

Response on the Public Consultation on the Preparation of a new Communication on Raw Materials

Policy Area: Defining critical Raw Materials

1. Do you have any comments on the methodological approach, including the scope, to determine criticality at EU level? If so, please specify.

We welcome that the criteria to define the criticality of raw materials have been made publicly available.

We share the notion that the **economic importance** of raw materials for key sectors is a crucial aspect in defining criticality. Technological progress will have a significant impact on the future use of raw materials. As technological progress is difficult to predict it will be important to regularly reassess which raw materials are of economic importance. The current raw material consumption by industry sectors cannot be extrapolated into the future. Nevertheless, it is absolutely necessary to evaluate the technological aspects of substituting such elements and materials from which shortage problems can arise in the near future, considering the geological resources and the geographic access.

The Report of the Ad-hoc Working Group on defining critical raw materials defines as the third criteria criticality the “**Environmental Country Risk**”. More recently published documents however, define “**Substitutability**” as the third criteria. We find this confusing and suggest clarification. In our view, environmental country risk as well as substitutability could both be subsumed under the second criteria – “**high supply risk**”. This second criteria seems very well designed in terms of concentration of raw materials and of economic and of political stability in countries.

We find that the criteria of substitutability should be applied in a more consistent way and be given more weight. There are materials for which the information on substitutability in the Report of the Ad-hoc Working Group appears incomplete. One example is graphite (Annex V, p.85), for which well-known substitutes exist (synthetically produced graphite) and which therefore, should be removed from the list of critical raw materials. The opportunities for substitution, recycling and savings with stable output should be examined more thoroughly to avoid giving an incorrect view with regard to the criticality of raw materials. Many materials are also defined as critical although a range of substitutes has been named in Annex V to the Report. Tantalum for instance can be substituted in capacitors; for antimony several substitutes are named for different technologies.

Finally the **environmental aspect** should not be seen as a pure potential threat to access to raw materials. Natural capital is an extremely important resource by itself and has to be treated as an asset. This means that certain deposits of raw materials are not to be counted as safely available sources in general because of an inevitable loss of natural capital – irrespective of the probability that a specific country will take into consideration measures to protect the environment. A better consideration of environmental aspects would also be helpful in terms of integrity of the concept. The economic dimension of those aspects is often ignored, what leads to misperceptions and higher costs in the long run.

2. Do you see any additional raw material that should be considered as critical? If so, please explain.

One element which is missing on the list is e. g. phosphate. Although there are still reserves, most of the deposits are contaminated by heavy metals. If we do not manage to recover phosphate from e.g. sewage plants, we will have to use the tainted reserves, which is costly. Moreover phosphate in sewage water leads to the eutrophication of watercourses. This problem could be resolved by phosphate recycling as well. We suggest that the problem should be tackled by strategies which belong to the third pillar - namely recycling, substitution and efficiency, than by securing access to new sources globally.

If the adequate consideration of environmental capital and its implications are included in the definition, there may appear other critical raw materials.

3. Do you have any comments regarding the recommendations of the report? If so, please specify.

We recommend to emphasize more strongly the importance of the third pillar of the strategy, i.e. resource efficiency, substitution and recycling. The main future challenge will be to increase resource productivity by enhancing raw material savings while maintaining the same output, fostering substitution strategies and further develop recycling. These three components of the third pillar have to be effectively backed by research, institutional capacities and political action on all levels.

We explicitly welcome the recommendations of the Report for those topics and urge the Commission to accord high priority to the implementation of resource policy. In our view the potential for enhancing efficiency, substitution and recycling are very significant and not yet exploited. For example the potential for saving rare earth elements in the construction of electric cars is still underestimated.

United Nations University's estimations indicate that actually the e-waste in the European Union amounts to about 8.3 – 9.1 million tons per year. The estimates for the global e-waste are at 40 million tons per year. This so called "waste" does contain highly significant quantities of noble metals and other rare elements: 41 mobile phones for example contain as much gold as one ton of gold ore. 15% of the global annual cobalt production, 13% of the palladium production and 3% of the gold and silver production are currently used for the manufacturing of mobile phones and computers. The fast growing production of electronical applications gives rise to the fear that huge quantities of resources might be lost because of inappropriate or no recycling activity related to those products.

Future technologies (e. g. fuel cells or photovoltaics) will increase the demand for many metals and other rare elements. Accordingly, adequate recycling would considerably enhance the raw material reserves (keyword urban mining) and reduce the pressure in the market. It is inefficient that the majority of used electronic applications are not fed into recycling systems. Estimates reveal that only in Germany about 100,000 tons of used electronic devices are exported despite of converse regulative provisions.

As prices on the raw material markets are rising, recycling of noble metals and other rare elements from used electronic applications and other products becomes increasingly economical. Also in this regard attention has to be drawn to urban mining. Globally an estimated 2.5 billion tons of raw materials are stocked within landfills for municipal waste. These encompass about 26 million tons of ferrous metals, 850,000 tons of copper scrap and 500,000 tons of aluminum scraps. The fraction of ferrous metal has the magnitude of about 3.5% and the fraction of the above mentioned non-ferrous metals together of about 0.2%. This underlines the particular importance of active engagement in complete ablation of landfills all over the world. It has already been implemented and is technically feasible on a large scale. Due to rising raw material prices, such efforts become more and more economically viable, especially if post operative treatment costs are considered.

