

Public Consultation on Commission Raw Materials Initiative

OUTLINE RESPONSE FROM

RESOURCE EFFICIENCY KNOWLEDGE TRANSFER NETWORK, UK

The Resource Efficiency Knowledge Transfer Network has been established by the Government to support the deployment of innovation that can enhance sustainability through resource efficiency. We have a membership of more than 3,000 (businesses, research groups, government representatives and individuals). We facilitate communication and networking between all interested parties and we promote contact between business and academia. We believe that the Commission's Raw Material Initiative is an important one and we would be pleased to assist in the development of this programme.

We agree that the availability and efficient use of resources will be key factors for sustainable development. We can aim for growth in the broad sense of the word but we must avoid the idea that we can continue with business as usual. We must avoid the term growth being considered to be synonymous with an increase in specific material consumption rates (kg per capita). Business as usual will only exacerbate the problems associated with access to natural resources. We agree that sustainable development raises important new challenges associated with access to, and efficient use of, raw materials.

We must be conscious of the direct coupling between energy and non-energy materials. The production of non-energy materials is a significant component of energy consumption and a major source of carbon dioxide emissions (e.g. cement and steel making). More efficient production methods and better designs for the use of non-energy materials would have a positive impact on reducing the demand for energy and on carbon dioxide emissions.

We must not only consider the supply side of the equation, we must also address demand. We would emphasise two general concepts: -

- i) There is a significant difference in the way that energy and non-energy materials are utilised. When fossil energy materials are used in a process, as a fuel or source of energy, they are consumed. They are not available for recovery or re-use (although of course we must strive to be efficient in the use of these energy materials). However the situation is different for non-energy materials; they are not usually consumed to any significant extent during their service life. They may be worn, corroded, fatigued, fractured, etc, but the bulk properties are often retained. At the end of their service life many non-energy materials could be reclaimed for re-use. Although there can be constraints on the re-use of secondary materials if the chain of utility is well managed they can often be recovered and re-used with significantly lower energy demand in comparison with materials produced from primary sources. For a sustainable future it is important that we take 'embodied energy' (exergy) into account when we consider process and product efficiencies.
- ii) We must promote and accelerate the adoption of 'Life-Cycle-Thinking' by all organisations. When new products and services are being developed the designers must take Life Cycle perspectives into account. This might be through 'Light weighting', design for extended life or selection of materials and assemblies with re-use/recovery in mind.

One problem that is a common obstacle to the development of more sustainable business operations has been the 'silo' mentality. Many organisations focus on their 'core business' and are thus unaware of the potential synergies, technologies or relevant knowledge that may be available in other businesses and organisations. This is exacerbated by the fact that Scientist and Engineers have tended to specialise in one specific discipline or area of expertise. This situation can only be addressed by making sure that everyone becomes more aware of the concepts of sustainability (education) and by ensuring that designs and developments are reviewed by the teams that can cover multi-disciplinary aspects. This team approach must be adopted from the design stage – sustainability is not something that can be 'bolted on' at the end of the design and manufacturing process.

The recovery and re-use of valuable materials is not new. Many cultures have been successful in reclaiming and re-using valuable resources. However since the successful deployment of large scale extraction operations and manufacturing systems the apparent cost of materials has decreased in comparison with the cost of labour (especially in the developed economies). We are only just beginning to realise the real cost of the processes and technical developments initiated by the Industrial Revolution. Ignorance of the impact of Carbon Dioxide emissions on the global climate meant that the real cost of managing these carbon dioxide emissions was not recognised. We must now manage the consequences of the growth in demand for energy and materials. This is not just a question of securing better access to raw material supplies. It is about optimising design, doing more with less and ensuring that we utilise resources efficiently. We must recognise that the period of 'cheap energy' (oil) is over and that we need an integrated approach from governments and business to move away from the 'throw away' society to one that recognises the cost of degrading our environment. We need to adjust our behaviour and move towards lifestyles that are compatible with the limitations of global resources.

