What can company decision-makers do?

Inform
In 2010, the European Commission published a list of critical raw materials for the European economy. This list was updated in 2014 and 2017. Although it is a useful tool for an initial assessment of potential problem areas for industry, it serves as only a rough guideline for individual economic sectors, regions and industries. Companies must keep track of national and international developments and regularly evaluate which raw materials could become critical for them in the future in the context of their individual product portfolio. This also includes estimated raw material requirements for future technologies, which will have a significant impact on demand for particular raw materials. There are not (yet) any comprehensive reports or assessments covering Switzerland as a business location. It is therefore recommended to contact suitable organizations (such as the ESM Foundation) in case of specific questions.

Act rather than react
Switzerland is almost exclusively dependent on foreign countries for its supply of critical metals. Information must be gathered and measures regarding future supply duly taken before supply bottlenecks become reality. The topic needs attention at an early stage of planning and development, and should be incorporated into risk management and corporate responsibility strategies.

Plan recycling in good time
Switzerland will only be able to ensure sustainable long-term management of raw materials if these raw materials do not exit the materials cycle. Early planning of recycling options at material and product levels is not only desirable from an environmental sustainability perspective, it also helps to ensure long-term supply.

Promote education and training
(Future) decision-makers in industry should be familiar with the topic of raw material limitations and critical metals, whilst engineers and product planners should be aware of options for substitution and increasing material efficiency. Companies are therefore advised to support targeted education and training in this area in order to develop the skills needed for informed strategic decisions. These skills include knowledge regarding relevant data on critical metals, as well as strategic knowledge in areas such as international legislation, diversification of supply chains, and sustainable product design.

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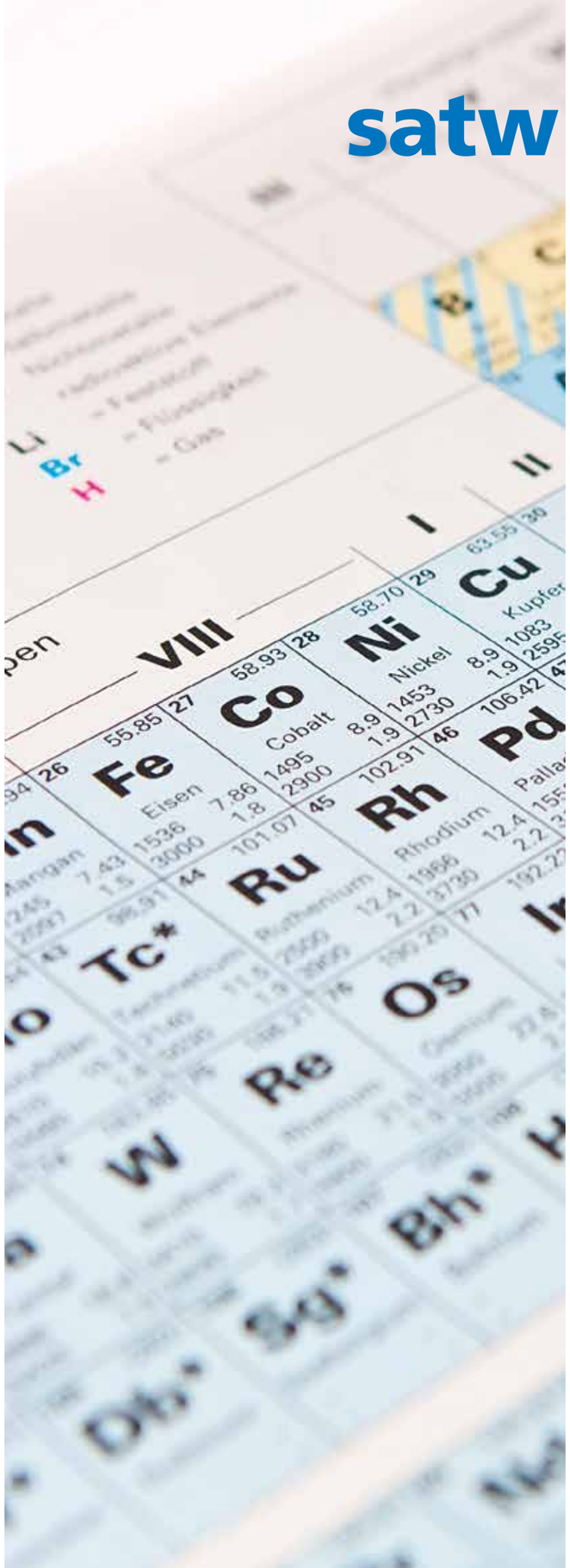

