



Central and Eastern Europe: Changes in minerals sector

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The socio-political changes in Central and Eastern Europe are having profound effects on the minerals industries in the region. This article gives details of these effects. It was prepared in the spring of 1993 when V Velev and A Kuzniak were visiting study fellows at The University of Nottingham, England, funded by the European Community through the Tempus programme.*

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The socio-political changes that have shook Central and Eastern Europe in the early 1990's are having profound effects on the minerals industries of this region. The break up of the Council for Mutual Economic Assistance (CMEA) that linked these countries with the Soviet Union exposed the inadequacies of many of the regions mineral industries. The mineral resource base may offer a direction from which wealth, jobs, reconstruction and future investment can come. Some of the operations may be economic through redefinition of purpose, restructuring and investment, or improved management. International finance and expertise, particularly from organisations like the European Bank for Reconstruction and Development (EBRD), will be needed to assist with these projects. The environmental legacy of historical and recent mining and metallurgical practices will also require considerable time and expense to correct. One disadvantage of possible investment by western companies in the region is the possible liability for historical environmental damage. The fundamental problem of energy supply and cost is common to all countries and is inevitably still linked strongly with the former Soviet Union (FSU). Reliance on imported energy, old nuclear installations and brown coal-fired power plants leaves many in an unenviable position. The hugely subsidised energy prices must rise; however, this will, and has, created enormous social, economic and industrial problems. The network of gas pipelines crossing these countries does provide transit fees, which are often paid as petroleum and/or natural gas supplies. While many refineries are associated with indigenous production and/or the pipeline network.

The geological environment is comprised of a number of mountain chains and massifs. These are highly enriched with a variety of minerals and exploitation of which has existed for hundreds of years. A number of the earliest mining schools were established in this region and these, along with the newer schools and universities, are

again faced with dramatic change. These changes are being assisted through collaboration with western Universities, funded by the EC, other international organisations and national Governments.

Albania

This small country, on the Adriatic coast, was for many years in self-imposed isolation from the rest of the world. The major geological feature, host to many metallic and industrial mineral deposits, is the Dinaric mountain belt, which strikes north-west to south-east across the country. Mining represents over 16 per cent of GDP in Albania and its further development remains an important aspect in the economic future of the now democratic country. The main minerals exploited in Albania are chromite, copper, and nickel. Albania ranks third in the world in the tonnage of chrome ore extracted. Last year, the Albanian Government passed a law creating the chrome company, Albkrom.

Headquartered in the capital, Tirana, it has 17 mining and processing operations under its authority. A lack of investment in the past has hampered modernisation and has given rise to low productivity. Recent legislation has tried to promote the industry, but enterprises such as Albkrom are taxed more than once, thus reducing profitability. Albkrom has been very amenable to joint venture discussions. Some cooperative projects are underway and underground and surface plant improvements, with reduced manning levels can be expected. Similar discussions have been reported with Albania's copper corporation, which historically (pre-1991) smelted around 60 000 t of concentrate at grades of only 16 per cent copper.

Energy mineral deposits are located chiefly in the south of the country and while the resources are not large, they can meet almost all of Albania's needs. The vast majority of Albania's energy needs are provided by hydroelectric power. Albania produced an estimated 2 Mt of brown coals and lignite in 1989. Oilfields exist in the

south-west between Elbasan and Vlores, but production has been in decline since the 1970's and is currently around 800 000 t/yr. The oil and gas produced is asphaltic and produces many problems in the three refineries situated at the deposits.

Bitumen is extracted at Selnica, north-east of Vlores, where it is refined. Concessions for exploration in blocks along the Adriatic coast are to be awarded as well as the invitation to international oil companies to bid for a 70 MUSD recovery enhancement programme at the existing on-shore oil fields. However, there have been considerable administrative delays caused by uncertainty over Albania's legal framework for investment. The government hopes that Albania will be linked with a gas pipeline, enabling it to be supplied with Russian natural gas.

Bulgaria

The country is divided, west-east, by a number of mountain belts, including the Balkans. The present mining and metallurgical industry is in a state of decline with many of the operations being inefficient, ecologically damaging and unprofitable.

Bulgaria suffers from having to import over 70 per cent of the required energy minerals and relies heavily on an old and potentially unsafe nuclear industry. The authorities are now working on an energy charter which will focus on two main areas – better use of indigenous lignite and nuclear power in order to reduce pollution and raise efficiency. Bulgaria produced an estimated 36 Mt of brown coals and lignite in 1989, mostly by surface mining.

Lignite reserves are substantial, however their high ash, moisture and sulphur content could restrict their use. However, domestic lignites can be blended with foreign high quality coal, this currently comes from Russia and Ukraine. Some of the funds (100 MUSD has been provided by the EBRD) will also be used for the installation of desulphurisation technology on coal-fired plants and safety improvements at nuclear reactor stations.

