Crimson Publishers
Wings to the Research

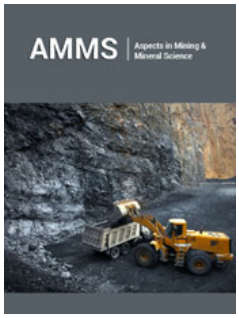
Opinion

Raw Materials in Europe – Last Twenty Years

Henryk Karaś* and Joanna Kulczycka

Cracow Technical Society, Mineral and Energy Economy Research Institute Polish Academy of Science, Poland

ISSN: 2578-0255



***Corresponding author:** Henryk Karaś, Cracow Technical Society, Mineral and Energy Economy Research Institute Polish Academy of Science, Poland

Submission: June 21, 2021

Published: June 30, 2021

Volume 6 - Issue 5

How to cite this article: Henryk Karaś, Joanna Kulczycka. Raw Materials in Europe – Last Twenty Years. Aspects Min Miner Sci. 6(5). AMMS. 000650. 2021. DOI: 10.31031/AMMS.2021.06.000650

Opinion

The pressure on resources is increasing. If current trends continue, by 2050, the global population is expected to have grown by 30% to around 9 billion. Most of people in developing and new emerging economies aspire to the welfare and consumption levels of developed countries. Owing to that intensive use of the world's resources puts pressure on our planet and threatens the security of supply for many economies. Historical long-term demand for base-metals has steadily increased by 1-3% per annum globally and this is likely to continue between now and 2050. Access to raw materials became a matter of survival in the globalized world. When we compare mining activity since 1850 Europe has a long tradition of mining and extractive activities, but EU economy in 2007 have changed deeply [1-5]. Europe descended from self-sufficiency to high import dependence on RM. Certain materials became particularly critical because of significant economic importance for key sectors (IT, robotics, green economy) high supply risks and lack of substitutes. During the last years of XXC. fundamental changes have been observed on global markets ; 450 export restrictions on more than 400 different raw materials strategies to secure privileged access to raw materials. That explains why the EU introduced RMI in 2008 which was based on 3 major pillars:

a. Access to raw materials on world markets at undistorted conditions;

b. The right framework to foster sustainable supply of raw materials from EU sources;

c. Increase resource efficiency and promoting recycling in the EU.

Implementing of that program which consisted of 10 activities was imposed on EC, member states and mining industry. Access to Critical Raw Materials became the main factor to achieve many challenges in developing future economy. The issue of CRM was conducted by governments, companies, and researchers, companies, and researchers. Among the first institutes to publish a method for assessing Raw Material Criticality was the US National Research Council, with the aim of compiling a list of CRMs for the US economy (NRC 2008). The EU published the first list of CRM in 2011. It was based on two factors: supply risk for EU (covering political-economic stability of producing countries, environmental country risk, possibility of recycling and diversity of supply. The second factor was economic importance for EU covering main applications and substitutability of any raw materials. The EC reviews the list of critical raw materials for the EU every three years. The list was, updated in 2014, 2017 and 2020. EU is still well-endowed with aggregates and industrial minerals as well as certain base metals such as copper and zinc. It is less successful in developing projects to source critical raw materials, even though there is significant potential for these. The reasons are multi-faceted: lack of investment in exploration and mining, diverse and lengthy national permitting procedures, or low levels of public acceptance. In 2012 EU introduced new program which highlighted the importance of RM. It was called EIP on Raw Materials Plan which main goals were to reduce import dependency; provide alternatives in supply;

push Europe to the forefront in raw materials sector and mitigate negative environmental impacts. New the EIP on RM management structure was set up and Strategic Implementation Plan was prepared. It consisted of 3 pillars: Technology, Non-Technology Policy, and International Cooperation Pillar. It was important to mention that EIP on Raw Materials EIP on Raw Materials was a part of EU innovation programme Horizon 2020 (2014 -2020). European Institute of Technology and Innovation located in Budapest established the RM centre called Knowledge and Innovation Centre with 8 local centres located in Europe which brought together three sides of "knowledge centres"; business, higher education institutions and research centres.

The World Bank projects that demand for metals and minerals increases rapidly with climate ambition. The most significant example of this is electric storage batteries, where the rise in demand for relevant metals, aluminium, cobalt, iron, lead, lithium, manganese, and nickel would grow by more than 1000 per cent by 2050 under a 2 °C scenario compared to a business as usual scenario. The OECD forecasts that, despite improvements in materials intensity and resource efficiency and the growth in the share of services in the economy, global material use will more than double from 79 billion tons in 2011 to 167 billion tons in 2060 (+110%). For criticality purposes, it is worth looking more closely at the OECD's forecast for metals, projected to increase from 8 to 20 billion tons in 2060 (+150%). Recycling is another keyway for reducing European demand for non-EU raw materials. In 2012 each EU citizen generated at about 17kg of WEEE/year. It is assumed that in the year 2020 this amount should increase until 24kg/person. This is why EU published in 2015 [6-9]. EU Action Plan–Guiding principles on Circular Economy. Some of activities predicted in this Action Plan were included in EIP on RM and Horizon 2020. There were other initiatives and projects which underlined importance of RM in Europe. Raw materials framework initiatives which are included in Horizon 2020 projects :

a. ERECON: the European Rare Earths Competency Network (2013-2015);

b. MIN-GUIDE (2016-2018) developing a "Minerals Policy Guide";

c. MINLEX study (2017)-Legal framework and permitting procedures in the NEEI in EU28;

d. Report "Evaluation and Exchange of Good Practice for the Sustainable Supply of Raw Materials" (2014);

e. MIREU-EU network of mining and metallurgy regions (2017-2020);

f. REMIX-Smart and Green Mining Regions of EU (2017+);