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"Data Network for Critical Raw Materials" workshop

Critical metals: How Swiss industry can look ahead

In April 2016, a workshop on the topic of a "Data Network for Critical Raw Materials" was organised by ESM Foundation, MatSearch Consulting Hofmann, Empa and Life Cycle Consulting Althaus with support from SATW. The term "critical raw materials" refers to raw materials (and in particularly metals) defined by the European Union as being urgently needed for this business location in the future but presenting, due to their unsecure supply, risks for the European economy – this affects Rare Earth Elements as well as other elements such as indium, cobalt, tungsten and many more.

Participants from research, industry, medium-sized companies, associations and politics came together to discuss ways in which Switzerland could respond to the threat of supply bottlenecks for critical raw materials. Moderated discussion groups tackled the impact of critical raw materials on the Swiss and European markets. They identified obstacles preventing the topic from being suitably prioritised by companies, attributed involved key stakeholders, and discussed ways of establishing greater transparency in the field of critical raw materials.

The greatest challenge was identified as being not a lack of data, but rather an unclear and dispersed flow of information, few opportunities for companies to individually gather information, and a lack of knowledge on strategies for handling raw materials limitations. **The greatest challenge facing Switzerland and Europe is to increase awareness of the issues surrounding secure supply of raw materials.**

This short brochure offers an overview of the topic, focusing on Switzerland in particular, and provides recommendations on:
How can companies get actively involved?
What can company decision-makers do?

Background to critical metals

The increasing consumption of precious and special metals for modern technologies in areas such as electromobility, energy production and storage, and information and communication technology is posing new challenges for our economy. The "energy revolution" is fundamentally reshaping European and Swiss energy provision, and demand for mobile devices (such as smartphones, tablets and laptops) is predicted to continue rising sharply over the coming years. In order to function, all of these technologies require metals whose total reserves on the planet are both low and unevenly distributed. Many of these metals have been classified by different organisations (e.g. at EU level) as "critical raw materials", and are therefore also known as "critical metals".

Even at the beginning of the 20th century, the metals which are now classified a critical were rarely used as technological raw materials. This has changed drastically over past decades and they now play a central role in various applications, as they offer specific properties: indium, for example, is an important component in flat screen production, platinum is required to manufacture catalytic converters for cars, tantalum is needed to produce aircraft turbines and capacitors, and lithium is increasingly used in batteries. These and other economically important metals usually origin from outside of Europe, often concentrated on few countries or even just one country of origin. This market concentration bears a risk of supply shortages, and makes importing countries economically dependent.

Around one fourth of the Swiss work force are employed in the secondary sector, i.e. in the processing of primary and intermediate products. Many of these products consist of or contain metals. For most metals, Switzerland is dependent on imports from abroad: in 2015 the country imported metals worth nearly thirteen billion Swiss francs. The possibility of supply bottlenecks, price increases, or even permanent depletion of critical metal stocks poses a threat to economy and innovation. Environmental and social consequences of aggressive mining and waste disposal in developing countries are another problem area.

