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Status of Critical Raw Materials reserves and production in Poland

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Workshop introducing the knowledge of critical raw materials in V4

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INTRODUCTION

Large scale energy storage

Increasing share of renewables such as wind turbines and photovoltaics in the energy mix of European Union creates challenges for the electricity grid. Compressed Air Energy Storage (CAES) could be one of the solutions to this problem.

Up till now as the Compressed Air Storage (CAS) salt caverns have been the preferred locations.



Critical raw materials as of 2020 EU report

2020 critical raw materials		
Antimony	Hafnium	Phosphorus
Baryte	Heavy Rare Earth Elements	Scandium
Beryllium	Light Rare Earth Elements	Silicon metal
Bismuth	Indium	Tantalum
Borate	Magnesium	Tungsten
Cobalt	Natural graphite	Vanadium
Coking coal	Natural rubber	Bauxite
Fluorspar	Niobium	Lithium
Gallium	Platinum Group Metals	Titanium
Germanium	Phosphate rock	Strontium



Raw materials critical for the economy of Poland

Experts list

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(Radwańska-Bąk et al. 2018)



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Raw material	Share of import in domestic demand, %	Domestic resources
Antimony	100	None
Baryte	100	Some reserves in Lower Silesia
Beryllium	100	None. Could be extracted from coal fly ash.
Cobalt	100	Possible recovery from Cu metallurgical waste or ore
Germanium	100	None
Gallium	100	Possible recovery from copper metallurgical waste
Indium	100	None
REE	100	Some waste contain REE
Platinum Group Metals	>80	Possible production from scrap metals containig platinum
Magnesium	100	Potential of production from dolomites
Natural graphite	100	Possible substitution by synthethic graphite
Niobium	100	None
Phosphate rock	100	Possible extraction, produced until 1971 in Poland.
Vanadium	100	0.26-0.76% V ₂ O ₅ in some deposits. Some reserves in Cu ore deposits. Uneconomical extraction.



Baryte and fluorite

In Lower Silesia Baryte is found in veins where the content reaches up to 80%.

Last baryte and fluorite mine „Stanisławów” was closed in 2008.

Documented reserves: 5.67 mln t of Baryte and 0.54 mln t of Fluorite

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Stanisławów
deposit 5.1 mln t



Cobalt

Fore-Sudetic Monocline and North Sudetic Trough.

Although KGHM Polska Miedz S.A. recovers many precious metals from Kupferschiefer ore, cobalt is not recovered yet. This metal occurs as an accompanying element, mostly in the form of cobaltite (CoAsS), with the average content of 50-80 g/Mg.

- 8 There is a possibility to recover cobalt from the Kupferschiefer ore mined by KGHM Polska Miedz S.A. Due to unique mineralogy of this ore, it is difficult to find an efficient technology for the recovery. The previous studies showed that it is possible to recover cobalt with the use of leaching technology, both for flotation concentrates as well as converter slag, where currently cobalt is cumulating in metallurgical processes.

