Rare earths search picks up as focus back on need for new supplies

Feel that? “That” is a sudden shift in the ground under the rare earths. In fact, Dudley Kingsnorth, speaking at the recently held 5th Annual Cleantech and Technology Metals Summit, hinted at one factor that might change the REE picture: the cheap price of cerium may lead to more applications using it.

But there are two main trends: one is a growing realization that, while we’ve been talking about lithium and other technology metals, a large chunk of electronics and technology still relies on various rare earth elements. Yes, lithium is going to be big, but future supply of that does not at this stage seem to be in doubt, what with all the contenders falling over each other to get into that business – and most particularly the fact that it can be sourced from a range of geological locations (Bolivia, Canada, Australia among them) rather than China having the whip hand.

In fact a writer in *The Irish Times* made this point recently when he wrote, after discussing lithium, **“what the world really needs now is cheaper and more reliable sources of the rare earth elements”**. While not quite making sense (the last thing the industry needs is cheaper REE as it can barely function with those prices now applying) you can see that his heart is in the right place. Yes, we do need more “reliable” sources of rare earths in the sense of having sources outside of China. But we have talked ourselves hoarse over the years about the long-term danger of depending on China without any resolution; perhaps, thanks to *The Irish Times*, we might focus our minds back on that.

The other trend is signaled by a number of news stories concerning the ability of the United States to get back into production of rare earths – something that has long been urged by those concerned about the resource securities issue.

The first item is the only one that has direct bearing on *mining* of rare earths in the US as opposed to *extraction* of them.

The Manchester, England, based advanced metals study group, AZOM, reports on work in the US concerning new aluminium-cerium alloys. The Oak Ridge National Laboratory is working with Eck Industries and the Lawrence Livermore National Laboratory on including cerium in these, making the alloy more workable and malleable.

This is the important point, according to AZOM: the most common REE-containing ore in the US, it says, has 500 times the amount of cerium than dysprosium (and a factor of three to neodymium). AZOM argues that if a market could be found for that cerium, then REE mining in the US becomes more attractive because adding 1% of cerium into aluminium alloys would provide a market for 3,000 tonnes of cerium a year.

(An important aside: this is not InvestorIntel claiming this to be the case; we are just reporting what has been claimed.)

This is what AZOM says: "if the new alloys are adapted for use in internal combustion engines, they could swiftly convert cerium from a problematic by-product of rare earth mining to an important product in itself. These aluminum-cerium alloys would allow engines to enhance fuel efficiency directly by operating hotter. They may also optimize fuel efficiency indirectly, and thereby leading the way for development of lighter engines that use small aluminum-based parts or use aluminum alloys to substitute cast iron parts such as transmission cases, cylinder blocks, and cylinder heads."

The second item comes from the Pratt School of Engineering at

Duke University in Durham, North Carolina. They recently produced a study showing that ashes from coal mined from the Appalachian Mountains could be a source of some technology metals. University researchers have measured the content of rare earth elements in samples of coal ash from every major coal source in the US. The results showed that coal from the Appalachians contained the most rare earths. Heileen Hsu-Kim, associate professor of civil and environmental engineering at Duke, concludes that “there’s literally billions of dollars worth of rare earths elements contained in our nation’s coal ash”.

The researchers used an extraction technique involving nitric acid and concluded that it would be possible to extract elements such as neodymium, europium, terbium, dysprosium, yttrium and erbium from the burned coal. Hsu-Kim said the next stage would be to look at the cost of extraction. “The trick will be exploring our options and developing technologies to drive the costs down.”

Thirdly, University of Wyoming researchers have joined those at the Idaho National Laboratory and the US Geological Survey to study retrieving REE from water produced in oil and gas production and geothermal projects.

How many of these will ever eventuate no one can guess.

And, true, investigations into extracting rather than mining do not help the mining companies that hope to get into producing these elements out of the ground.

But the take-home from this post is that the reliable supply of REE is still very much an issue. And that the development of new mines outside China is still much needed because, even with lithium flying high, much of our technology will still depend on REE.