

THE MINERAL INDUSTRY OF THE CZECH REPUBLIC

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The Czech Republic, whose raw material supply was largely based on imports, was an important Central European manufacturer of consumer and producer of durables and chemicals. Only a minor amount of mineral resources needed for industrial raw material stocks were derived from domestic sources. The Czech Republic's mineral industries that were of domestic and regional importance included steelmaking, which was based on imported raw materials, and industrial minerals and construction materials production, which was based largely on domestic raw material resources. The Czech Republic's economy had been undergoing structural changes in transition to a market-based system, which resulted in the contraction of some commercial activity, and in 1998, the growth of the country's gross domestic product declined by 2.3% compared with that of 1997 (Kreil, 1999).

The Government of the Czech Republic continued to promote policies structured to integrate the country into the European Union (EU). The country's membership in the World Bank for Reconstruction and Development, the International Monetary Fund, the Organization for Economic Cooperation and Development, and the World Trade Organization, including participation in the General Agreement on Tariffs and Trade, were largely an outcome of this effort.

Three constituent acts compose the country's mining law. Act No. 44/1988 Coll., On Protection and Use of Mineral Resources (the Mining Act), as amended; the Czech National Council Act No. 61/1988 Coll., On Mining Activity, Explosives, and State Mining Administration (Authority/Sedenka), as amended; and the Czech National Council Act No. 62/1988 Coll., On Geological Works, as amended. The Mining Act classifies minerals into two categories—reserved and unreserved. The reserved category refers to mineral deposits that, apart from market considerations, were determined to be necessary for the development of the national economy (Luks, 1997). Other provisions in the mining law address issues of licensing and Federal and regional compliance with environmental regulations during the exploration and exploitation of a mineral deposit.

The Czech Republic's metals sector produced a broad range of base metals and their semimanufactures from imported primary raw materials (ores and concentrates) and secondary materials (scrap). The metals sector represented approximately 10% of the value of the country's industrial production. The iron and steel branch alone generated between 8% and 9% of the industrial output. Employment in the metals sector generally accounted for 10% of the total employment in industry with employment in the iron and steel sector accounting for about 8% of the Czech Republic's industrial workforce. Material costs composed 60% of total production costs of the metals sector; labor costs, 12% (Ambroz, 1997).

The iron and steel branch accounted for more than 75% of the sales of the country's metals sector and comprised 12 enterprises that produced crude steel, pig iron, rolled materials, and steel and cast iron pipes, including closed welded pipes steel and various welded semimanufactures. The nonferrous metals branch comprised nine major enterprises that produced finished and semifinished commodities of aluminum, copper, and lead and their alloys. The nonferrous metals branch relied entirely on domestic and imported scrap and on imports of semimanufactured products as its raw materials base. Overall, scrap accounted for between 40% and 50% of new metal production. Total employment in the metals sector (1995 data) amounted to almost 128,000 employees (Urban, 1998).

Although gold mining in some parts of the Czech Republic remained prospective, economic resources of most metals have been depleted. According to GEOFOND (1999, p. 17), geologic reserves of metallic ores as of December 31, 1997, were "mostly subeconomic." Gold-bearing polymetallic and tin-tungsten ores were the only exceptions.

In 1998, TVX-Gold brought down the book value of its Kasperske Hory project in the Sumava Mountains to zero, following a decision by the Government of the Czech Republic to revoke the licenses for the project. TVX indicated that it could consider legal action in the matter, especially in view of its continued interest in the property. Domestic and foreign environmental groups lobbied against gold mining developments at Sumava and presented a number of legal challenges during recent years (Mining Journal, 1999).

Determined to be uneconomic during the country's transition to a market economy system, the production of the Czech Republic's eight deposits of iron ore declined rapidly in the 1990's. Practically all the raw materials consumed by the country's steel industry (iron ore and concentrate, pellets, and agglomerate) were imported from Australia, Brazil, China, and Russia. The country's steel industry comprised eight steel plants with a collective capacity to produce almost 11 million metric tons per year (Mt/yr) of steel. The main steel producers—Nova Hut sp (Ostrava), Poldi United Steel Works, Trinecke Zelezarny, and Zelezarne—accounted for about 85% of total production capacity.