KGHM PM S.A.
Cu deposits in



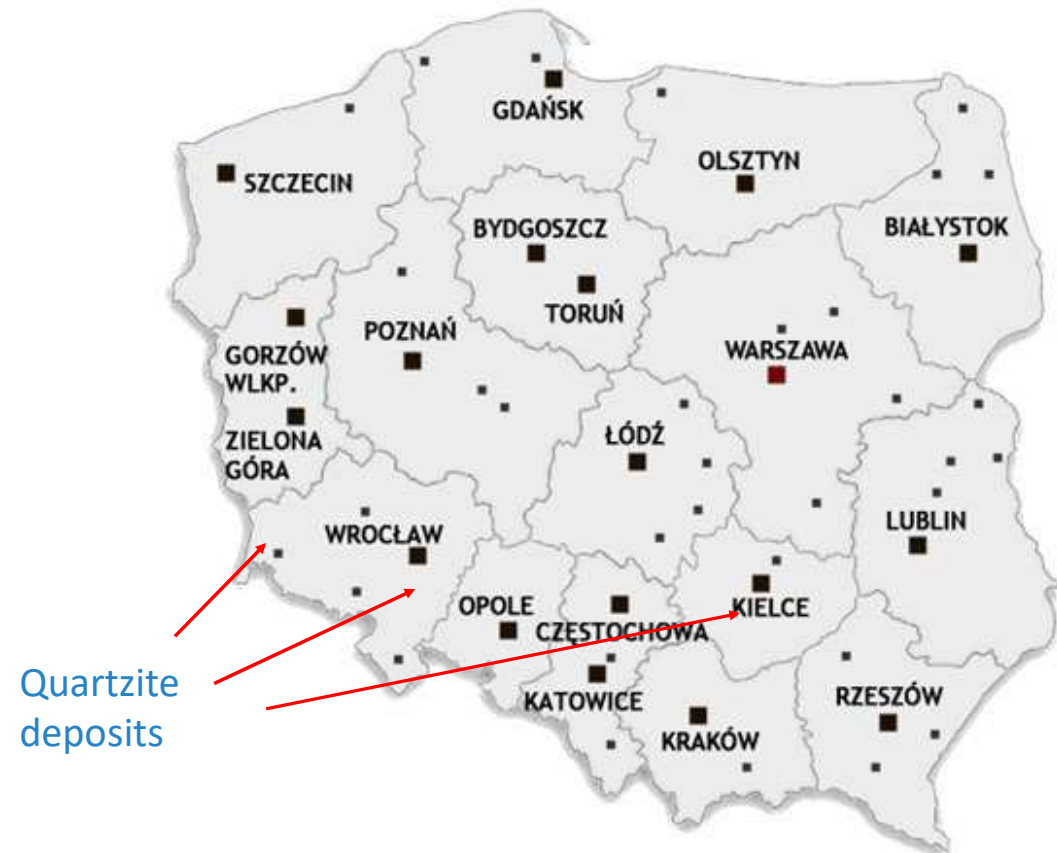
Documented reserves: 118 000 t



Silicone metal

Silicon metal is produced in the submerged arc electric furnace by the reduction of quartzite rock with suitable carbonaceous reducing agents. Raw materials are selected for chemical purity, size consist, electrical resistance, and smelting characteristics.

