

Polish coal powers Europe

Poland is one of Europe's top nations for minerals output, with coal at the forefront, and is an important producer of copper and silver



Polkowice-Sieroszowice is one of KGHM Polska Miedź's three copper mines

Photo: KGHM Polska Miedź

POLAND: FAST FACTS

Capital:	Warsaw
Total area:	312,679 km ²
Population:	38 million
Currency:	zloty (Zt)
Main mineral commodities:	Coal, copper, silver

BY KRZYSZTOF GALOS

LOCATED in central Europe, this former Soviet satellite hosts a wide variety of minerals. It is the European Union's (EU) top producer of hard coal and silver, and is the second largest for refined-copper production.

Globally, Poland ranks as the world's eleventh-largest producer of copper and the world's sixth-largest producer of silver.

In recent years, Poland has experienced continuous economic growth, largely influenced by its accession to the EU in 2004. The zloty strengthened considerably against the Euro and US dollar in 2008, but weakened when the global economic downturn hit in September.

Economic slowdown in 2009 has affected Poland's minerals industry. Lower demand for electricity reduced demand for hard coal by 8% and brown coal by 2%. A housing crisis caused a decrease in demand for construction materials (such as cement and aggregates) by around 15%. Increased electricity prices also hurt the

“Hard coal is still the most important mineral commodity produced in Poland”

financial results of many mining companies – for instance those that operate underground mines and smelters – that are dependent on high supplies of electricity.

There are only a dozen or so mineral commodities exported in large amounts from Poland. These include hard coal, coke, refined copper, lead concentrates, refined lead, refined silver and zinc.

MINING LAW AND ENERGY POLICY

In December 2008, Poland's new geological and mining law was accepted by the government and sent to parliament, where it is still under consideration. It is expected to become operational in 2010.

The new law will be similar to the present one, but it simplifies licensing procedures, especially for common minerals. It will also introduce a new concept of ownership: 'mining property' of the State Treasury. Included in this category are metallic ores, sulphur, potash salt, gypsum and gemstones.

The Polish government is also working on a new energy policy to operate until 2030. The policy, in the final stage of preparation, promotes:

- **Increase of security for energy supplies:** Through protected access to hard and brown coal reserves; support of hard-coal mining with appropriate development work based on money coming from investors (the privatisation of the hard-coal industry is assumed).

- **Diversification of structure of electric energy generation:** Through development of nuclear power plants (at least two plants by 2030);

- **Development of renewable energy supply to a 15% share in 2020;**

- **Reduction of power industry influence on the environment:** through construction of modern power units, also with use of carbon capture storage technology and modern coal burning technologies.

COAL FUELS DOMESTIC POWER

Hard coal is still the most important mineral commodity produced in Poland, although production has been decreasing since 1997. Production in 2008 amounted to 84Mt – 40% less than ten years ago.

Thermal coal contributes to 86% of output and metallurgical (coking) coal 14%. Hard coal's contribution to Poland's primary energy supply is very significant, but continuously declining – around 48% in 2008. Exports of hard coal, which were at 30Mt/y in the mid-1990s, have now dropped to just 8.5Mt in 2008, while coke exports are still quite high.

The hard-coal industry consists of three large state-owned companies: Kompania Węglowa SA, Jastrzębska Spółka Węglowa SA and Katowicki Holding Węglowy SA.

There are also two smaller companies: LW Bogdanka SA – the only one operating outside of the Upper Silesian Coal Basin, in the Lublin Coal Basin in eastern Poland – and Południowy Koncern Węglowy SA (PKW).

Kompania Węglowa is still the largest producer of hard coal in the EU. It operates 16 mines in four mining centres in the eastern, central, northern and western part of the Upper Silesian Coal Basin. It has a total capacity of around 45Mt/y.

POLAND'S PRODUCTION RANKING (EU)

Rank	Material
1	Hard coal, coke, copper concentrates, silver
2	Refined copper
3	Lignite, zinc and lead concentrates
4	Quartz sand
5	Cement, gypsum, and feldspar raw materials
6	Zinc, lead, limestone

Poland is also the only EU producer of rhenium

Kompania Węglowa's production amounted to 44.5Mt in 2008, and is expected to be about 42Mt in 2009. It consists of 83% of thermal coal for power plants, 10% of coarse thermal coal for private consumers and 7% of coking coal.

