MSMEs and Sustainable Resource Management

Guidelines and best practices for MSMEs to assure resiliency and progress towards a circular economy in sustainable resource management and critical raw material supply chain solutions

by H. Gielisch, R. Berse, M. Haschke and E.B. Teigler
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Best practices for MSMEs to assure resiliency and progress towards a circular economy in sustainable resource management and critical raw material supply chain solutions

- Micro, Small and Medium Enterprises (MSME) are the main drivers of the world’s economy

List of enterprises in the EU below 250 employees
(source Eurostat (online data code: sbs_sc_sca_r2))
Revenues have fallen for the vast majority of small and medium-size enterprises in Europe since the onset of the Covid-19 crisis.

Source: McKinsey.com
How is the pandemic affecting the local economy and the provision of capital to companies - An Example from Mongolia

<table>
<thead>
<tr>
<th>Minerals product</th>
<th>Unit</th>
<th>Volume</th>
<th>Increase or Decrease 2020.04.15/2019.04.15 (%)</th>
<th>Revenue (US$ million)</th>
<th>Increase or Decrease 2020.04.15/2019.04.15 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper concentration</td>
<td>thou.tn</td>
<td>359.4</td>
<td>-14.5%</td>
<td>409.7</td>
<td>-31.1%</td>
</tr>
<tr>
<td>Coal</td>
<td>thou.tn</td>
<td>3521.8</td>
<td>-62.4%</td>
<td>284</td>
<td>-63.8%</td>
</tr>
<tr>
<td>Iron ore</td>
<td>thou.tn</td>
<td>2404.5</td>
<td>-3%</td>
<td>164.5</td>
<td>+22.7%</td>
</tr>
<tr>
<td>Gold</td>
<td>tonnes</td>
<td>1.6</td>
<td>-66.6%</td>
<td>80.4</td>
<td>-58.9%</td>
</tr>
<tr>
<td>Zinc ore and concentration</td>
<td>thou.tn</td>
<td>41.7</td>
<td>-11%</td>
<td>53.7</td>
<td>-20%</td>
</tr>
<tr>
<td>Flourspar ore and concentration</td>
<td>thou.tn</td>
<td>168.3</td>
<td>+27.8%</td>
<td>42.5</td>
<td>-10.6%</td>
</tr>
<tr>
<td>Refined copper</td>
<td>thou.tn</td>
<td>3.6</td>
<td>+18.4%</td>
<td>19.7</td>
<td>+7.3%</td>
</tr>
<tr>
<td>Crude oil</td>
<td>thou.bbl</td>
<td>359.9</td>
<td>-80.6%</td>
<td>18.6</td>
<td>-82%</td>
</tr>
<tr>
<td>Molybdenum concentration</td>
<td>thou.tn</td>
<td>1.7</td>
<td>-0.27%</td>
<td>12.23</td>
<td>-17%</td>
</tr>
</tbody>
</table>

Source: (Mongolian_Mining_Journal, 2020)

Mongolia 2020 coal exports shrink by 22% to 29 million t

Source: thecoalhub.com
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- What is a Critical Raw Material (CRM)?

List of critical raw materials to the EU 2020 (EC, 2020).

