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Environmental Life Cycle Assessment – its application in Polish non-ferrous mining industry

Abstract

LCA (Life Cycle Assessment) is a new tool for an environmental management. The most important treasure/quality of the LCA is the „cradle-to-grave” perspective. It means that this analysis is interested in a single product (what can mean product as really existing thing or a whole process of its production, utilization etc.) from mining of raw materials to the eventual disposal of wastes generated during the whole life of this product/process. LCA compares the energy and materials that go into the system (during the whole — as defined — life of the product/process) and the amount of generated by this system wastes and pollution. *System* in this case means set of all single operations (for example extraction of raw materials, manufacturing or disposal of the product) connected with product/process LCA is interested in. LCA is a tool that can help many producers in the world in taking decisions, which can lead to reducing the amount of wastes or to changing the technology and in such way — to influence the improvement of the environment. Such activity has at least two advantages — first of all is the protection of the environment, second — improvement of the producer’s image on the world market.

In Polish non-ferrous mining there are three important metals producers: KGHM Polska Miedź SA is the largest copper producer in Europe, Trzebień SA – producer of zinc-lead concentrates, and ZGH Bolesław – zinc producers. For all of them the environmental aspects are very important as all mining and metallurgical industries are burdensome to the environment. Therefore for any producer’s strategic management policy environmental standards (LCA is adapted now by ISO 14040 family) should be applied. For underground non-ferrous metals production the most important environmental problems are as follows:

<i>Stage</i>	<i>Environmental aspects</i>
Prospecting for the raw material	Small local pollution
Mining	Mining water discharge – including salted water
Processing	Solid wastes disposal
Manufacturing	Dust and gas emission + solid wastes disposal
Transportation	Dust and gas emission
Distribution	Dust and gas emission
Use	—
Waste utilization	Solid wastes disposal
Recycling or final disposal	Improvement of the environment