Activities and major issues during 1998 included a decision by the Nova Hut integrated steel mill to restructure its operations to work on the basis of EU standards. The company's estimated cost of restructuring and modernization was estimated to be \$650 million. The construction of a 3-Mt/yr minimill and the full application of continuous casting by yearend 1999 were major components of the company's modernization program. By mid-1998, about \$250 million had been invested in the minimill project. This work, the second phase of the company's modernization process, initially was undertaken in 1997 by ICF

Kaiser of the United States and included the construction of an equalizing furnace and hot-rolled strip mill. Also, a new \$55 million billet caster was designed with a 990,000-metric-ton-per-year (t/yr) capacity. Moreover, the completion of a third billet caster by 1999 would allow Nova Hut to close its ingot casting shop and blooming mill. The company's strategic program included increasing the proportion of its flat products production to 40% from 25% (Metal Bulletin, 1998a).

At Vitcovice A.S. Ostrava, pig iron production was terminated in 1998. Three blast furnaces and a sinter plant were closed. Iron would be provided by Nova Hut (Steel Times, 1998, Czech Republic—Looking for Jvs, accessed November 27, 2000, at URL <http://www.dmg.co.uk/steeltimes/review/czech.htm>). The company's overall modernization plan was to be completed by 2001 at a cost of about \$73 million (Metal Bulletin, 1999).

Trinecke Zelezarny (Trinec) announced plans to raise the output of special steels to 22,000 metric tons (t) from 14,470 t produced in 1997. Of the 22,000 t, about 20,000 t would be designated stainless and tool steel compared with 12,700 t in 1997. Trinec management also announced plans to increase exports of rails (a major source of revenue), which amounted to 70,000 t in 1997. Major customers were Egypt, Finland, and Germany, as well as countries of Eastern Europe. Trinec's facilities, which comprised billet and bloom casters, have a combined capacity of 2.25 Mt/yr (Metal Bulletin, 1998b).

In 1998, Nova Hut and Trinec undertook a study and evaluation of their coal-fired electric powerplants with respect to lowering emissions. The project was financed through joint funding by the U.S. Agency for International Development and the U.S. Department of Energy. A variety of technical recommendations were made, taking into account the discrete needs of each facility (Greenbaum, 1998). According to the International Cement Review (1998), foreign investment in the Czech Republic's cement industry encompassed practically the entire industrial branch. Cimenteries CBR S.A., Heidelberger Zement AG, Dyckerhoff Zement GmbH, Lafarge, and Holderbank Financier Glaris AG, based in the EU, were the principal investors in the country's cement plants and associated quarries. In 1998, the country's consumption of cement rose by about 1.6% compared with that of 1997. Total cement output increased by slightly more than 1%, and the near-term outlook looked for growth associated with new construction projects, rather than reconstruction of old sites (International Cement Review, 1998).

The energy policy of the Czech Republic promoted the decontrol of energy prices; the denationalization, rationalization, and restructuring of the energy industrial sector; the improvement of conservation, health and safety, and pollution control in the energy sector; the diversification of electricity; natural gas and petroleum supplies; and an improvement in the efficiency of domestic production of fossil fuels.

The Government planned to harmonize the country's energy sector's standards with those of the EU. In part, this would reduce the country's dependence on solid fuel (e.g., coal, wood) from 60% in 1996 to 50% by 2000 to 40% by 2005 (Lynch, 1999, p. 1).

In the Czech Republic, hard or bituminous coal mainly occurs in the Upper Silesian Basin. Of the resources pertaining to this region, about 15% is in the Czech Republic, and the balance is in

Poland. Bituminous coal has a higher degree of coalification than lower rank coals. Some of the characteristics of Czech bituminous coal include a carbon content of more than 73.4%, less than 50% volatile matter, and a dry (ash free) calorific value that exceeds 24 megajoules per kilogram (MJ/kg).

In addition to hard coal, the Czech Republic distinguishes two types of lower rank coal—brown coal and lignite. Brown coal is distinguished by having a lower level of coalification, with a fixed level of carbon of less than 73.5%, more than 50% volatiles, and a dry (ash free) calorific value of less than 24 MJ/kg. The vitrinite reflective boundary between hard/bituminous coal and brown coal is lower than 0.5% for brown coal. The boundary between brown coal and lignite is not, however, recognized owing to the inclusion of high-volatile lignite in the brown coal category (GEOFOND, 1999, p. 63). The Czech Republic's brown coal deposits are worked in the northwestern part of the country in the Bohemian brown coal basins. The major brown coal basins are found in the Krusne Hory Mountains region, covering an area of 1,900 square kilometers (km²). Coal is also mined in the Cheb, the Sokolov, and the Zitava Basins.

