



CIRCULAR BUSINESS

FOCUS ON RAW MATERIALS IN LOWER SILESIA

Example of circular economy in Lower Silesia region

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## Jeleniogórskie Kopalniach Surowców Mineralnych Lipiński Spółka Jawna

Raw materials industry has a key role in the regional economy, has been recognized as one of the smart specializations and is also very important in the context of the circular economy.

Lower Silesia is one of the key regions of raw materials in Poland. Region is rich in many different natural resources, especially copper and silver ore, brown coal, hard coal, natural gas, rock raw materials. Most of these raw materials is of considerable economic importance.

Deposits of brown coal, copper ore and silver are key assets for regional and country-wide economic prosperity. The sector has a great potential for cooperation with R&D centers, particularly in such areas as new mining technologies, full characteristics of raw materials (processes, equipment, materials) and rare-earth elements extraction technology (materials recovery). Raw materials industry has significant share in industrial manufacturing, employment and investment expenditures as well as expenditures on innovations.

Due to the key role in the regional economy, this area has been recognized as one of the smart specializations. It is also very important in the context of the circular economy, particularly in relation



to technologies for useful materials recovery, recycling and waste treatment. Presented article illustrate an example of good practice of Circular Economy issue in Raw Materials industry.

**The use of carbonate fillers and dolomite dust is wide.**

It could be use in paints, construction, household chemicals, plastic industries etc.

Jeleniogórskie Kopalnie Surowców Mineralnych (JKSM) was established in 1954. In 1956, the Rędzińskie Zakłady Kruszyw Mineralnych in Rędziny was incorporated into JKSM. In the year 1991 the state-owned enterprise JKSM was transformed into a sole-shareholder company of the State Treasury, which was privatized in 1997. In 2000, a new operational strategy was adopted, consisting a significant modernization of the production of raw materials through, among others, the use of technologies that allow the management of almost all extracted minerals.



**Key numbers in Lower Silesia region:**

**1623** MILLION TONS

The total resources of the identified deposits of granites.

**0.9** MILLION TONS

Total extraction of block granites amounted to 26 deposits in 2013.

**1** MILLION TONS OF MINING WASTE

Annually generation due to the extraction and processing of granites in the Lower Silesian Voivodeship.

**The Rędziny Mine**

From the dolomites extracted in the mining plant the rock material is processed. In addition, carbonate fillers, dolomite flours and decorative stones are used in gardening and fertilizer for agriculture sold under the trade name DOLLON. The use of carbonate fillers and dolomite dust is wide, from the production of paints and varnishes through construction and household chemicals to the rubber and plastic industries. Another important area from the point of view of the circular economy is the production

of feldspar dust from granite waste produced in other mining plants of Lower Silesia. Granite waste cannot be utilized in agriculture due to the large acidification of these rocks. In the Lower Silesia, unfortunately, the majority of soils are acidic. It is estimated that annually about 1 million tonnes of mining waste is generated in the Lower Silesian Voivodeship due to the extraction and processing of granites, therefore the environmental and economic problem is high.



## Granite waste

All the more noteworthy is the fact that in 1999 the production of feldspar dust originating from mining waste was noticed. At present, JKSM Lipiński S.J produces 5,000 tons of feldspar dust per year. It should be emphasized that production shows an upward trend. The product is offered in two grades 1 and 2. The chemical compositions of the above-mentioned products, expressed as a percentage by weight, are as follows:

- SiO<sub>2</sub> - 72.5 - 77.5,
- Al<sub>2</sub>O<sub>3</sub> - 12.0 - 14.0,
- Fe<sub>2</sub>O<sub>3</sub> - 0.2,
- TiO<sub>2</sub> - max 0.08,
- CaO - 1.2 - 2.5,
- MgO - 0.1 - 0.4,
- K<sub>2</sub>O - 3.5-4.5,
- Na<sub>2</sub>O - 2.5 - 3.5.



**Feldspar dust (feldspar-quartz)** are used in the glass industry (packaging and technical glass) and ceramics.



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### The Lower Silesian Voivodeship

is located in areas with a very varied geological structure. In the Sudety and Przedzudecki Blocks there are magma, metamorphic and sedimentary rocks.

In the scale of Poland, the region is the center for the extraction of many important minerals, hence the good practices in mining waste management developed at JKSM Lipiński Spółka Jawna are of great importance for the development of hard-to-sell rock material currently arising and deposited in heaps. Activities undertaken by the Management Board of JKSM Lipiński Spółka Jawna in connection with mining dolomite rely on multidirectional management of the raw material, which in consequence means virtually waste-free exploitation of the

deposit. Both directions are part of the principles of the circular economy. The activities described above deserve to be popularized.



**Good practices, in the case of wide application, will contribute to improving the efficiency of mineral management and the positive attitude of society towards mining, thanks to the reduction of the amount of burdensome mining waste. The European Union uses much more raw materials than it produces itself, therefore the maximum use of its own minerals is a very important matter.**

## CONTACT

Lower Silesia Team in cooperation with Mirosław Maliszewski - Poltegor Institute

For further contact:

**Justyna Lasak:**  
[justyna.lasak@umwd.pl](mailto:justyna.lasak@umwd.pl)

**Michał Frycz:**  
[michal.frycz@umwd.pl](mailto:michal.frycz@umwd.pl)

**Mirosław Maliszewski:**  
[miroslaw.maliszewski@igo.wroc.pl](mailto:miroslaw.maliszewski@igo.wroc.pl)



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