral resources became subject to reevaluation from a market-economy perspective.

Reserves, as defined by market economies, are mineral deposits that can be mined at a profit under existing conditions with existing technology. In centrally planned and other nonmarket-economy countries, such as Bulgaria, political rather than economic considerations were paramount in formulating policies for industrial development. Political directives to discover exploitable mineral resources may have resulted in possible overestimations and other distortions of collected field data.

Infrastructure

Bulgaria's inland system of transportation consisted of 43,161 kilometers (km) of railroads, highways, and waterways. The railroad system consisted of 4,049 km of 1.435-meter standard-gauge track and 245 km of narrow-gauge track. About 908 km of the total was double track and 2,342 km was electrified. The highway system consisted of 33,397 km of hard-surface roads, including 228 km of superhighways, and 4,045 km of earth roads. There were also 470 km of inland waterways, with ports at Ruse, Vidin, and Lom on the Danube River. The country's merchant fleet consisted of 108 ships totaling 1,240,204 gross register tons or 1,872,723 deadweight tons. These included 32 cargo, 2 container, 5 roll-on/roll-off ships; 16 petroleum, oils, and lubricant tankers; 2 railcar carriers; and 48 bulkers. The country's major ports were Burgas, Varna, and Varna West. Bulgaria's pipeline system consisted of 192 km of crude petroleum pipe, 418 km of refined products pipe, and 1,400 km of pipe for natural gas.

Outlook

Given years of official neglect of severe industrial pollution and associated health-related problems, the new democratically elected Government of Bulgaria determined not to continue the industrial policies of the former Communist Government. To survive, the country's minerals industry had to meet two major criteria: (1) social demands for strict observance of industrial environmental standards, and (2) market demands that require industrial enterprises to strictly meet the specific needs of consumers of their output. It has become clear that Bulgaria's mineral industry, in meeting the aforementioned criteria, would become smaller in scale, more efficient, and less polluting.

¹Text prepared Sept. 1995.

²NTIS, Legal Text Service. Central and Eastern Europe and Russia and Independent States. Winter/Spring 1994.

³World Bank, Bulgaria: Environmental Strategy Study Update and Follow-Up. Report No. 13493-BUL, Washington, DC, December 1994, pp. 64-74.

⁴Work cited in footnote 3.

⁵Work cited in footnote 3.

⁶Work cited in footnote 3.

⁷Mining Journal (London). Aug. 6, 1993, p. 90.

⁸Georgiev, K. Mining Industry of Bulgaria. Oruktos Ploutos (Athens), 85/1993, pp. 44-51.

⁹SWB EE/W0292. July 29, 1993, p. A/7, from "Standard News" July 20,

1993.

¹⁰Mining Journal (London), Sept. 23, 1995, p. 215.

¹¹_____. May 13, p. 348.

¹²_____. Jan. 21, 1994, p. 46.

Major Sources of Information

The Geological Institute of the Bulgarian Academy of
Science
Sofia, Bulgaria

Lead and Zinc Co.
Plovdiv, Bulgaria
Polimet
Sofia, Bulgaria

Major Publications

Mino Delo (Mining Issues), monthly.
Statisticheski Godishnik (Statistical Yearbook), annual.