According to GEOFOND (1999, p. 65), Czech standards for coal describe high volatile lignite as a variety of brown coal that had undergone the least amount of coalification and that still has xylitic characteristics. Its dry (ash free) calorific value is less than 17 MJ/kg. The boundary between brown coal and high volatile lignite is not distinct. Lignite is mainly consumed by the electric-power-generating sector and is used for heating. The chief deposits occur in the Vienna Basin, which extends from Austria to Moravia.

The Government of the Czech Republic remained the principal source of financing for the coal industry. The main funding aims included mine closures, land reclamation, and issues pertaining to mining health and safety. State financing for exploration in all sectors of mining for the period from 1993 to 1998 amounted to approximately \$34.4 million (US \$1=33 Czech koruny). From 1994 to 1998, mine labor in the hard coal sector declined to 45,300 employees from 55,000 employees, and that in brown coal fell to 24,400 employees from 32,700 employees (Economic Commission for Europe, 1998).

The Czech Republic's main oil- and gas-producing area is in the "Vienna-Moravia oil-bearing province" (GEOFOND, 1999, p. 67). The deposits in this province are contained in a large number of "individual oil-bearing structures and producing horizons. . ." to a depth of 2,800 meters (m). Sandstones of Middle and Upper Badenian ages are described as hosting the most productive oil deposits; Hrusky has been the largest deposit. By 1998, however, most of the oil at Hrusky had been extracted, and the reservoir served mainly as an underground gas storage facility. An additional oil- and gas-bearing area was explored in the Moravian region of the subsurface Carpathian foredeep sediments (GEOFOND, 1999, p. 67). As of December 31, 1998, the Czech Republic's petroleum resources amounted to 37.846 million metric tons (Mt), of which 11.403 Mt was categorized as economic proven; 13.499 Mt, as economic probable; and 12.944 Mt, as subeconomic (GEOFOND, 1999, p. 68).

Major commercial activities during the year involved the exploration for oil and gas by Medusa Oil and Gas Limited, a

subsidiary of Ramco Energy plc. Medusa drilled the Krumvir-2 discovery well in Medusa's Karlin license area, about 30 kilometers southeast of Brno, reaching the 3,600-m mark. The well reportedly began test producing 750 barrels per day of 30° API gravity low-sulfur oil, and sustained output was reached in March 1999 (Oil & Gas Journal, 1998). Medusa obtained 48% interest in the Karlin license area from Moravske Naftove Doly, a.s. Hodonin (MND), the Czech state monopoly responsible for petroleum exploration and production. In mid-May, Ramco plc., through its subsidiary Medusa, signed an agreement with MND to participate in the Brezi-Mikulov exploration license. This agreement was based on a 1997 MND-Medusa Brezi-Mikulov licensing agreement. Medusa would begin drilling the Brezi-3 exploration well by yearend 1998. The agreement gave Medusa an 85% interest in the license and will allow the company to participate further with MND in an adjacent area, which will combine to 292.4 km² for the joint venture (Oil & Gas Journal, 1998).

References Cited

- Ambroz, Petr, 1997, The Czech steel industry: Czech Business and Trade, no. 8, p. 35-36.
- Economic Commission for Europe, 1998, Results of the restructuring of the Czech coal industry and the future role of coal for the national economy: United Nations Economic and Social Council, ENERGY/GE.1/1998/7, July 16, 10 p.
- GEOFOND, 1999, Mineral commodity summaries of the Czech Republic: Ministry of the Environment of the Czech Republic, June, 153 p.
- Greenbaum, Miles, 1998, Czech Republic steel works power plant life extension and emissions reduction study: Office of Fossil Energy, July 1, 2 p.
- International Cement Review, 1998, Hungary: Global Cement Report, p. 114-115.
- Luks, Josef, 1997, Current mining law in the Czech Republic: Czech Business and Trade, no. 11, p. 35-36.
- Lynch, Richard, 1999, Fossil energy international—An energy overview of the Czech Republic: U.S. Department of Energy, December 3, 15 p.
- Kreil, Erik, 1999, Czech Republic: U.S. Energy Information Administration, September, 6 p.
- Metal Bulletin, 1998a, Czech mill aims to meet EU standards: Metal Bulletin, no. 8283, June 4, p. 22.
- 1998b, Trinec plans to increase alloy steel production: Metal Bulletin, no. 8293, July 9, p. 20.
- 1999, Vitkovice upgrades its plate mill: Metal Bulletin, no. 8365, April 8, p. 18.
- Mining Journal, 1999, Czech license problem: Mining Journal, v. 332, no. 8524, March 26, p. 209.
- Oil & Gas Journal, 1998, Czech Republic: Oil & Gas Journal, November 2, p. 98.
- Urban, Zdenek, 1998, Metallurgy and metal processing in the Czech Republic: Czech Business and Trade, no. 1, p. 15-16.

