We Must Recycle The Rare

Increased recycling of rare earth elements and other precious raw materials in Europe is more critical than ever, if we want to remain in any way competitive on a global market. Kathryn Sheridan looks at this and other issues from the European Commission

With China moving to reduce its exports of rare earth elements, there is no longer just an environmental incentive but also an economic driver to improve waste management, in particular the reduction, re-use and recycling of rare earth elements.

In the last few years, China has adopted a more protectionist stance in the provision of rare earths, such as antimony, graphite and magnesium and is expected to introduce a full export ban by 2015. This position is starting to impact electronics producers worldwide with major German technology manufacturers, in October, reporting their first shortage of rare metals used for electronics like mobile phones, according to a recent article in *Spiegel Online*.

China puts this brake on exports down to its own dwindling stocks which need, it says, to be conserved for environmental reasons. However, countries affected by reduced imports believe that China is taking advantage of Europe's own shortage in rare earth elements to push companies to locate their production and invest in China. Currently, 95 percent of the production of rare earths is located in China so, when push comes to shove, there is little that Europe can really do.

Surely China's blockade on shipments of rare earths should encourage other countries to put their own mines into production? Perhaps, but the prospects to do so are limited, at least in the short-term. Mines require a lot of investment and can take years to come online. Permitting can also be an issue. Even where there are big deposits, for example in Canada, Greenland, India or Russia, it could take up to five years to develop mines that could compete with China's production.

EU policies are needed, which are aimed at encouraging citizens to further embrace the three Rs of "reduce, re-use and recycle" for high-tech products to face up to China's tightening grip on the rare earths that European industry needs. The European Commission's 2008 Raw Materials Initiative may be a step in the right direction.

The Ad-hoc Working Group on Defining Critical Raw Materials published its report *Critical Raw Materials* for the EU this year, in which it identified recycling of raw materials or raw material-containing products and improvements in the overall efficiency of the management of critical raw materials as two of the most crucial steps needed if the EU is to tackle its shortage of the rarer raw materials.

Unveiling its 2020 Energy Strategy in November, the Commission made clear that it will apply assertive tactics to guarantee continuous access to scarce natural resources. The rare earths are used not only for electronic equipment but also in batteries and wind turbines. The Commission's statement caused some concern among national diplomats as it sent a clear message to China to back off on its rare earths export restrictions.

While from a trade policy perspective this is understandable, for the long-term environmental and economic wellbeing of the EU, we should not overlook our resource efficiency and waste legislation.

Element			Uses
21	Sc	Scandium	Light aluminium-scandium alloy for aerospace components, additive inmercury-vapor lamps
39	Y	Yttrium	Yttrium-aluminum garnet laser, YBCO high temperature superconductors, yttrium iron garnet microwave filters
57	La	Lanthanum	High refractive index glass, flint, hydrogen storage, battery-electrodes, camera lenses, fluid catalytic cracking catalyst for oil refineries
58	Ce	Cerium	Chemical oxidizing agent, polishing powder, yellow colours in glass and ceramics, catalyst for self-cleaning ovens, fluid catalytic cracking catalyst for oil refineries
59	Pr	Praseodymium	Rare-earth magnets, lasers, core material for carbon arc lighting, colourant in glasses and enamels, additive in Didymium glass used in welding goggles, ferrocerium firesteel (flint) products
60	Nd	Neodymium	Rare-earth magnets, lasers, violet colors in glass and ceramics, ceramic capacitors
61	Pm	Promethium	Nuclear batteries
62	Sm	Samarium	Rare-earth magnets, lasers, neutron capture, masers
63	Eu	Europium	Red and blue phosphors, lasers, mercury-vapor lamps
64	Gd	Gadolinium	Rare-earth magnets, high refractive index glass or garnets, lasers, x-ray tubes, computer memories, neutron capture
65	Tb	Terbium	Green phosphors, lasers, fluorescent lamps
66	Dy	Dysprosium	Rare-earth magnets, lasers
67	Ho	Holmium	Lasers
68	Er	Erbium	Lasers, vanadium steel
69	Tm	Thulium	Portable X-ray machines
70	Yb	Ytterbium	Infrared lasers, chemical reducing agent
71	Lu	Lutetium	PET Scan detectors, high refractive index glass

Table 1: the 17 rare earth elements, their atomic number and symbol and their main usages

Other News From The EC

IN MORE general policy terms, the Commission last year recommended establishing an EU agency responsible for enforcing compliance with EU waste legislation. Under the Commission's proposal, this agency would have extensive powers to review national enforcement systems and undertake inspections of waste facilities. More recently the Commission has started preparing a strategy to ensure compliance with EU waste legislation. Presented as part of the Commission's 2011 work programme, the strategy aims to ensure compliance through closer monitoring of member states' implementation progress and a bigger role for national judiciaries in enforcing compliance.

The next move was for member states to transpose the 2008 EU Directive on the Protection of the Environment through criminal law into national law by the end of last year. The Directive outlines a number of environmental offences that must now be considered criminal offences, even if they were committed intentionally or as a result of negligent behaviour.

EU efforts are also being made to better manage specific waste types, such as nuclear fuel and other radioactive waste. A process to ensure safer storage of the 7 000m^3 of radioactive waste being generated within the Union each year has been initiated. By moving it from storage sites near the ground to deep underground repositories, the risk posed by fires, accidents and earthquakes will be reduced. While countries such as Finland, France and Sweden have already launched national plans to have such repositories in place before 2025, others have not done so.

On 3 November 2010, the European Commission presented a number of common EU safety standards for the disposal of nuclear power plant fuel, as well as medicine and research radioactive waste. The Proposal for a Council Directive on the Management of Spent Fuel and Radioactive Waste requires EU members to present national programmes on how, when and where they handle their nuclear waste and when they will fully implement the International Atomic Energy Agency's safety standards. Compliance with the safety standards would be assured by an independent body, which would also be responsible for granting licences for the construction and management of the proposed repositories.

The draft Directive allows for co-operation between EU member countries in managing their waste but forbids any export of radioactive waste to outside the EU. It also states that EU citizens would have to be informed and consulted prior to the construction of any proposed radioactive waste storage sites.

Not only radioactive waste management, but also food waste management within the EU has also been on the political agenda recently. In a joint declaration on 28 October, academics and NGOs urged the European Commission to propose a food waste directive before 2015 and to halve the annual food waste from 50 percent to 25 percent of all purchased food by 2025.

Given that food waste today accounts for a quarter of the world's total freshwater consumption and that each tonne of food waste generates 4.2 tonnes of CO_2, hardly a positive carbon balance, the issue of food waste needs to be resolved. The declaration urges the United Nations to make food waste reduction a new Millennium Development Goal and will continue to lobby for a Global Partnership Against Food Waste to be set up.

With this backdrop it seems likely that the EU legislative waste framework will only get more complicated, but also that the mantra of "reduce, re-use, recycle" is ever more important today, particularly if we are to reduce the Union's dependence on Chinese rare raw materials. CIWM

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