The company invested Zt865 million (US\$307 million) in 2008 and will invest Zt900 million in 2009 to maintain production capacities and increase efficiency. It plans to sell its Silesia mine with large, but undeveloped reserves, to an external investor.

In April 2009, Kompania Węglowa signed an agreement with RWE to construct a power plant in Wola (on the grounds of Kompania Węglowa's former Czczott mine) with a capacity of 800MW. The plant will be supplied with hard coal from Kompania Węglowa's mines. The facility is expected to be operational in 2015. Kompania Węglowa is not expected to be privatised in the coming years.

Jastrzębska Spółka Węglowa operates six mines in the southwest part of the Upper Silesian Coal Basin and has a total capacity of 16Mt/y. The company is the largest producer of coking coal in Europe – coking coal constitutes 80% of Jastrzębska Spółka Węglowa's production. Production was 13.6Mt in 2008, but due to the fall of the coking coal market in 2009 it is expected to be less than 11Mt this year.

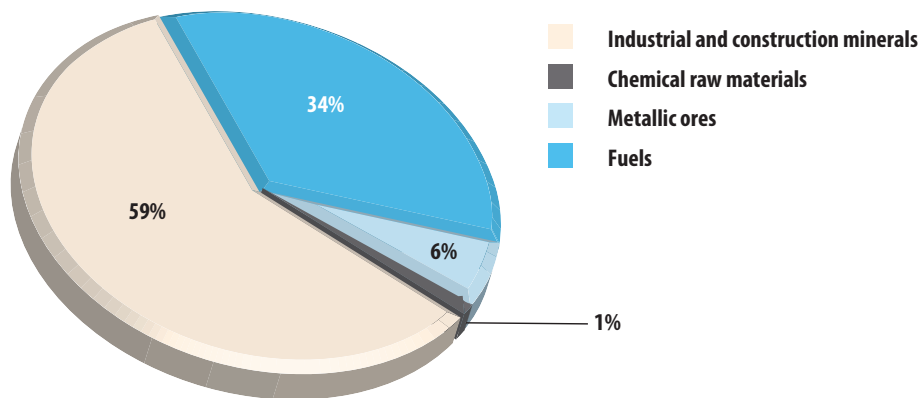
The government plans to privatise Jastrzębska Spółka Węglowa through a listing on the Warsaw Stock Exchange. This will probably not happen before 2011, after the full integration of the Przyjaźń and Zabrze cokeries into a single coking-coal holding: Grupa Węglowo-Koksowa.

"KGHM Polska Miedź SA is Poland's only producer of electrolytic copper and is also the largest copper mine producer in Europe"

The company has started to develop a new Bzie-Dębina Zachód deposit (initial production is expected in 2018) and Pawłowice deposit (to commence in 2022), which will extend Jastrzębska Spółka Węglowa's mining activity until 2055.

Katowicki Holding Węglowy comprises six thermal coal mines in the central part of the Upper Silesian Coal Basin. The mines have a total capacity of 15Mt/y. The company invested Kt900 million in 2008 and will invest a similar sum in 2009 to maintain production capacities.

Katowicki Holding Węglowy will also be privatised



Mining output in Poland (2007)

through a listing on the Warsaw Stock Exchange or a stock sale to a private investor, but not before 2010.

Południowy Koncern Węglowy has two mines – Sobieski-Jaworzno III and Janina – that have a combined capacity of 5Mt/y. Tauron power owns the company and the mines supply its power plants, which are located nearby.

New World Resources NV, the Czech mining company listed on the London, Prague and Warsaw stock exchanges, plans to redevelop two deposits in the Upper Silesian Coal Basin: Dębienko (the mine closed in 2000) and – together with Jastrzębska Spółka Węglowa – Morcinek (which closed in 1998), located near the Czech border. The exact date of the development is still uncertain.

LW Bogdanka operates the largest single hard coal mine in Poland, the Bogdanka mine, which has a 5.5Mt/y capacity and delivers only thermal coal. In June 2009, LW Bogdanka debuted on the Warsaw Stock Exchange. New investors paid Zt528 million for a 32% stake.