Access to mineral potential in the EU were included in two projects; MINLAND (2017-2019) Mineral resources in sustainable land-use planning; MINATURA2020 (2015-2017) - "mineral deposits of public importance". The other important issue which is based on undistorted access to RM is EU defence programme introduced in 2015 in Brussels. Still one of the biggest challenges the underground mining industry faces today is the ability to manage the complete value chain as one operation. Better management of the complete value chain will help companies understand where operational effectiveness, workforce safety, environmental compliance and energy efficiency can individually increase productivity and extract more value from existing assets. However, in order for this to happen equipment needs to operate reliably and predictably. Ensuring miner safety is going to be another challenge going forward. Mining industry is trying to remove people from dangerous situations by leveraging greater mechanization and automation. Removing people from dangerous or uncomfortable places will also allow the industry to attract a stronger, more educated workforce [10-12]. Europe is going to be the first climate-neutral continent by 2050 (the European Green Deal-Europe's new growth strategy). The strategy, which was announced on 10.03.2020, has two pillars of transition: ecological and digital and will; affect every part of our economy, society, and industry; -require new technologies, with investment and innovation to match; -create new products, services, markets and business models, new jobs and skill; enable a shift from linear production to a circular economy. EU industry will need a secure supply of clean and affordable energy and raw materials to become more competitive as it gets greener and more circular. That needs more investment in research, innovation, deployment, and up-to-date infrastructure. New innovation programme called Horizon EUROPE (2021-2027) should help in developing new production processes and create jobs in the processes for fuel cells, wind, robotics, mastering the quality of 3DP materials, batteries, solar cells, UAV, and digital technologies. The new RM SIP programme should enhance the transition to a climate neutral European industry i.e. energy-intensive industries including RM sector need to reach climate neutrality by 2050.

a. Mining, mineral processing, smelting, and refining are energy-intensive industries

b. The pressure on natural resources is already leading to a more circular approach to manufacturing technologies.

c. The EU should also support the development of key enabling technologies that are strategically important for Europe's industrial future. Some of them an in close link with RM sector.

d. These include; robotics, microelectronics, high performance computing and data cloud infrastructure, blockchain, industrial biotechnology, nanotechnologies, advanced materials and technologies

e. Boosting recycling and the use of secondary raw materials will help reduce dependency on RM.

Currently, mining metals and recycling tend to be separate businesses that are largely not integrated This is changing as mining companies turn their attention to urban mining or recycling as part of their business and rethink their business models (FOM, 2016).

We are also witnessing the arrival of new players in the minerals value chain in the form of high-tech and big brand technology firms who acquire diversified mining portfolios with a view to securing access to vital inputs and taking full control of their supply chains. (the electric carmaker, Tesla, which acquired lithium assets: a key ingredient for their batteries (PWC, n.d.). For example, the recycling of REEs is difficult [13-15]. REEs are used in very small quantities, making the economics of recovery unfavorable. Similar example concerns lithium. However, a product-centric approach can change the economics of recycling.

Funding

This work was funded by the Polish National Agency for Academic Exchange (NAWA) as the part of the project "International Cooperation for Rational Use of Raw Materials and Circular Economy" (COOPMIN) which is conducted in the Division of Strategic Research in the MEERI PAS (2019-2020), project no. PPI/APM/2018/1/00003.

References

1. (2014) Raw Materials Challenges. Industrial Technologies Conference, Chairman of Carlsberg A/S, and the Carlsberg Foundation, Flemming Besenbacher, Denmark.
2. (1850) Activity of World Metal Mining. Raw Materials Group, Stockholm, Sweden.
3. (2017) The Growing Role of Minerals and Metals for a Low Carbon Future. World Bank, USA.
4. (2019) Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences. OECD, France.
5. (2006) Communication from the EC, COM 699, The Raw Materials Initiative-Meeting our critical needs for growth and jobs in Europe.
6. (2020) Material Criticality: An overview for decisionmakers. Brochure by the International Round Table on Materials Criticality, IRTC, India.
7. (2012) EIP – Novel Concept European Innovation Partnership on Raw Materials. Europe.
8. (2015) KIC EIT Raw Materials Knowledge and Innovation Communities (KICs). Karen Hanghøj/Per Kalvig, United Kingdom.
9. (2015) Circular Economy Package. Annual conference European Innovation Partnership on Raw Materials.
10. (2020) Critical Raw Materials for Strategic Technologies and Sectors in the EU-A Foresight Study.
11. Renda A, Alcidi C, Baiocco S, Corti F, Schaus M, et al. (2020) A new industrial strategy for Europe. Intereconomics 3: 132.
12. (2021) European Raw Materials Alliance and RM policy in EU.
13. http://ec.europa.eu/research/horizon2020/
14. (2019) Horizon Europe-Investing to shape our future. European Commission, Europe.
15. UNEP (2021) The Use of Natural Resources in the Economy: A Global Manual on Economy Wide Material Flow Accounting. United Nations Environment Programme, Nairobi, Kenya.