The Swiss Federal Council has expressed its views on the issue of raw material supply in Switzerland: "Primary responsibility for the supply of materials, in particular (rare) metals, lies with the private sector." To allow potential supply bottlenecks to be identified at an early stage, the interdepartmental Raw Materials platform organised by the Federal Departments of Foreign Affairs (FDFA), Finance (FDF), and Economic Affairs, Education and Research (EAER) has called for "the flow of information within federal administration to be safeguarded and pooled." All of those involved are therefore being ask to tackle the topic in a timely manner and to develop strategies for how to avoid or mitigate potential bottlenecks. A survey organised by the ESM Foundation in 2015 revealed however that Swiss industry often lacks knowledge which metals are used in their company: the majority of respondents stated that they did not know any or only knew very few of the critical metals used in their semi-finished products. Furthermore, even companies which had this basic knowledge often knew little about the precise structure of their supply chains. In addition, most of the companies surveyed indicated that critical raw materials did not appear in their risk management strategy.

How can companies get actively involved?

Strengthen Switzerland's position as a pioneer for sustainability
Switzerland introduced take-back systems for electric and electronic devices 20 years ago, and is also innovatively involved in sustainable solutions in other sectors. Environmentally and socially sustainable strategies in planning, research and development can enable companies to help strengthen and further expand this position as an innovator in the international research and industry landscape, by creating further transparency on material flows and by developing business models which increasingly feed critical metals back into the materials cycle.

Establish dialogue and collaboration
In particular small companies often lack the capacity to employ raw material supply specialists. Companies should therefore work together in interdisciplinary teams to conduct sensitivity analyses and develop scenarios to identify potential supply risks. The ESM Foundation can help with coordination and arranging suitable partners (**www.esm-foundation.org**). Thought should be given to new business models in order to create more sustainable supply chains, such as using longer-term supply agreements or joint ventures. In order to be able to better assess supply risks, companies are being asked to participate in case studies and contribute their experience. This could help with developing further measures designed to mitigate the risks for affected industries.

Promote European and international cooperation
Innovative companies should not limit their collaborations to the national stage, but also cooperate on a European level. The Swiss Federal Department of Foreign Affairs recommends "supporting G20 initiatives to increase transparency regarding prices and volumes in physical raw material markets (...) in multilateral forums." Participating in European research programmes represents an opportunity to gain an overview of developments abroad and to work together to counter supply risks for Europe. Since January 2017, Switzerland has again been fully associated with Horizon 2020, and Swiss companies are thus eligible for funding in all the corresponding activities. Detailed information about submitting research applications is available from the Euresearch information network, funded by the State Secretariat for Education, Research and Innovation (**www.euresearch.ch**).

Activities in Switzerland

Various activities in Switzerland and Europe are tackling the issue of critical metals and their relevance for the economy, society and environment. SATW published a brochure entitled "Rare Metals – Raw Materials for Future Technologies" in 2010, summarising the situation for Swiss and European industry using the example of selected critical metals. As part of the "Metal Risk Check" project (supported by the Swiss Federal Office for the Environment), Swissmem, Ernst Basler & Partner and Empa developed an online tool which allows companies to make a rough estimate of their dependencies on critical metals, in particular in semi-finished products (www.metal-risk-check.ch). Empa is also involved in the European Horizon 2020 "ProSUM" project which is compiling a central database of information on the existence and flows of metal-containing devices in Europe with the aim of improving critical metals recycling in the long term. Furthermore, the ESM Foundation has been coordinating the European education project "SusCritMat" since early 2017. The aim of the project is to provide PhD students and (future) decision-makers from industry and research with the foundations they need to learn about critical metals and enable them to make better, more sustainable decisions.

Events on the topic

A workshop providing training in dealing with critical raw materials, organised by the ESM Foundation in collaboration with Empa and supported by SATW, will be held at Empa Akademie on 27 February 2018. The workshop will deal with the issue of what can be done to prepare the next generation of researchers, developers and managers in this area and raise awareness of the topic. More information is available at **www.esmfoundation.org**

More information

If you would like to get involved in one of the measures described in this brochure, please contact the ESM Foundation for more information. Contact details, further reading on the topic, and links to the projects mentioned can be found at **www.satw.ch/en/resources/detail/publication/critical-metals**

Imprint

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