The Polish government plans to sell 56% of stocks belonging to the State Treasury to private investors. Money raised through the stock market will be used to invest in the development of the Stefanów coal field and a new processing plant. This will double production to 11Mt/y in 2014.

Even now, LW Bogdanka is the most profitable hard coal producer in Poland – it sells its coal primarily to a few power plants that are located up to 200km from the mine.

BROWN COAL PLENTIFUL

Brown coal is the second basic fuel for the Polish power industry, assuring supplies for generation of 32% of domestic electric energy. Production totalled 59Mt in 2008, and is supplied by four companies: KWB

Belchatów SA with the Belchatów and new Szczerców mine (31-35Mt/y); KWB Turów SA, with its Turów mine (10-12Mt/y); KWB Konin SA, with five open pits (combined output of 10-11Mt/y); and KWB Adamów SA with three open pits (4-5Mt/y). They supply brown coal to the neighbouring power plants of Belchatów, Turów and the Pątnów-Adamów-Konin power complex.

All the brown coal mines are state-controlled. Since 2007, the Belchatów mine and power plant and the Turów mine and power plant, among others, have been included in the largest power company in Poland – PGE Polska Grupa Energetyczna SA.

KWB Konin and KWB Adamów are still state-owned companies, but they will be privatised in 2010. The nearby Pątnów-Adamów-Konin power company will be privatised in the near future.

KWB Belchatów, the largest brown coal producer in Europe, started to supply coal from its new Szczerców mine to the Belchatów power plant in August 2009. At full capacity, the Szczerców mine will produce 36.5Mt/y until 2038. Brown coal from Belchatów and Szczerców supply the largest thermal plant in Europe, with a capacity of 4,440MW (a new power unit of 858MW will commence in 2010).

After 2020, reserves at the Konin and Adamów mines will be exhausted. However, there are plans to develop two large brown coal deposits: Legnica in southwest Poland (available reserves of 3,000Mt), and Gubin-Zasieki-Brody in west Poland near the German border (1,200Mt). KWB Belchatów and KWB Turów have reserves to maintain production until 2035-2038.

COPPER STRONG, SILVER STERLING

KGHM Polska Miedź SA is Poland's only producer of electrolytic copper and is also the largest copper producer in Europe. The company ranks as the world's second-largest producer of silver, ninth-largest



ZGH Bolesław plans to increase electrolytic zinc production by 100,000t/y at the Pomorzany mine

Photo: ZGH Bolesław

KGHM POLSKA MIEDŹ PRODUCTION (‘000T UNLESS INDICATED)

	2007	2008
Copper in concentrates	452	429
Refined copper	533	527
Refined silver (Moz)	39	38
Refined gold (oz)	28,388	28,999
Pig lead	21	24
Refined lead	15	20

producer of copper and the seventh largest producer of refined copper.

The company is situated in the southwestern part of Poland, near the towns of Lubin, Sieroszowice and Głogów. This huge copper ore deposit – covering an area of about 550km² – in Legnicko-Głogowski Okręg Miedziowy (the Legnica-Głogów copper district) was discovered in 1957 and mining development started in 1961 (when KGHM was established). Industrial production began in 1968.

Initial reserves of Legnicko-Głogowski Okręg Miedziowy were 1,661Mt of ore containing 33Mt copper and 93,000t silver. KGHM's total reserves amount to 1,195Mt of ore with an average copper content of 2.08% and silver content of 58g/t (for 24.8Mt Cu, and 69,500t Ag).

The company has an integrated production structure that consists of:

- Three mines – Lubin, Polkowice-Sieroszowice and Rudna, with adjacent ore processing plants;
- Three copper smelters - Legnica, Głogów I and Głogów II;
- Głogów precious metals plant; and
- Cedynia copper rolling mill.

Copper ore is extracted in underground mines at a depth of 650-1,150m, then transported to adjacent processing facilities. As a result of beneficiation, copper concentrate is produced (containing 23-27% Cu) and sent to smelters. There, the concentrate is melted in shaft furnaces (Legnica, Głogów I) or a flash furnace (Głogów II), and fire refined into anode copper, which is further processed in nearby electrolytic refineries into cathode copper.