<table>
<thead>
<tr>
<th>Critical raw materials</th>
<th>2020 critical raw materials (new as compared to 2017 in bold)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony</td>
<td>Hafnium</td>
</tr>
<tr>
<td>Baryte</td>
<td>Heavy Rare Earth Elements</td>
</tr>
<tr>
<td>Beryllium</td>
<td>Light Rare Earth Elements</td>
</tr>
<tr>
<td>Bismuth</td>
<td>Indium</td>
</tr>
<tr>
<td>Borate</td>
<td>Magnesium</td>
</tr>
<tr>
<td>Cobalt</td>
<td>Natural graphite</td>
</tr>
<tr>
<td>Coking coal</td>
<td>Natural rubber</td>
</tr>
<tr>
<td>Fluorspar</td>
<td>Niobium</td>
</tr>
<tr>
<td>Gallium</td>
<td>Platinum Group Metals</td>
</tr>
<tr>
<td>Germanium</td>
<td>Phosphate rock</td>
</tr>
<tr>
<td>Phosphorus</td>
<td></td>
</tr>
<tr>
<td>Scandium</td>
<td></td>
</tr>
<tr>
<td>Silicon metal</td>
<td></td>
</tr>
<tr>
<td>Tantalum</td>
<td></td>
</tr>
<tr>
<td>Tungsten</td>
<td></td>
</tr>
<tr>
<td>Vanadium</td>
<td></td>
</tr>
<tr>
<td>Bauxite</td>
<td></td>
</tr>
<tr>
<td>Lithium</td>
<td></td>
</tr>
<tr>
<td>Titanium</td>
<td></td>
</tr>
<tr>
<td>Strontium</td>
<td></td>
</tr>
</tbody>
</table>
Why we need Critical Raw Material (CRMs)?

**Defense Industry**

**Batteries**

**Automotive Sector**

**CRMs in Key Sectors**

- **Electrical and Electronic Equipment**
- **Renewable Energy**
- **Chemicals and Fertilizers**

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The supply of CRMs from Primary Mineral Resources is in the hands of a few countries.
The world focuses today on Circular Economy

The circular economy is not always the panacea to guarantee supply. Biosphere and Technosphere can hardly be compared, even if a closed circular economy is sometimes dreamed up by some economists.

The supply of CRMs from Secondary Mineral Resource (SMR) like landfills, dumps etc. Amounts of some CRMs as ‘Annual addition to stock in landfills in EU’ and ‘Stock in landfill in EU’.

Source: JRC elaboration based on 2015 MSA study (Deloitte Sustainability, 2015).

We do not have enough raw material to supply the EU with CRMs from SMR: Example Cobalt 2017 EU consumption 104,000 t (Source EC, 2018b)
Why we need CRMs? – CRMs demand in the EU for the hybrid and electric vehicles segment (Source: EC, 2018a).

Technology
BEV: Battery Electric Vehicle
PHEV: Plug-In-Hybrid
HEV: Hybrid Electric Vehicle

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#### End-of-Life Recycling

**Input Rate (EOL-RIR)**

for the periodic table

Source: JRC elaboration based on Deloitte Sustainability et al., 2017
The industry needs CRMs from Primary Mineral Resource (PMR) because recycling of many CRMs is only partially or not possible.
What effects the supply of CRMs in the COVID-19 pandemic?

- The availability of Transportation staff (lorry driver, porters etc.)
- The truck, which is not allowed to pass a provincial or national borders
- The interposed customs office in the port with too few staff
- The merchant ship which has to be in quarantine for 3 weeks in the port
- The customs clearance in the port of destination which has no people to clear, etc.

are problems which cannot be calculated in advance.
Current status of MSMEs in critical raw material (CRM) supply

- MSMEs need CRMs from primary deposits because recycling of many CRMs is only partially or not possible.

- The supply of CRMs from primary deposits is in the hands of a few countries.

- The further development of any future technology is not feasible without access to CRMs. Without access to CRMs, there will be no progress in the field of communication, the further development of electric vehicles, renewable energies and national defence.

- The pandemic has shown the world how vulnerable supply chains are in the globalised world. The pandemic will change these supply chains and their future organisation.
Final Conclusions:

- The search for CRMs in Secondary Deposits will not provide us with CRMs for a long time, it is only an interim solution.

- Recycling management and Circular Economy only works to a limited extent and only for a short time, it is not the perpetuum mobile.

- What Europe and the world needs to be independent from CRM producing countries are own Primary Deposits.

We must start again exploration and mining in our own countries.
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References


- **EC (2017a):** Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the 2017 list of Critical Raw Materials for the EU, COM (2017) 490 final.


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Web References

- www.sustain-community.com
- www.thecoalhub.com/mongolia-2020
Thank you!

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