TABLE 1
BULGARIA: PRODUCTION OF MINERAL COMMODITIES 1/ 2/

(Metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994 e/
METALS					
Aluminum metal, secondary	4,550	2,050	2,690	1,830	955 5/
Bismuth metal	45 e/	40	40	40	40
Cadmium metal, smelter	309	232	200 r/	265 r/	286 5/
Copper:					
Ore:					
Gross weight	13,200 r/	15,500 r/ e/	16,000 r/ e/	19,700 r/	19,000
Cu content	55	65 r/	67 r/	93 r/	75
Concentrate:					
Gross weight	200 e/	360	270	250	250
Cu content	26	46	35	33	33
Metal, primary and secondary:					
Smelter	30,300	27,800	25,000	28,000 r/	40,000
Refined	24,300	12,800	18,000 r/	26,300 r/	26,500 5/
Gold metal e/	2,400	2,000	2,000	2,000	2,000
Iron and steel					
Iron ore:					
Gross weight e/	1,080 5/	700 r/	900 r/	1,000 r/	950
Fe content	321	182	239 r/	266 r/	250
Iron concentrates	447	270	351 r/	428 r/	400
Metal:					
Pig iron for steelmaking	1,140 r/	943	837	998 r/	1,400
Ferroalloys: ferrosilicon e/	18	28	20	20	20
Steel, crude	2,180 r/	1,620	1,550 r/	1,940 r/	2,490 5/
Semimanufactures, rolled	2,160	1,310	1,320 r/	1,600 r/	2,050 5/
Lead:					
Mine output, Pb content	63,000 e/	50,000	45,000	40,000	50,000
Concentrate: e/					
Gross weight	81,000	62,300	60,000	60,000	65,000
Pb content	57,000	43,600	39,000	39,000	43,000
Metal, refined, primary and secondary	66,600	56,200	53,100 r/	57,000 r/	62,300 5/
Manganese ore:					
Gross weight	39,000 e/	34,000	25,500 r/	15,500 r/	11,500
Mn content	11,000 e/	8,700	6,900 r/	4,000 r/	3,000
Molybdenum, mine output, Mo content e/	150	120	120	120	120
Silver, mine output, Ag content e/	54	37	35	35	35
Tin, metal	64	22	23	23	22 5/
Uranium, oxide, U content e/	700	700	600	600	600
Zinc:					
Mine output, Zn content	49,000	29,100	29,000	32,000 r/	30,000
Concentrate: e/					
Gross weight	79,000	70,000	70,000	65,000	75,000
Zn content	35,000	31,000	31,000	30,000	33,000
Metal, smelter, primary and secondary	75,500	58,700	57,800 r/	54,000 r/	64,000 5/
INDUSTRIAL MINERALS					
Asbestos	500 r/	400	500 r/	500 r/	500
Cement, hydraulic	4,710	2,370	2,130 r/	2,010 r/	2,200
Clays:					
Bentonite	200 e/	114	80 e/	67	70
Kaolin	186	106	104 r/	111 r/	115
Feldspar	48 e/	46	48 e/	51	50
Gypsum and anhydrite:					
Crude	494	63	125 r/	143 r/	150
Calcined	102	41	57 r/	54 r/	60
Lime: Industrial	1,560	1,030	729 r/	531 r/	500
Nitrogen: N content of ammonia	1,310	1,090	905 r/	885 r/	900
Pyrites, gross weight e/	180	170	170	150	150
Salt, all types	2,300 r/	1,970 r/	1,000 r/	650 r/	700
Sodium carbonate, calcined	1,050	893	517 r/	259 r/	300
Sulfur: e/					
S content of pyrites	70,000	60,000	60,000	50,000	50,000
Byproduct, all sources	60,000	50,000	50,000	50,000	50,000
Total	130,000	110,000	110,000	100,000	100,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, marketable:					
Anthracite	43	42	45 r/	41 r/	40
Bituminous	100	86	203 r/	222 r/	200
Brown	3,710	3,090	3,350 r/	3,420 r/	3,400
Lignite	27,800	25,200	26,700 r/	25,400 r/	26,200
Total	31,700	28,400	30,300	29,000 r/	29,800

See footnotes at end of table.

Table 1--Continued
 BULGARIA: PRODUCTION OF MINERAL COMMODITIES^{1/}

(Metric tons unless otherwise specified)

Commodity	1990	1991	1992	1993	1994 e/
MINERAL FUELS AND RELATED MATERIALS--Continued					
Coke do.	1,380	738	840 r/	912 r/	969 5/
Gas, natural, marketed million cubic meters	14	10	8 r/	7 r/	8
Petroleum:					
Crude: As reported thousand tons	60	58	53 r/	43 r/	45
Refinery products e/ thousand 42-gallon barrels	65,000	20,000	20,000	20,000	25,000

e/ Estimated. r/ Revised.