A part of these cathodes is used to produce wire rod in the Cedynia plant and continuous cast billets in the Legnica smelter. Anode slime, which arises during the



LW Bogdanka operates the largest single hard coal mine in Poland, the Bogdanka mine

Photo: LW Bogdanka



The Pagórki Zachodnie feldspar-quartz mine

Photo: Strzeleckie Kopalnie Surowców Mineralnych Ltd



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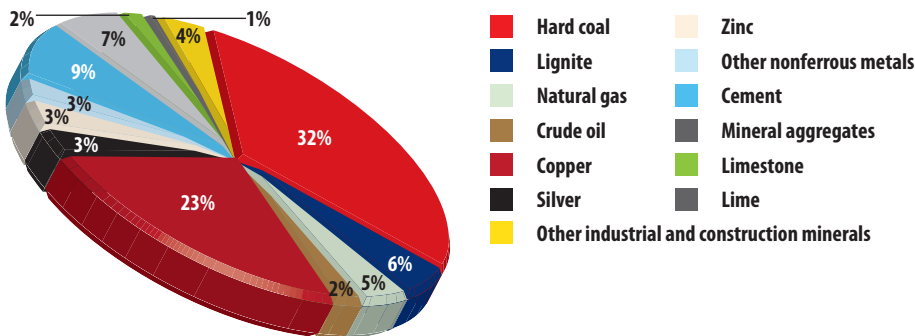
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JORC Compliant Resources of the Myszków Deposit, Poland

Category	eMo ppm cut-off	Million Tonnes	eMo %	eCu %	Mo ppm	W ppm	Cu ppm	Ag ppm
Mineralisation	500	1327	0.10					
Inferred	850	726	0.12	0.60	617	404	1210	2.22
Inferred	1000	507	0.13	0.66	671	460	1295	2.19
Inferred	1500	102	0.17	0.85	779	631	2022	2.30

The only world-class molybdenum deposit in Europe

The Myszków Mo-Cu-W deposit in Poland 100% owned by **Strzelecki Metals Ltd** (through its Polish subsidiary **SKKGM**) is the only world-class molybdenum deposit in Europe. The resources in the table (left) were calculated by SMG Consultants (Brisbane), and are based on nearly 30km of diamond drilling. The 'moly-equivalent' values were derived from ppm values of all metals using the formula: eMo = 1*Mo + 0.76*W + 0.19*Cu + 15*Ag (see website for details).



Value of mineral production in Poland (2007)

copper electrorefining process, is used by the Głogów precious metals plant for the production of refined silver and gold, as well as Pt-Pd slime.

In 2008, KGHM's copper ore production decreased slightly to 29Mt, with an average copper content of

1.64% Cu. Copper concentrate production amounted to 1.87Mt, and the copper content in the concentrates decreased by 5% to 429,550t.

Electrolytic copper production decreased by 1.2% to 526,806t, as smelters were supplied not only by KGHM's

own concentrates, but also by imported copper concentrates and blister copper. The usage of copper scrap also increased.

Recently, KGHM signed an agreement with Salobo Metais SA for long-term copper concentrate deliveries between 2012-2016. Moreover, KGHM produces copper wire rod (206,200t in 2008), oxygen-free copper rod (11,800t) and copper continuous cast billets (20,200t). According to projections in August, refined copper production in 2009 is expected to be about 500,000t and silver production 1,200t.

Since 1997, KGHM stocks have been traded on the Warsaw and London stock exchanges. The State Treasury is still the owner of 41.8% of the stocks, though the government plans to sell 10% of KGHM's stocks in 2010 – but still maintain control of the company.

Recently, KGHM's most important investments were: initial works on development of a new deep copper-silver deposit – Głogów Głęboki Przemysłowy; commencement of refined lead production; and reconstruction of the Głogów II flash smelter.

According to the latest KGHM strategy for the years 2009-2018, the company plans to invest Kt19.8 billion, and achieve refined copper production of 700,000t/y. The main areas of investment will be: work on extraction of thin seams; construction of a new flash smelter and electric furnace smelter at Głogów (to replace obsolete shaft furnaces); further works on the development of GGP deposit; investment in foreign mining assets (probably in North America); and entrance into the power industry (common ventures with some power industry company).