There are plans for the restructuring of the coal mining sector. Out of the 14 mines operating, only 4 are profitable. A holding company of all mines is to be established. It is hoped it will be easier for the new company to manage the mines and to decide which of them should be closed. This will be a difficult decision to make, however, as some 65 000 workers are employed in this sector. A small amount of coking coal is produced, this was not sufficient to meet the demands of a large metallurgical industry and coal was imported to meet requirements. Oil is only presently produced from deposits in north-eastern Bulgaria, though it is hoped that further reserves will be discovered off-shore in the Black Sea. However, international boundaries have yet to be agreed.

Bulgaria has several metallic minerals of importance, namely; iron, copper, lead/zinc, manganese and gold. Due to the low grade of iron ores being mined, the iron and steel industries are reliant on imports, often from Russia and the Ukraine. At present only the two openpit copper mines are working at full capacity. Their output is feeding two metallurgical plants, which have severe ecological problems. Part of the concentrates produced are exported. Underground production from the copper mines has decreased due to economical problems. Some, such as the Chelopech mine, has closed due to environmental problems, particularly the high arsenic content of the ores, and hence concentrates. The relatively high gold content makes the operation economically attractive and they are currently involved in a joint venture with a western company to investigate the application of alternative extraction technologies. The lead/zinc deposits are of such low grade that their economics are highly dubious. However, more selective mining practices and the recovery of by-products, such as silver, gold and bismuth, may alter this scenario.

The industrial minerals sector of the industry should have a better chance of surviving the economic changes and privatisa-

tion as it has not been subsidised in the past. A variety of high quality industrial mineral deposits exist and are exploited.

The Czech Republic and Slovakia

The Czech Republic, comprising the states of Bohemia, Moravia and Silesia separated from Slovakia on 1st January 1993.

A major producer of hard coal (26 Mt in 1989), as well as brown coals and lignite (92 Mt in 1989). Almost all coal deposits are in the Czech Republic, with the hard coals coming from the Lower and Upper Silesian basins which extend into southern Poland. The majority of reserves, of high quality coking coal, are found in the Upper Silesian (Ostrava) basin, accounting for around 80 per cent of production. Mining in this basin is however wrought with technical problems due to the depths at which the majority of seams lie (600 to 1000 m). Brown coals and lignite accounts for 95 per cent of all coal used in power generation but this is expected to decrease as the coals are highly sulphurous and cause a great deal of environmental damage from sulphur dioxide pollution. Privatisation of the coal industry is based on the formation of five independent companies.

Disputes over supply and payment for coal have occurred between the Czech Republic and Slovakia and is a factor in the desired expansion of nuclear power generation by the latter. Slovakia is negotiating with the ERBD over a credit for funds to complete the Mohovce nuclear plant. The installation, using Soviet technology, was started under the former Czechoslovak government. New West European safety equipment will be installed. Joint venture Western participation is envisaged, with credit repayment to be in the form of electricity. The republic also claims to have reached agreement with Russia for the disposal of nuclear waste from the plant. However, agreement must still be reached with Ukraine for transport of this material across its territory.

Joint venture plans have been announced to expand gold production from

The socio-political changes in Central and Eastern Europe have profound effects on the minerals industries in the region. The map shows the countries discussed in this article: Albania, Bulgaria, the Czech republic, Poland, Romania, Slovakia, former East Germany and the former Yugoslavia.

the state-owned Ore Mines Hodrusa, in Slovakia. The company expects to be privatised in 1994, with 50 per cent of the shares being sold to a Canadian company, Keylock Resources. Currently gold production at the Rozalia mine, employing 180 people, is around 66 kg of gold, with associated copper and silver.

The industrial minerals sector holds the greatest promise for future development as many of the minerals exploited are of economic grade unlike the metalliferous mining industry which has to be subsidised. Slovakia has very significant production of magnesite; while the Czech Republic has reserves and production of graphite with a downstream pencil manufacturing industry. Kaolin production is important, ranked sixth in the world, with around 3.4 Mt/annum being produced in the 1980's.

The earliest known mining school was established in western Bohemia in 1716, and degree level education continues at Kosice in Slovakia and Ostrava in the Czech Republic.

Hungary

Again lignite is the predominant energy mineral, though hard coal reserves exist and have been exploited. New generating capacity is planned with the decommissioning of inefficient and/or polluting plants, plus a long term strategy involving the diversification of power sources with an approximate three-way split between coal, hydrocarbon and nuclear. Petroleum is produced, but reserves are expected to be depleted soon and production levels have been reducing.