1/ Previously published and 1994 data are rounded by the U.S. Bureau of Mines to three significant digits; may not add to totals shown.

2/ Table includes data available through Sept. 1995

3/ In addition to the commodities listed, barite, chromite, fluorspar, magnesite, palladium, platinum, tellurium, uranium, and a variety of crude construction materials (common clays, sand and gravel, dimension stone, and crushed stone) are produced, but available information is inadequate to make reliable estimates of output levels.

4/ Prior to 1990, ferromanganese and several unspecified ferroalloys were produced; since 1990, Bulgaria has reported only the production of ferrosilicon.

5/ Reported figure.

TABLE 2
BULGARIA: STRUCTURE OF THE MINERAL INDUSTRY FOR 1994

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities	Annual Capacity
Cement	Reka Devnia	Devnia	1,825
Do.	Zlatna Panega	Panega	1,300
Do.	Others	Temelkovo, Dimitrovgrad, Pleven, and Beli Izvor.	1,590
Coal:			
Bituminous	Economic Mining and Power Combine (Smek) Balkanbass	Balkan Coal Basin in central Bulgaria, northwest of Silven	445.
Brown	G. Dimitrov	Pernik coal basin, southwest of Sofia	4,000
Do.	Others	Bobov Dol and Pirin in western Bulgaria	3,100
Lignite	SMEK East Maritsa	East Maritsa coal basin near Zagora	25,000
Do.	Others	Marbas, Pernik, and Bobov Dol coal basins	5,300
Copper (Cu):			
Concentrate, Cu content	Medet-Asarel Co.	Panagurishte, Pazardzhik district	25.
Do.	Chelopech Ltd.	Srednogorie, Sofia district	5.
Do.	Bradtze	Malko Turnovo	2.
Do.	Elatzite-Med Ltd.	Srednogorie, Sofia District	15.
Do.	Rosen	Burgas, near the Black Sea	1.
Do.	Tsar Asen	Srednogorie, Sofia district	2.
Do.	Burgaskii Mines Ltd., Zidorovo	Burgas, near the Black Sea	0.5.
Metal, refined	Georgi Damyanov	Srednogorie, Sofia district	120
Iron ore	Kremikovtsi Iron and Steel Combine	Kremikovtsi	2,000
Lead-zinc (Pb-Zn):			
Concentrate, Pb-Zn content	Gorubso Co.	Erma Reka, Kurdjali, Laki, and Rudozem, all in Madan area near Greek border	59 Pb, 47 Zn.
Do.	Madzharovo Ltd.	Near Plovdiv	3 Pb, 2 Zn.
Do.	Ossogovo Ltd.	Ossogovo Mountains, western Bulgaria	3 Pb, 2 Zn.
Do.	Ustrem Ltd.	Near Thundza River, eastern Bulgaria	3.5 Pb, 0.8 Zn.
Metal:			
Pb, refined	Dimitur Blagoev	Plovdiv	65.
Do.	Georgi Dimitrov	Kurdjali	60.
Zn, smelter	Dimitur Blagoev	Plovdiv	60.
Do.	Georgi Dimitrov	Kurdjali	30.
Manganese ore	Mangan Ltd. (Obrotchishte)	Varna district	50.
Natural gas	Ministry of Power Supply	Chiren field, in northwest Bulgaria	(1/)
Petroleum:			
Crude	do.	do.	(1/)
Refined, barrels per day	Economic Trust for Petroleum Products	Refineries in Burgas, Pleven, and Ruse	260,000
Steel, crude:	Kremikovtsi Iron and Steel Works	Near Sofia	1,800
Do.	Stomana Iron and Steel Works	Pernik	1,300

1/ Insignificant capacity.