Development of the GGP deposit down to a depth of over 1,250m is one of the most important KGHM investments. The mine should enable KGHM to maintain the current level of production for an additional 15 years, as this deposit contains 25% of current available reserves of KGHM.

The planned life-span of the Lubin and Rudna mines is around 2030, the Polkowice-Sierszowice mine until 2040, and extraction of the new GGP deposit will last until after 2050.

EUROPE'S SOLE RHENIUM PRODUCER

Poland is the only country which mines rhenium in Europe. A subsidiary of KGHM Polska Miedz – KGHM Ecoren SA – introduced the original technology of ammonium perhenate recovery from sulphuric acid waste of copper extraction unit at the Głogów II Copper Smelter. The initial production in 2006 amounted to 1.5t, while in 2007 – when commercial production started – production rose to 3.5t. It is expected that ammonium perhenate production will soon amount to 8t; and KGHM Ecoren will become the world's third-largest producer of this material, after Chile's Molibdenos y Metales SA (MolyMet) and Freeport McMoRan Copper & Gold Co in the US.

In 2010, KGHM Ecoren will commission in Legnica the next modern installation for production of metallic rhenium (in a form of pellets) from ammonium



Legnica, one of KGHM Polska Miedz's three copper smelters



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Following the success of the inaugural event in June 2009, Aspermont UK and Advantix will host the 2nd Russian & CIS Mining Symposium in London on April 27-28, 2010.

The resources sector remains the backbone of the Russian economy and the aim of the Symposium is to provide an essential update on the mining challenges and investment opportunities in Russia, Central Asia and the Ukraine.

The Symposium conference programme will feature a vast breadth of industry insight and expertise with over 30 key, international speakers from the mining, finance and associated sectors discussing strategy, finance, investment and economics within the CIS mining sector.

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The PM will have experience in as many as possible of the following areas:

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Qualities:

Capable of doing a good job working in a small company with limited resources

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Independent problem-solving nature

Good communications skills

Geographical:

Must be prepared to travel (UK, East Africa, Western Australia). Will ultimately be based in Tanzania

All enquiries should be sent by email to info@africaneagle.co.uk or posted to our London office at 2nd Floor, 6-7 Queen Street, London, EC4N 1SP, UK and marked for the attention of the Operations Director, Chris Davies

BRIGHT FUTURE FOR STRZELECKI'S MYSZKÓW MOLY DEPOSIT

ASX-listed Strzelecki Metals Ltd is now two years into the drilling of Europe's largest Mo-Cu-W-Ag deposit, located at Myszaków in Poland.

The porphyry is located 80km northwest of Krakow and has an estimated metal-in-the-ground value of nearly US\$30 billion.

It is one of several porphyry copper-type deposits identified within a loosely defined belt of Pre-Cambrian to Palaeozoic rocks in south-central Poland. Molybdenum represents about half of the metal value with the remainder being derived from copper, tungsten and silver.

In May this year, Strzelecki published the first JORC-compliant resource statement for its Myszaków deposit. This states that out of 1,300Mt of porphyritic mineralisation, there is a 726Mt inferred resource containing 985Mlb of molybdenum, 878,000t of copper, 293,000t of rhenium and 53Moz of silver with an average grade of molybdenum equivalent (eMo) of 0.12%.

When the cut-off grade is lifted from 850ppm of eMo to 1,500ppm the high-grade core (eMo = 0.17%) of 104Mt can still support a 20-year mine life at 5Mt/y.

With its Myszaków licence, Strzelecki inherited over

30km of diamond drilling data from previous Polish governments.

Today this drilling would cost over US\$20 million. The deposit occurs in a very small part – 0.5km², of the 234km² exploration ground held by the junior company, which has now identified additional target areas for drilling.

Its location is geographically advantageous on both micro and macro scales: on the fringe of the Silesia region it is 1km from a main railway line and other excellent infrastructure is nearby.

