

21st-century prospects for Poland's mineral commodities

# Underground Treasures



Krzysztof Galos studies Poland's mineral commodities market and its past and future fluctuations

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**After vast deposits of oil were discovered under the North Sea, Norway was transformed from a poor country into a very rich one nearly overnight: this demonstrates how individual countries' affluence is still frequently determined by what riches await discovery under their soil**

The economic growth of countries and societies is spurred by the proper development of human potential, but also by properly tapping into natural resources – both renewable (flora, fauna, water, air) and nonrenewable. The latter category predominantly includes mineral deposits that can be worked to yield useful raw materials of various types.

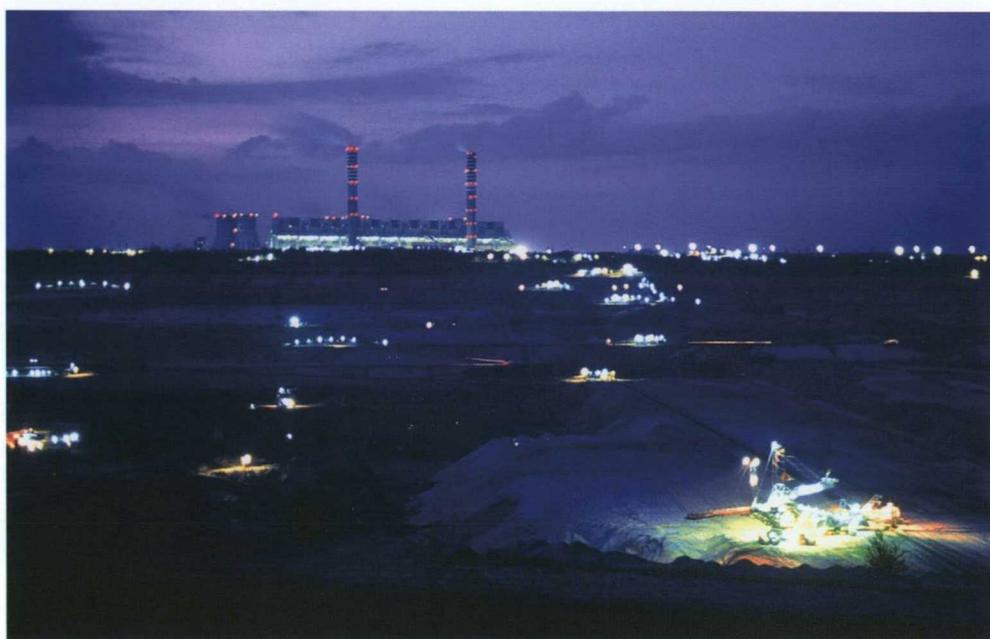
Nearly every sector of the economy gives rise to significant and diverse demand for

various mineral commodities. How to satisfy that demand in a way that is favorable to the economy is a complex issue and an important field of research. In Poland, the most extensive research in this domain is pursued at the PAN Mineral and Energy Economy Research Institute in Kraków, with results published since 1993 in the yearbook *Bilans gospodarki surowcami mineralnymi Polski i świata* (since 1997 also in an English version, *Minerals Yearbook of Poland*). The Institute's staff members study such issues as evaluating the effectiveness of new raw material ventures, seeking better ways to tap into deposits, planning and forecasting the national raw material economy, implementing the principle of sustainable development in the mining industry, developing unconventional energy sources (especially geothermal energy), and the optimal management of industrial and communal wastes.

## From Stone Age to Oil Age

The history of mankind's seeking and utilizing of mineral resources stretches back at least tens of thousands of years. Indeed, the main

