Recycling of metals from urban mines- a strategic evaluation [1]

Urban mining has attracted increasing attention as a research topic, owing to the high growth rate, environmental issues, and market potential of waste generated in urban areas. Metal recovery from such waste has become increasingly important especially in accordance with the concept of metal criticality. This study develops a model by evaluating various types of urban waste in order to understand the criticality of these waste streams and determine their potential for metal recovery. Two factors, i.e. the resource index and technology index, are defined and assessed through a systematic review of data from the literature and industry. High values of the resource index indicate that the waste is important to the European Union (EU) economy and hence has significant potential for recycling as a resource. Furthermore, a high technology index indicates that the waste can be processed for metal recovery with less technology investment than that required for a waste that has a low technology index. However, a high environmental impact for the recovery of metals, indicates that processing of the waste is difficult and potentially has high impact on the environment. A case study of 11 waste streams from a local recycling company is performed, by using the correlation of these two indices. The results of the evaluation suggest that the information and communication technology (ICT) scrap and the rare-earth elements (REEs) containing end-of-life (EOL) products exhibit significant potential for metals recovery. The technical aspects governing the recovery of valuable metals from these two resources are further analysed and potential processing routes (flowsheets) can be suggested. Combined with both physical separation and metallurgical processing, the proposed evaluation methodology and the processing routes for targeted critical metals, are expected to contribute to the development of competitive recycling technologies.

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http://www.sciencedirect.com.ccl.idm.oclc.org/science/article/pii/S0959652615015... [2]

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Type of evidence:

- Models/scenario building [3]
- Scientific articles [4]

Sectors:

- Manufacturing [5]
- Services [6]

Policy changes:

- Tax and other economic incentives [7]
- Research and innovation policy [8]

Expected changes of economic processes:

- More recycling and use of recycled materials [9]
- Product as a service [10]

Indirect effects on the economy:

- Impact on value chains [11]

Environmental impacts:

- Use of resources [12]
- Pollution [13]

Economic impacts:

- Economic stability/uncertainty [14]

Social impacts:

- Health effects (environmental) [15]

Time frame for impacts to materialize:

- Medium term (3 to 5 years) [16]

Enabling factors:

- Environmental awareness of consumers [17]
- Changes to corporate culture [18]
- Regulatory environment [19]

Administrative level:

- National [20]
- Regional/local [21]

Method of valuation:

- Quantitative assessment [22]
- Monetisation [23]

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Links
[1] https://circular-impacts.eu/library/1396
[2] http://www.sciencedirect.com.ccl.idm.oclc.org/science/article/pii/S0959652615015887
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