TABLE 1
CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1994	1995	1996	1997	1998
METALS						
Aluminum, secondary		48,339	48,000	45,000	45,000 e/	45,000 e/
Copper, refined, secondary e/		23,323 2/	20,000	20,000	20,000	20,000
Gold metal	kilograms	75	--	--	--	--
Iron and steel:						
Iron ore:						
Gross weight	thousand tons	--	36	32	28	26
Fe content e/		--	10,000	10,000	10,000	10,000
Metal:						
Pig iron	thousand tons	5,287	5,289	4,898	5,195	4,982
Ferroalloys, total electric furnace e/	do.	1	1	1	1	1
Steel, crude	do.	7,075	7,189	6,257	6,495	6,253
Semimanufactures	do.	6,445	8,851	9,368	10,017	10,205
Lead:						
Pb content of concentrate		500	--	--	--	--
Metal, secondary e/		20,000	20,000	20,000	20,000	20,000
Silver	kilograms	100	--	--	--	--
Uranium, mine output, U content		537	611	589	624	611
Zinc: e/						
Mine output:						
Ore (Pb-Zn), gross weight		15,000	--	--	--	--
Zn content of ore		100	--	--	--	--
Concentrate, gross weight		9,000	--	--	--	--
Zn content		4,000	--	--	--	--
Metal, secondary		1,000 2/	1,000	1,000	1,000	1,000
INDUSTRIAL MINERALS						
Cement, hydraulic	thousand tons	5,303	4,825	5,015	4,877	4,894
Clays:						
Bentonite	do.	65	54	59	110	125
Kaolin	do.	2,706	2,800	2,798	2,982	3,049
Other	do.	823	915	738 r/	759 r/	1,030
Diatomite		40,000	29,000	35,000	42,000	40,000 e/
Diamond, synthetic e/	carats	5,000	5,000	5,000	5,000	5,000
Fertilizer, manufactured:						
Nitrogenous, N content		234,000	264,000	252,600	250,000 e/	250,000 e/
Phosphatic, P ₂ O ₅ content		13,700	14,000	415,500	400,000 e/	400,000 e/
Potassic, K ₂ O content		21,900	22,000	25,000	20,000 e/	20,000 e/
Mixed		85,000	117,000	552,300	500,000 e/	500,000 e/
Feldspar		170,000	183,000	211,000	243,000	299,000
Fluorspar		10,000	--	--	--	--
Gemstones, crude, pyrope-bearing rock		33,000	24,000	39,000	49,000	43,000
Graphite		25,000	27,000	30,000	25,000	28,000
Gypsum and anhydrite, crude		591,000	542,000	443,000	241,000	222,000
Lime, hydrated and quicklime	thousand tons	1,206	1,186	1,176	1,217	1,200 e/
Mica		--	3,803	--	--	--
Nitrogen, N content of ammonia e/		200,000	254,000	304,100	250,700	250,000
Quartz		2,000	3,000	4,000	13,000	1,000
Salt e/		180,000	180,000	180,000	100,000	100,000
Sand and gravel:						
Common sand and gravel	thousand cubic meters	11,465	10,525	12,350	11,727 r/	9,279
Foundry sand	thousand tons	1,093	964	1,079	769	815
Glass sand	do.	862	1,026	1,130	994	827
Stone:						
Basalt (for casting)		85,000	108,000	90,000	103,000	100,000 e/
Dimension stone	thousand cubic meters	225,000	210,000	190,000	258,000 r/	305,000
Limestone and other calcareous stones	thousand tons	10,205	10,092	10,610	11,010 r/	11,169
Building stone	thousand cubic meters	8,290	9,021	9,891	10,845 r/	9,528
Sulfur, byproducts, all sources e/		20,000	20,000	40,000	40,000	40,000
Sulfuric acid e/		337,000	340,000	350,000	350,000	300,000
Wollastonite		--	800	800	--	--

See footnotes at end of table.