There has been important progress in the concept of Industrial Ecology in the US which has been progressed in Europe (e.g. research groups at Chalmers University in Sweden and at the University of Delft in Holland and the government funded National Industrial Symbiosis Programme in the UK). Japan has recognised their dependence on imported materials and has mobilised their population towards more sustainable behaviour. There have been important mass balance studies (e.g. UK studies available at <http://www.massbalance.org/index.php>). These can provide nations or regions with a better picture of the movement of strategic materials across their borders. In mature economies there is a significant inventory of materials within the chain of utility and a significant volume of important materials contained in 'end-of-life' products. An important way of reducing the dependence on primary materials is through improving the effective recovery of materials from 'end-of-life' and redundant products. EU legislation has been introduced to promote this type of behaviour in some areas but this need to be expanded. It does not make sense for us to use significant amounts of energy to produce products from primary materials and then dispose of these valuable materials in mixed waste streams (this is tantamount to throwing away not only material but energy too). One legacy from the profligate way in which we have used energy and materials in the past is the fact that industrialised countries have significant volumes of accumulated 'working capital' of materials (with the associated embedded energy); in the form of buildings, machinery and equipment. The EU's dependence on external supplies can be reduced by better management of this 'inventory' of materials.

Another way of addressing potential material supply issues is to explore the potential for substitute materials. One of the results from the implementation of the REACH legislation is that some alternate materials or technologies have been developed so that mercury and cadmium utilisation can be reduced. The EU could focus research on looking for substitutes for materials and technologies that have the biggest impact on the environment. It is important to stress the importance of Life Cycle thinking and sustainability as important factors in all aspects of our life not only because of Climate Change but also due to the constraints of the global biosphere (renewable, resources, changes in ocean surface pH, soil fertility, etc). Science and engineers can focus on moving towards more

sustainable technologies if the political, social and business communities commit to this as a priority. The development of an EU centre for Life Cycle information should be continued.

In conclusion we address each of the objectives stated in the consultation document in turn: -

- 1) Increase the supply of raw materials from European sources on a sustainable basis.

Of course we must continue to invest in R&D that aims to improve the efficiency of production from primary sources through advances on current methods or through the development of new techniques – combined collaborative developments are facilitated through EU research projects such as Biomine

<http://biomine.brgm.fr/index.asp>

However within the economies of the EU there is a vast inventory of secondary materials. The fact that Life Cycle Thinking was not used in the past means that some of these are difficult to recover. However where it makes sense to recover secondary materials we must do so. We must also change our approach to product design in order to maximise the potential for the recovery of secondary values (e.g. EU programmes such as Promise and Ionmet): -

http://ec.europa.eu/research/infocentre/article_en.cfm?id=research/rtdinfo/special_fp7/fp7/06/article_fp734_en.html&item=Success%20stories&artid=4754
http://cordis.europa.eu/fetch?CALLER=FP6_PROJ&ACTION=D&DOC=1&CAT=PROJ&QUERY=1200995750475&RCN=78731

- 2) Ensure sustainable and a more transparent supply from third countries

The global nature of the modern economies and biosphere means that the EU must build sustainable partnerships with countries that share the sustainable production and consumption vision.

- 3) Encourage capacity building in developing countries

The EU will need to work with the appropriate multi-national businesses and agencies to support the development of sustainable partnerships with developing countries. The EU has the capability to assist developing countries to minimise the environmental impact of their materials industry. This will mean that technologies and skills will be transferred from the EU to these developing countries (e.g. developments in the Diamond industry in Botswana).

- 4) Encourage greater efficiency in the use of resources

This is a critical issue which must be tackled from the design stage. We must aim for continuous improvement in Resource Efficiency. This will not only reduce the growth in demand for materials but it will reduce the energy demands too. The EU can show leadership by stimulating the move towards products designed for sustainability.

- 5) Establish and adequate EU knowledge base on raw materials.

The EU has a broad range of materials expertise but we need to continue developing new materials and technologies (e.g. nano-technology). We need to ensure that product design takes account of the broad environmental factors associated with the materials selected (availability, environmental impact, potential, etc). In the UK the Knowledge Transfer Networks aim to improve the communication and co-operation between the research and business communities and to support the deployment of innovation (the Resource Efficiency and Materials KTNs focus in this area).

(Please note that a review of Material Security prepared for the Resource Efficiency KTN will be available in April 2008).