Europe consumes 29% of annual global molybdenum production. Myszaków's location at the heart of the continent in a politically stable and growing economy means it is likely to become the preferred supplier to many of Europe's steel mills, the company says.

By contrast, the closest molybdenum mines are in Armenia and Iran. Present estimates indicate that when in production Myszaków has the potential to satisfy up to 8% of Europe's molybdenum demand.

In October, Strzelecki is expecting the results of a concept study and plans to resume its drilling programme early next summer.

perrhenate, which will have a 3.5t/y capacity. Rhenium products from KGHM Ecoren are used in the air and space industries (as a component of special alloys), and in the petrochemical industry (as catalysts). The company has managed to establish a long-term business relationship with Rolls-Royce plc and Johnson Matthey plc.

ZINC, LEAD MINING STOPPAGES

Mining of zinc-lead ores in the Cracow region of Upper Silesia-Cracow will probably cease between 2014 and 2016 owing to exhaustion of economic reserves. The ores are still mined and processed by ZGH Bolesław SA (comprising the Pomorzany mine and the Olkusz-Pomorzany processing plant), which delivers 75,000t/y of electrolytic zinc and over 30,000t/y of lead in

gical Bolesław smelter 60%. The total metallic zinc output recovered to 144,000t in 2008. Its exports are still over 70,000t/y, while imports recently rose to 25,000-30,000t/y.

Pig lead is produced from Zn-Pb concentrates in the Miasteczko Śląskie smelter (50%) as a by-product of copper smelting by KGHM (30%), and from secondary sources by Orzeł Biały SA in Bytom and Baterpol Ltd in Świętochłowice. Refined lead is produced by Orzeł Biały (35%), Baterpol (28%), Miasteczko Śląskie (up to 25%), and recently also in the Legnica Smelter of KGHM. The total refined lead production has been continuously increasing to 111,000t in 2008. Refined lead is both imported and exported at the level of 15,000-25,000t/y.

The Miasteczko Śląskie smelter is the only domestic producer of refined cadmium and delivers 350-600t/y of this metal. The majority of this production is exported.

ZGH Bolesław plans to merge with HC Miasteczko Śląskie SA at some stage. In 2010, the State Treasury plans to sell 85% of ZGH Bolesław stocks to a private investor. Orzeł Biały and Baterpol are private companies.

ALUMINIUM MINING CEASES

Aluminium Konin – Impexmetal SA, in Konin, is Poland's only domestic producer of primary aluminium. Output has been running at about 54,000t/y. Due to high electricity prices, the primary aluminium production unit at the Konin smelter stopped operating in February 2009. Currently, Poland is entirely dependent on aluminium imports (70,000-105,000t/y), with only a small production of secondary aluminium (21,000t/y).

MOLY AND TUNGSTEN POTENTIAL

Molybdenum-copper-tungsten mineralisation was identified near Myszaków, 80km northwest of Kraków, in the 1960s. In 2006, Śląsko-Krakowska Kompania Górnictwa Metali (a subsidiary of Australian company Strzelecki Metals Ltd), obtained an exploration licence for detailed exploration of the Myszaków unique porphyry Mo-Cu-W deposit. Twelve drillholes, each 1,200m deep, are to be examined until 2011. In May, Strzelecki Metals released its first resource estimates (see box, above).

“The government plans to sell 10% of KGHM's stocks in 2010 - but still maintain control of the company”

concentrates.

The company plans to increase electrolytic zinc production to 100,000t/y and develop satellite deposits to ensure mining production up to 2016.

Operations by the second significant zinc-lead mining producer – ZG Trzebieńka SA – ceased at the beginning of 2009 due to the exhaustion of reserves. Total annual production of zinc in concentrates has been gradually decreasing – down to some 130,000t recently. This figure will fall by 25-30% this year due to the ZGH Trzebieńka closure.

Lead in concentrates production recently stabilised at 50,000t/y but will drop to under 35,000t/y. All lead concentrates and 30% of zinc concentrates are exported, while over 75,000t/y of zinc in Zn-Pb concentrates is imported for the HC Miasteczko Śląskie SA smelter.

Refined zinc is produced at two smelters: the Miasteczko Śląskie pyrometallurgical smelter contributed 40% of production, and the hydrometallur-

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