Of the many metalliferous mines only those for bauxite, manganese and uranium survived the old regime. Underground extraction of bauxite was conducted at a number of mines, however, costly water pumping programmes were required, which caused environmental and hydrological damage. Bauxite and alumina production will be halved to 1.2 Mt and 0.45 Mt respectively over the next five years. Much of the processed alumina was ex-



ported to smelters in the former Soviet Union. In Hungary all aluminium smelters will be closed by 1995, due to energy costs, removing 75 000 t of capacity from the market.

The uranium mining operations at Mecsek Mount in southern Hungary, once producing 17 Mkg of metallic uranium, have now closed.

A variety of industrial mineral deposits exist in the north of the country. Hungary is the world's fifth largest producer of perlite, with an output of 93 000 t in 1990; much of this output is exported, both in unexpanded and expanded form, to a number of Western European countries.

Hungary passed a new mining act in April 1993 allowing the exploitation of minerals, hydrocarbons and geothermal energy to proceed by the right of concession. Concessionaires will pay royalties to the state proportional to the value ex-

tracted. In their natural form they are still considered state property.

Poland

Poland's energy sector is the largest in Central Europe, accounting for 10 per cent of GDP and 5 per cent of employment (around 850 000 people). Poland has a major hard coal mining industry in the south of the country. Output in 1989 ranked it fifth in the world with 178 Mt, in addition an estimated 71.8 Mt of brown coals and lignite was mined. The hard coals contain supplies of high coking quality, which supply the national steel industry. Poland is the fourth largest coal exporter (27 Mt in 1990) and this provides around 10 per cent of export revenue. Natural gas (around 4 000 cubic metres per annum) and a small amount of crude oil is produced in the south-east of the country. An additional 400 cubic metres per annum of natural gas

is produced from the degasification of coal seams. There is no nuclear power generation.

The coal industry is currently being restructured with mines being grouped into companies. With the government phasing out subsidies some closures seem inevitable. Some mines require substantial capital investment to retain or reclaim profitability; it is hoped that foreign capital can be attracted. Many mines are highly mechanised and use longwall methods, with caving, to extract coking and steam coals. Such methods of working have induced widespread subsidence problems. The hard coal and lignite-fired power plants will be fitted with new systems, including FGD, to limit emissions and improve environmental protection. One of these developments is a Polish-Swedish joint venture in the introduction of new coal combustion technology. This will provide a domestic base for the production of multi-bed combustion (MBC) fluidised bed boilers. Coal-bed methane is also proposed as a source of future "environmentally friendly" energy.

The copper industry, vertical integrated with mining, processing and smelting interests, controlled by Kombinat Gornico-Hutniczy Miedzi (K. G. H. M.) is being restructured. However, trade unions have resisted an attempt to sell a minority stake to foreign investors. It is located in the Legnica Glogow basin, near Lubin in south-west Poland, where reserves are estimated at around 3 400 Mt of ore grading 1–2 per cent copper. Output comes mainly from the Rudna mine, but four smaller operations exist, Lubin, Polkowice, Sieroszowice and Konrad. Mining is done principally by highly mechanised room and pillar methods. The concentrates produced are flash smelted at Glogow, this resulted in 387 000 t of electrolytic copper and 914 t of silver in 1992; on which the state-owned copper producer reported a 81 MUSD profit. Lead and zinc are produced by other enterprises from the mining of around 5 Mt of ore, yielding 187 000 t of zinc and 76 000 t of lead in 1992.

Poland is currently the largest producer of technical (100 per cent) sulphur in the world. Production comes from the 'Frasch' process, producing around 4 Mt in 1991. However, recent falls in demand from domestic and export markets has resulted in the closure of the Machow sulphur mine in Tarnobrzeg Province.

An updated mineral deposits and mining law is currently being debated in the Polish parliament. Politicians have acknowledged that delays in issuing exploration and mining concessions have undermined credibility as (joint venture) partners. The draft law would partially break the state's geological rights monopoly, introduce market principles (concession payments would ensure economic use of the minerals) and address fresh problems. These include mineral deposits under the sea, and the storage of oil, gas, radioactive and toxic wastes underground.

Romania

Romania holds the majority of oil and natural gas reserves in this region, but as with most eastern European deposits they are almost exhausted and the possibilities of finding further large discoveries (with the exception of the Black Sea) is thought unlikely. Production is currently around 7 Mt and the import of oil (estimated at more than 7 Mt for 1993) is now necessary. The drop reflects the gradually shrinking domestic production from a peak of 14 Mt in the early 1970's. Romania has been the first country to exploit the discoveries of oil under the Black Sea, east and north east of Constanta. Some oil shales are also mined at Anina, near Resita in south-west of the country. Romania is also an important producer of hard coals (estimated at 11 Mt in 1989) and brown coals and lignite (41 Mt in 1989). Coal is envisaged to play a much more important role in national energy production in the future with output expected to increase.