TABLE 1--Continued
CZECH REPUBLIC: PRODUCTION OF MINERAL COMMODITIES 1/

(Metric tons unless otherwise specified)

Commodity		1994	1995	1996	1997	1998
MINERAL FUELS AND RELATED MATERIALS						
Coal:						
Bituminous	thousand tons	20,910	21,309	21,784	20,847	19,521
Brown and lignite	do.	60,728	58,773	60,441	58,142	51,935
Coke	do.	5,125	4,945	4,836	2,916 r/	2,648
Fuel briquets from brown coal	do.	499	616	600	600 e/	600 e/
Gas:						
Manufactured, all types	million cubic meters	1,136	791	800	800 e/	800 e/
Natural, marketed 3/	do.	154	165	146	118	137
Petroleum:						
Crude:						
As reported	thousand tons	131	149	155	159	172
Converted	thousand 42-gallon barrels	889	1,010	1,052	1,080	1,167
Refinery products e/	do.	40,000	35,000	27,000	27,000	35,000

e/ Estimated. r/ Revised.

1/ Table includes data available through February 2000. In addition to the commodities listed, arsenic, dolomite, illite, sodium compounds, talc, and zeolite are produced, but information is inadequate to make reliable estimates of output levels.

2/ Reported figure.

3/ Includes gas produced from coal mines. Gross output of natural gas is not reported, but is believed to exceed reported marketed output by an inconsequential amount.

TABLE 2
CZECH REPUBLIC: STRUCTURE OF THE MINERAL INDUSTRY IN 1998

(Thousand metric tons unless otherwise specified)

Commodity	Major operating companies	Location of main facilities 1/	Annual capacity
Bentonite	Keramost a.s.	Most	150
Cement	Bohemia, Cizkovice, Hranice, Karlov Dvor, Lochkov, Pracovice, and Velary	Bohemia	3,500
Do.	Bystre, Malomerice, Mokra, Ostrava-Kunice, and Zahorie	Moravia	2,800
Clay, kaolin	Mines in Karlovy vary area	Western Bohemia	450
Do.	Mines in Plzen area	Central Bohemia	150
Coal:			
Bituminous	Mines in OKD coal basin	Ostrava-Karvina, northern Moravia	22,100
Do.	Mines in KD coal basin	Kladno, central Bohemia	3,000
Brown	SHD administration	Most, northwestern Bohemia	61,000
Do.	HDB administration	Sokolov, western Bohemia	17,000
Lignite	JLD administration	Hodonin, southern Moravia	5,000
Copper, ore	Zlate Hory	Northern Moravia	300
Graphite	Grafit a.s. Grafitove doly Stare Mesto, s.r.o.	Netolice Stare Mesto	35
Kaolin	Zapadoceske Kaolinove a Keramicke Zavody a.s.	Horni Briza	190
Mica	GARMICA s.r.o.	Netolice	5
Lead-zinc, ore	Horni Benesov and Zlate Hory	do.	400
Lead, metal, secondary, refined	Kovohute Pribram	Pribram	26
Natural gas	Gasfields around Hodonin	Southern Moravia	25
Petroleum:			
Crude	Oilfields around Hodonin	do.	140
Refinery	Kolin, Kralupy, Pardubice, and Zaluzi	Bohemia	NA
Steel, crude	Nova Hut sp (Ostrava)	Kunice-Ostrava	3,800
Do.	Zelezarne Vitkovice	Vitkovice-Ostrava	900
Do.	Trinecke Zelezarny	Trinec	3,000
Do.	Poldi United Steel Works	Kladno-Prague	1,700
Do.	Zelezarny Bila Cerkev	Hradek-Rokycany	300
Do.	Zelezarny Veseli	Veseli and Moravou	300
Do.	Zelezarny Chomutov s.p.	Chomutov	350
Do.	Bohumin Iron and Steel Works	Bohumin	40
Titanium dioxide	Precheza a.s.	Precheza	25
Uranium	DIAMO s.p.	Straz pod Ralskem	2

NA Not available.

1/ Names and locations of mines and crude oil refineries are identical.