Quartzite rock deposits are located in Upper
9 Silesia and in Świętokrzyskie



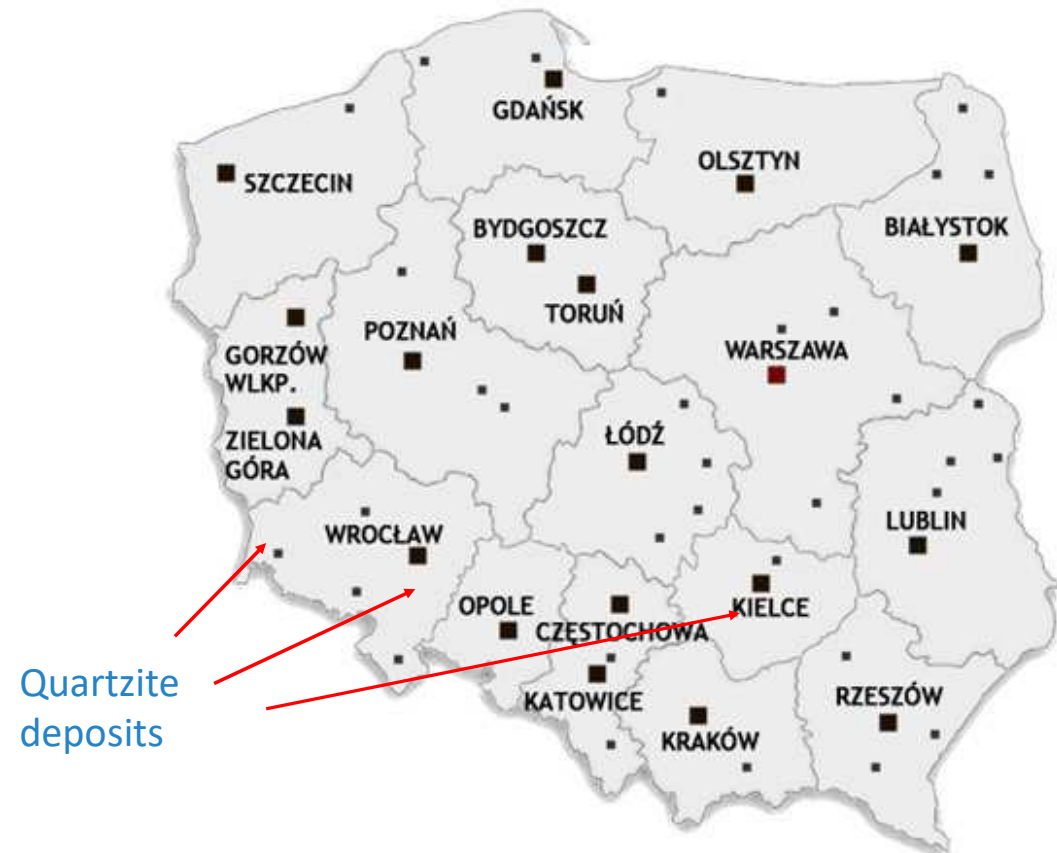
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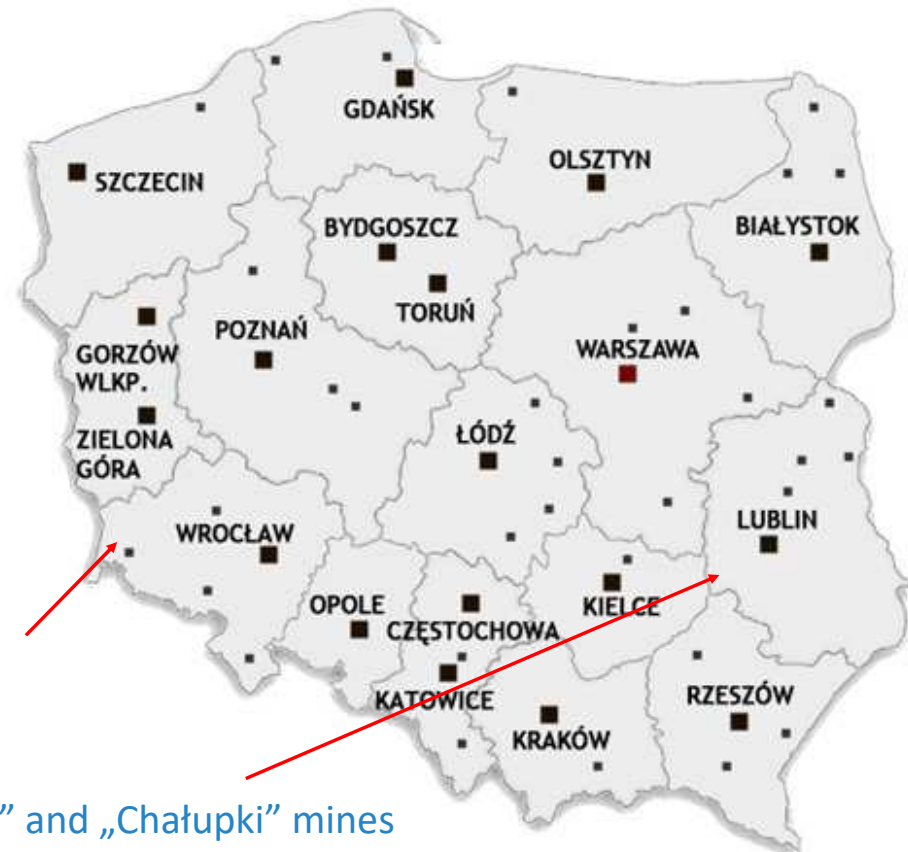
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Phosphate rock

Deposits of phosphate concentration, averaging 14% P_2O_5 were recognized in the NE part of the Świętokrzyskie Mountains. The resources of 10 deposits are amounted to 42.4 Mt of phosphates (7.35 Mt P_2O_5) including 10.77 Mt in the formerly mined deposits at Annapol (1924-1970) and Chałupki (1936-1956).