National production of iron ore is typically low grade and agreements have been entered into with the Ukraine to provide

technology and equipment for iron ore imports. These agreements predate the break up of the Soviet Union and future supplies from these sources are doubtful. At many of the polymetallic (Cu–Pb–Zn) mining operations, metal output was costing between one-and-a-half and four-and-a-half times the metal value.

Former Yugoslavia

Yugoslavia was the second largest country in Central and Eastern Europe, after Poland. It comprises a very complex geology, geography and ethnic mix.

The independence of some former Yugoslav states and the full-scale civil war that is in progress, within and amongst others, has drastically affected a sizeable and diverse mining industry. It will be several years before the economies of whatever countries form or remain can stabilise again and continue to develop the vast mineral resource base.

Coal reserves (estimated at 2 000 Mt), mainly brown coals and lignite, are scattered in over 130 basins throughout the region. Many of these reserves are amenable to opencast mining methods. Coal accounts for around 85 per cent of the energy minerals used in power generation. Several small oil and gas deposits are located in the north of the region, extensions of those found in Hungary.

Slovenia has concluded a contract with the ERBD for a loan to rehabilitate three hydroelectric power stations. While the Italian electricity utility Enel has extended its cooperation network and concluded a technical/scientific cooperation agreement with its counterpart in Slovenia, Eles. The incomplete restructuring of the legal and economic system seems to be the main obstacle to plans for desperately needed foreign equity investment in coal-fired electricity production in Croatia. This includes the installation of flue gas desulphurisation equipment, to be partially paid for by long-term delivery of electricity to Italy. Electricity supply from other neighbouring states has been disrupted by the civil unrest. Diesel generators have been brought

in as a temporary measure. The region had a flourishing metalliferous industry based on a variety of ores, including around 150 000t/yr of electrolytic copper, around 3.5 Mt/yr of lead/zinc ore based on the output of some 20 operations and a number of other metals (Output figures are for 1990). Around 70 per cent of the copper production came from just three operations. The Bor complex in Serbia produced 43 per cent of the output from both surface and underground operations and the two underground mines of Majdanpak in Serbia and Bucim in Macedonia meet the balance at 445 and 13 per cent respectively. The Bor complex claims the largest copper reserves in Europe and the plant was being upgraded to increase productivity, similar modernisation programmes have been reported for the other two mines.

Former East Germany

Following the reunification of Germany, the mining industry is still going through a massive overall as it readjusts back to a market economy after years of central planning. The technical and financial base of the former West Germany has helped some of the marginal operations survive, while the social and employment considerations have allowed continued support to other operations. The Treuhandanstalt, the institute charged with restructuring the East German economy, handles plans for the privatisation of the mining enterprises.

The country was the world's biggest producer of lignites which peaked at 300 Mt per annum in 1989. The lignite has a very high sulphur content (usually over 3 per cent) compared with the less than 0.8 per cent in mines of the former West Germany. The stricter environmental legislation of a unified Germany has meant that production has fallen considerably (129.4 Mt in 1992). A joint U.S./British group is negotiating with Treuhand for the privatisation of some areas, while a German consortium, including Rheinbraun, has presented

a concept for the Lisatian district. The main deposits of metalliferous ores were and are found in the Erzgebirge Harz mountains and the Thuringian Basin. Most of the metal mining operations have now closed due to the low grades. Environmental problems remain from the uranium mining and processing operations that provided material for the nuclear industries of the former Soviet Union. At Wismut an area of 1 000–1 200 square kilometres is affected by severe radioactive contamination.

A variety of industrial minerals are exploited. East Germany was the world's third largest producer of potash. This is mined from the eastern extension of the vast stratigraphic horizon of the Zechstein Basin, which extends from England through western continental Europe. These overmanned mining operations have in the past caused severe river pollution. The Treuhand quickly moved to close the most inefficient and loss-making mines. Only four of the original ten mines are now operating, with only 7 000 of the 33 000 workforce still employed. In view of the difficulty to date of finding a buyer, the Treuhand has proposed an amalgamation of the eastern German mines with Kali+Salz AG, a loss-making western German subsidiary of BASF. The new merged company would further reduce capacity and employment, while investing in new product lines. Treuhand itself would retain a 49 per cent interest in the company, which would avoid total closure and further job losses in eastern Germany.

Summary

The mining industries of Central and Eastern Europe have been forced to undertake some of the most dramatic and painful industrial restructuring programmes in the region. The sector was organisational geared to central control and divorced from normal economic forces. Many mines, processing plants and smelters have, and will, close. The parts and companies that

survive, such as the Polish coal industry, offer domestic wealth creation and will retain an important international role, particularly in Europe.

Note

* The Escuela de Minas, Universidad de Oviedo, Spain and The Department of Mineral Resources Engineering, University of Nottingham, England have collaborated in two Tempus applications to the European Community. These projects link with universities in Poland and Bulgaria and cover mining finance and environmental problems associated with mining activities.

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