Poland's Belchatów coal mine is the largest opencast mining excavation in Europe



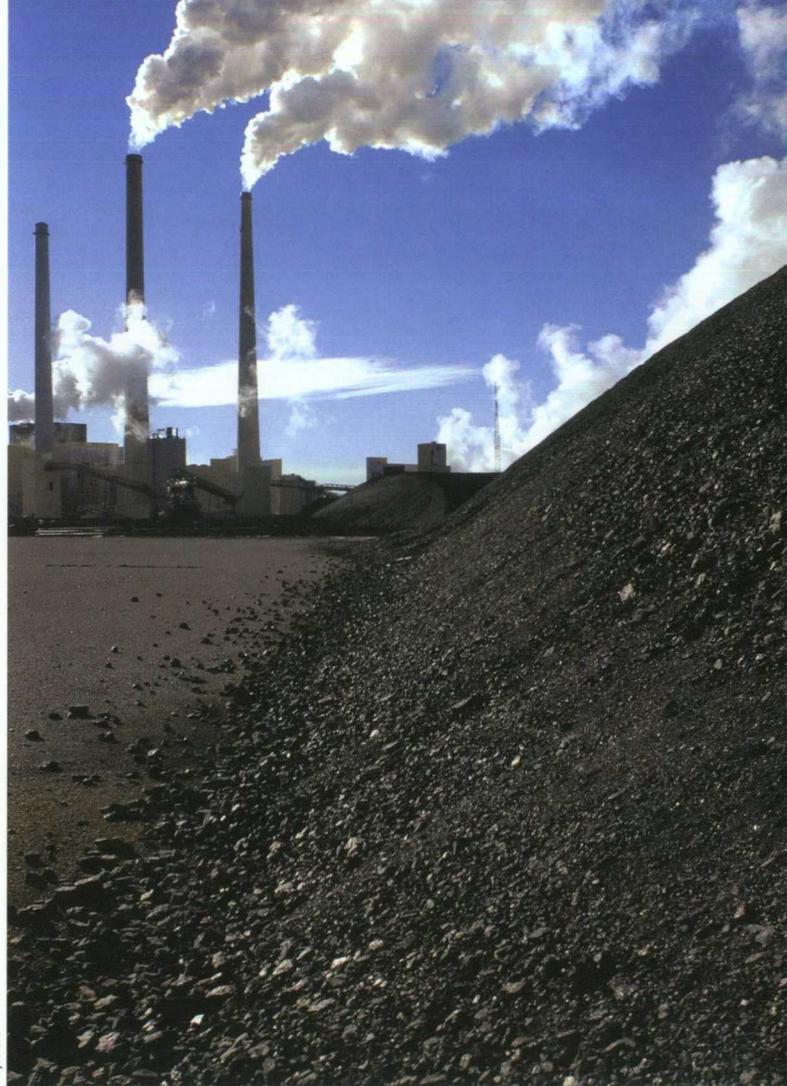
Piotr Sadurski/Newsweek Polska/Reporter

periods in the history of material culture are seen as having been delineated by mankind's discoveries of major new uses of minerals. Flint was already used to produce tools in the late Paleolithic. The Neolithic saw the development of ceramic technology, involving the use of clays, as well as the first use of native metals to produce forged objects. The Bronze Age, in turn, brought the first smelting of copper and its alloys (bronzes) from metal ores, while the Iron Age, beginning not quite three thousand years ago, brought the use of iron ores and the discovery of what are now the most important metallic alloys – steels (alloys of iron with e.g. carbon and silicon). Various types of stone, as well, became increasingly commonly used as building materials.

A clear upswing in the consumption of mineral commodities has occurred in the past three centuries, especially since the start of the technical revolution in the latter 18th century. Rapid industrialization sparked dynamic growth in the consumption of fuels, metallic resources, chemical raw materials, and ceramic and construction materials. The number of kinds of raw materials harnessed by mankind thus rose from several dozen to around a thousand.

The latter half of the 20th century exerted a fundamental impact on the condition of the mineral commodities economy in Poland, as the development of mining and heavy industry was one of the priorities of the Communist authorities of the time. This led Polish production of hard coal, zinc and lead ores to jump severalfold, and spurred the discovery and harnessing of deposits of world-scale significance: copper ores in the region of Lubin and Głogów and deposits of sulfur in the region of Tarnobrzeg.

Abrupt growth in the consumption of a wide range of mineral commodities in Poland occurred chiefly in the 1960s and 70s, in connection with rapid industrialization under the centrally planned economy. The next decade brought a period of evident stagnation in this regard. The start of the 1990s, when market reforms were initiated in Poland, noted a clear drop in the domestic economy's demand for raw materials. For many types of raw materials – including petroleum, aluminum, copper, cement, gypsum, aggregates, dimension stone, glassmaking sands, and feldspars – this situation was of short duration and in subsequent



Andy Olsen

years demand resurged to levels significantly higher than those seen in the 1980s (with certain economic fluctuations). For certain materials, however, the downturn in domestic demand in the early 1990s would prove more permanent, as a consequence of economic or technological change. This has particularly affected hard coal, coke, silver, iron and steel, refractory clays, filling sands and lime.