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Former „Annapol” and „Chałupki” mines

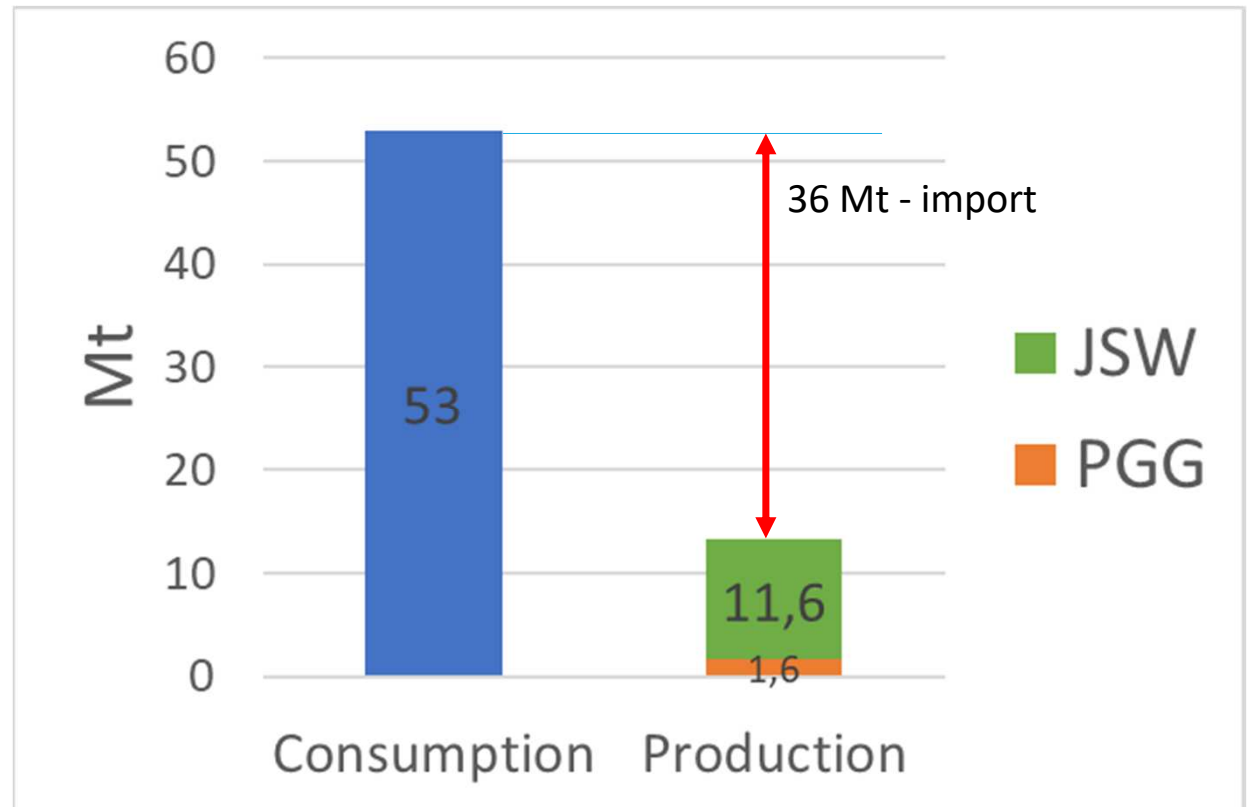
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Coking coal

Coking coal is mined mostly by JSW SA Company but also by the PGG company. Share of import in domestic demand is approximately 75%.

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Conclusions

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02^s

03^s

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THANK YOU!

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