Policy Area: Promoting Skills and Research, Development and Innovation

21. What type of actions would you propose to provide better cooperation between companies, universities and public authorities in order to promote skills in the extractive or other raw materials sectors? Please specify.

A major future focus should lie on the cooperative development and implementation of resource efficiency strategies. These contain as described above research for substitutes, especially renewable substitutes, savings and recycling techniques. Such developments are to be backed institutionally in terms of research, facilitation, implementation and evaluation. The actors should jointly identify relevant fields for cooperation and design projects to develop more resource efficient procedures and technologies.

22. Are you aware of any research, development and innovation programme(s) at national, regional or local level? Please specify.

Several German Ministries and NGOs offer such programs (German Federal Ministry of Education and Research, Federal Ministry of Economics and Technology, Federal Environment Agency, Deutsche Bundesstiftung Umwelt etc.). We would appreciate if the European Commission would collect such information systematically and make it publicly available on its website.

23. Where do you see the major gap / the urgent need for the raw materials sector related research, development and innovation at EU level. Please provide details.

The publicly available data on resource flows in the economy are of poor quality and incomplete. It is nearly impossible to gather information on quantities of raw materials used in individual sectors and branches – measured in tons and measured in Euros – as well as economy-wide. Given the lack of this kind of information, it is difficult to identify economic and environmental priorities for action. Once such priorities are elucidated it would seem advisable to set up or encourage research in efficiency solutions for the relevant sectors and processes as well as the implementation of effective measures.

Moreover, the existing statistics account overwhelmingly for material inputs and do not contain information on the individual raw materials. This problem should be alleviated by the collection and publication of valid data on raw material contents in products and semi-finished or intermediary products.

24. What is your idea of a major research and innovation action that would have the highest positive impact on the security of raw materials supply for the EU industries? Please specify.

As mentioned before, a major focus should lie on the development and implementation of resource efficiency strategies. These contain, as described above, research for substitutes, especially renewable substitutes, saving opportunities and recycling techniques. Such developments are to be backed institutionally in terms of research, facilitation, implementation and evaluation. Resource efficient procedures and technologies are the most effective way to minimize the risks of raw material shortages on the world market. Urban mining is just one example, including the introduction of urban resource cadastres. A minimization of the external input of resources into the economy and a maximization of recycling would lead to a situation, in which the dependency of human welfare from huge external resource inputs would be minimized. Moreover such technologies will sell globally and can have an additional positive impact by providing access to and competitiveness on markets of the future.

26. Are there any other aspects related to skills, R&D and innovation for other raw materials, such as wood, that need to be further promoted? Please, specify.

The initiation and promotion of specific research activities related to the substitution of potentially scarce raw materials is crucial. The implementation of this aspect into funding- and research-

programmes of the European Union as well as on national level is of special importance. Finding substitutes for scarce raw materials has to be considered as a major challenge to innovation activities. Innovation-driving measures are needed.

The research for substitutes for raw materials in specific applications should include renewable resources and new basic materials. The substitutes should have minimal economic, environmental and social cost.

Policy Area: Resource Efficiency and Recycling

27. In your view, and beyond measures already being taken (e.g. the recast of the WEEE Directive), what practical measures can be taken by the EU and by Member States to prevent the illegal shipment of obsolete end-of-life vehicles and electronic equipment?

The quality of recycling should be assured by reasonable standards. The set of VDI guidelines VDI 2343 „Recycling elektr(on)ischer Geräte“/ „recycling of electr(on)ical applications“ of the VDI-GEU (sub-association for energy and environment) contains standards and gives advice to logistics (p.2), deconstruction (p.3), treatment (p.4), exploitation (p.5), marketing (p.6) and reuse (p.7).

The scrapping premiums for old cars, which led to an increased export of old cars out of European Member States has been a rather negative example for resource management. Adequate provisions for recycling were missing, which led to a considerable loss of resources, in particular platinum out of catalytic converters. Apart from that platinum recycling from catalytic converters is a positive example for the successful increase of resource recovery from old cars. The guideline VDI 4082 „Trockenlegung und Vorbereitung von Fahrzeugen auf die Zerlegung/Demontage“/ „Drainage and Preparation of Vehicles for Deconstruction“ contains provisions for the recycling of old cars. As prices on the raw material markets are rising, recycling of noble metals and other rare elements from used electronic applications and other products becomes more and more economically attractive. This refers to the term urban mining, too.

It is also important to foster research activities which promote recycling. Technical and organisational possibilities to recycle raw materials exist already. To some extent there are even options for the recycling of critical raw materials. However, technical and organisational recycling possibilities in Europe are often too expensive. Consequently, raw materials need to be imported. With the termination of their life-cycle, raw materials are either disposed of or returned back as scrap to countries like China or India. Thanks to the low budget work force in these countries to date, recycling can there be applied achieving a high degree of selection.

A major challenge for Europe is the innovative development of cost-efficient organisational and technical processes which enable us to keep discarded products and the raw materials contained in these within the economy without further regulative interference. On the basis of the proposed research activities, future technologies need to be engineered to make recycling in Europe possible on a very high level of selection and by using highly automated technical processes.

29. Have you identified major problems with recovered paper? What are the main issues that need to be further analyzed?

The recycling quotas in European Member States are differing significantly. This indicates that there is a significant untapped potential. Countries with a poor performance should try to catch up concerning their recycling quota.

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