**Hard coal is and will remain the primary fuel for Polish power plants**

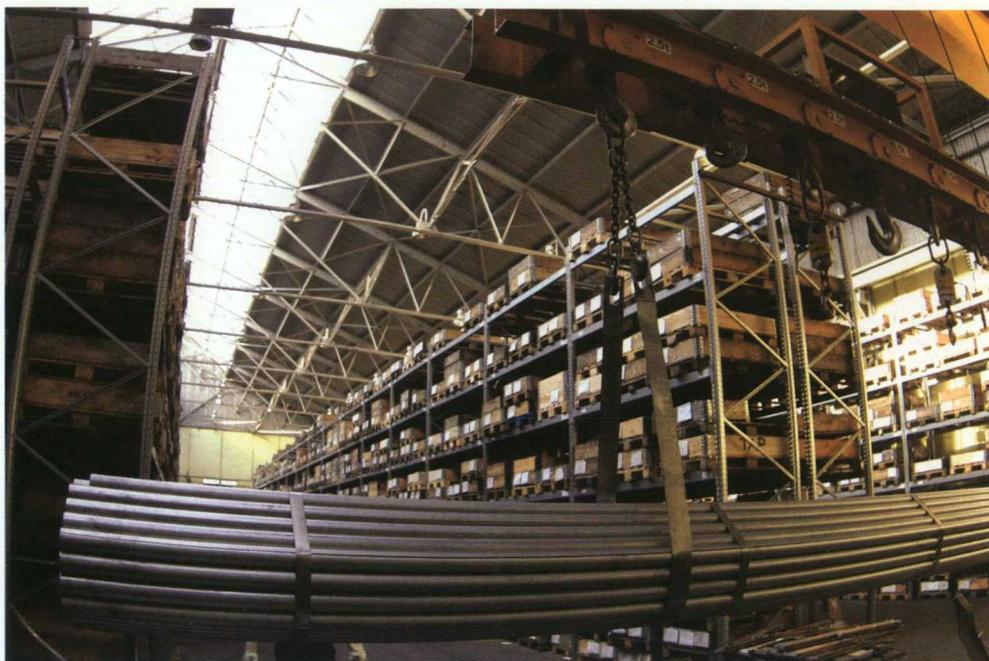
### Land of coal and copper

Poland is one of the most important producers of mineral commodities in Europe, supplying significant quantities of hard and brown coal, steel, copper, zinc, lead and silver, as well as rock salt, sulfur, soda, limestone, lime, cement, gypsum, and other minerals. Poland is moreover a world-class producer of certain commodities: hard and brown coal, coke, copper, sulfur, and salt. The overall value of mineral production in Poland came to 38 billion zlotys in 2004, with hard coal continuing to dominate as the leading type of mineral mined in our country.

Hard coal is also the main Polish mineral sold abroad (accounting for 35% of the value of raw material exports in 2005), exported in quantities of 20 million tons per year.

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The steel market has recently experienced buoyant growth due to vast demand in China



Andrzej Wawok/Reporter

Our country likewise exports copper (26%) in quantities exceeding 200,000 tons per year, as well as silver (6%) and zinc (2%). The significance of sulfur, once one of the most prominent Polish export minerals alongside hard coal and copper, has significantly waned in recent years (currently representing 1% of export value). On the other hand, one disturbing phenomenon is to be found in large exports of scrap metals, mainly iron, aluminum, and copper, which have recently risen to account for 12–14% of the value of mineral raw materials exports. Rock salt, limestone, and lead ore concentrates have in recent years become other Polish export minerals, albeit of lesser significance in terms of value.

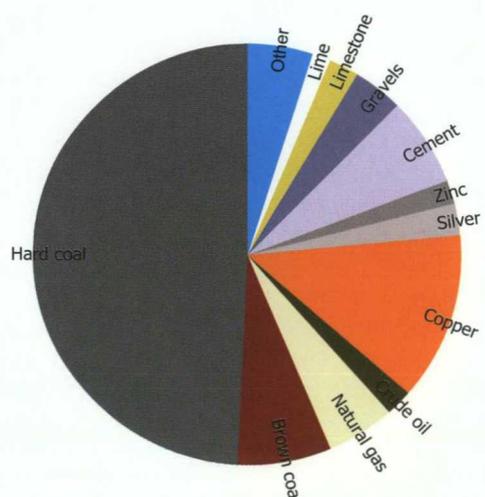
Poland has never been and will never be a self-sufficient country in terms of mineral commodities. The extent of the Polish economy's dependency on imports of numerous minerals is systematically rising. Many branches of industry would be unable to develop without imports of crude oil (50–60% of the overall value of raw materials imports), natural gas (20–27%), iron ore concentrates (3–5%), aluminum (4%), phosphate rock (1–3%) and potassium salts (1–2%), which Poland does not have or does not mine in sufficient quantities.

### Imbalance of trade

Like a clear majority of European countries, Poland is above all a consumer of

mineral commodities. When we do possess deposits facilitating the profitable mining of the respective raw materials, such production is developed in keeping with the principles of sustainable development. In other cases, the domestic economy has to resort to imports, which frequently satisfy most or even all of the country's demand for a given mineral.

Although Poland has seen a negative balance in its mineral trade for at least 30 years, for a long time this deficit was to a significant degree mitigated by exports of large quantities of hard coal, copper, and sulfur. The negative balance has been significantly increasing for about 10 years now, mostly due to energy



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Breakdown of the total value of Poland's mineral production in 2004

commodities (coal exports are shrinking, oil and gas imports rising) – totaling -13 to -16 billion zlotys per year in recent years and evidencing a clear correlation with world oil and gas prices. As a consequence of the dramatic climb in these prices, the trade deficit reached -23.5 billion zlotys in 2005. The only group of raw materials in which Poland sees a positive balance of trade are metallic raw materials, owing to large and profitable exports of copper and silver, despite the country's imports of growing quantities of iron ores, aluminum, ferroalloys, nickel and other metals.

Domestic demand for mineral commodities is the main driving force behind the development of the mining industry and production of raw materials in Poland. It is rare for a mineral produced in Poland to be chiefly directed for export. One such rare case was seen in the 1960s, when native sulfur production was developed and 80% of it went to export. At present, something similar holds for the silver obtained as a by-product of refining copper: more than 95% of its production is exported.

### Step towards the future

The profound sociopolitical and economic transformations that have been taking place in Poland over the past decade and a half have had a significant impact on the face of the domestic mineral economy. Poland's significance as a producer of internationally-traded minerals has clearly waned (the exceptions here being copper and silver, being increasingly mined by the company KGHM). The group of energy commodities has on the one hand seen a profound drop in production of hard coal, stemming from shrinking domestic demand. On the other hand, domestic oil production has reached record levels owing to the discovery and development of new deposits in the Wielkopolska province and on the Baltic shelf – although still managing to satisfy merely 5% of domestic oil demand. KGHM stands chances of boosting its production of copper and related minerals in the coming years, although the same cannot be said for the prospects of zinc and lead ore mining, as its deposits are nearing exhaustion. Smelting of these metals may nevertheless be sustained, based on imported ore concentrates (zinc) or secondary sources (lead).

Poland remains an important European producer of salt and its derivative sodium

carbonate, while the continued extraction of elemental sulfur at Poland's last active mine, Osiek, hinges upon how prices develop on the international market. Lacking its own sources, Poland remains an importer of potassium salts and phosphate rock. But since Poland does possess numerous deposits of minerals for use in construction and in the ceramic and glassmaking industries, the national economy will here continue to satisfy its needs chiefly from domestic sources. Exceptions to this rule may be seen for high-quality types of magnesites, kaolins, ceramic clays and bentonites, whose domestic production can no longer be boosted.

Overall, Poland's mounting economic demand for minerals should be expected to be satisfied to an increasing degree by imports. This pertains in particular to such raw materials as petroleum, natural gas, iron ore concentrates, ferroalloys, aluminum, phosphate rock, and potassium salts. Prospects for any increase in Poland's mineral exports are quite dim, meaning that the negative balance of trade in minerals will inevitably be growing even wider. ■

#### Further reading:

Galos K., Kamyk J., Lewicka E., Smakowski T., and Szlugaj J. (Eds.). (2006). *Minerals Yearbook of Poland*. Kraków: Mineral and Energy Economy Research Institute, Mineral Policy Division.

East News



**Copper is one of Poland's leading export products, sold in quantities of more than 200,000 tons per year**