



HB Markets

THE DARK SCIENCE OF RARE EARTH METALS

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Background:

As far as the stock market is concerned, it is likely that the “noughties” will forever be associated with negative events such as the Dotcom boom and bust at the start of the decade and the near collapse of the world financial system in 2007 – 2008. But in between these two events, a phenomenal asset bubble grew to become one of the largest of its kind, creating a mighty bull market in commodities prices, and especially precious metals.

Given the traditional role of gold as a hedge against the levels of inflation associated with an asset bubble, it is little surprise that after nearing a \$150 / oz low in 1999, the noughties have been all about the rise and rise of the metal. And today, thanks to ongoing Quantitative Easing and Money Printing programmes, coupled with multi billion Euro bailouts in the EU zone, Gold can reasonably be expected to continue making record highs such as that just seen over \$1,460 / oz. There is a problem here though. All the time Gold remains a hedge against eroding paper currency values, the start of an interest rate hike cycle could mean that bulls of the market are left holding a commodity suitable for jewellery, but little else.

Many investors out there have already taken this as a given, and as a result are looking for value elsewhere. As a result, an area that has moved sharply into focus of late is the shiny new world of rare earth metals (RE), where the market is estimated to have a value around £1.2 to £1.8 billion a year. The big

plus here from an investing and speculative view, is not only the hedging inflation aspect offered by a “solid” commodity, but also that RE metals consist of a group of elements where demand is ballooning both in industry and technology. From an investment perspective, RE should have all the upside of the big name precious metals like gold and silver, but with the added attraction that like platinum and silver they form an indispensable raw material for industry and technology. In addition, their relative rarity will ensure a premium price.

Since the beginning of 2010, rumours have circulated that China, chief producer of these elements, had threatened to stop exporting from 2012, thus potentially making RE commodities rarer still and sending their value rocketing. While this move has been described as protectionist, from China’s standpoint as the second largest economy in the world, the move is understandable as it needs the RE metals to assemble goods from companies all over the world. In fact key RE stock Molycorp (MCP:NYSE) has said that China could be a net importer by 2015, and added to this, consumption of RE oxides is forecast to reach 190–210 000 tonnes by this middle of this decade. Due to expected shortages, demand is expected to be exceptionally high for neodymium, dysprosium and terbium.

Definition:

RE metals are a rather obscure group of 17 elements, best defined by the fact that they are generally not present to a sufficient degree in any one location in commercially viable quantities. Added to this, and underpinning their respective values, the metals are notoriously difficult to mine and extract.

For the record the 17 Rare Earth Elements are as follows:

Scandium, Yttrium, Lanthanum, Cerium, Praseodymium, Neodymium, Promethium, Samarium, Europium, Gadolinium, Terbium, Dysprosium, Holmium, Erbium, Thulium, Ytterbium and Lutetium.

Rare earths are divided into two groups: the light REE (e.g. neodymium, lanthanum, cerium) and the heavy REE (e.g. dysprosium, terbium)

Rare Earth Metals Availability:

Ironically, according to the experts, RE metals are abundant in the Earth's crust. The problem (and one that underlines their value) is that this group of elements lies in relatively low quantities in any one place. Examples of this are Bastnäsite (containing Cerium), which is predominantly available in China and the U.S., and Monazite (which contains thorium, lanthanum, and cerium), which prevails in Australia, Brazil, China, India, Malaysia, South Africa, Sri Lanka and Thailand. An encouraging forward view comes from the U.S. Geological Survey (USGS), which says that undiscovered resources are thought to be very large relative to expected demand.

Key Rare Earths And Their Uses:

Cerium:

Catalytic converters in vehicles. Pollution control equipment. Diesel fuel additives.

Neodymium:

Magnet / magnetic field booster. Cell phones, computers, audio speakers, miniature motors.

Holmium:

Medical and dental lasers and nuclear control rods. Glass colouring.

Dysprosium:

Lasers. Fuel injectors for diesel engines. Compact discs, data-storage applications.

Thulium:

Laser-based surgical tools.

Yttrium:

Red light emitting diodes (LEDs) and superconductors.

Erbium:

Photographic filters. Colouring agent for sunglasses and jewellery. Optical amplifiers for fibre-optic communications systems.

Rare Earth Metals Consumption:

Based on reported data from the USGS in 2009, RE metals were used in the following proportions: chemical catalysts, 22%; metallurgical applications and alloys, 21%; petroleum refining catalysts, 14%; automotive catalytic converters, 13%; glass polishing and ceramics, 9%; rare-earth phosphors for computer monitors, lighting, radar, televisions, and x-ray-intensifying film, 8%; permanent magnets, 7%; electronics, 3%; and other uses, 3%. To provide some perspective on usage, a 3-megawatt wind turbine might require 600kg of rare earths for its magnets. Each Toyota Prius uses up to 15kg of Lanthanum in its hybrid engine battery.

The Rare Earth Metals Problem:

Western economies and in turn Western Governments have been caught off guard by both the sudden surge in demand for RE (as technology advanced at breakneck speed towards the end of the 2000s) and China's new stance to keep an increasing proportion of its own mineral resources, (currently 60%) to itself. The American Security Project has rung alarm bells by describing actions by the U.S. Government to address the current shortage in its report entitled "Rare Earth Materials in the Defense Supply Chain". It is clear that for the U.S., there are considerable military implications in regard to the availability or otherwise of RE, while the UK Government is set to assess its

position after commissioning "Lanthanide Resources and Alternatives", (Lanthanides being the collective name of 15 of the 17 so called rare earth elements).

Recent Significant Newsflow:

March 31st 2011: The official Xinhua News Agency said China will increase taxes on RE metals from April 1. The "resource tax" will raise 30-60 yuan per tonne, depending on the type of RE mineral, a substantial increase from the current level of 0.5-3 yuan per tonne. The Xinhua report said that the tax rate for mined light rare earth is 60 yuan (\$9.1) per tonne and the rate for medium and heavy rare earth is 30 yuan per tonne.

March 22nd 2011: The Ministry of Land and Resources said China has set its total output of rare earth metals at 93,800 tonnes this year, 4,600 tonnes more or 5.16 percent higher compared to last year's. China will not grant any new licenses for rare earths prospecting and mining before June 30 2012.

March 16th 2011: Reuter's reports that China's exports of RE metals rose above \$100,000-per-tonne for the first time in February, an almost nine-fold increase on the year before.

October 2010: The Chinese Ministry of Commerce announces a 35% reduction in the export quota for the first half of 2011, compared to the corresponding period in 2010. Separately, the Guardian reported that China, (which produces 97% of the world's supply of RE metals - 70% comes from just one Chinese mine near the city of Baotou, in Inner Mongolia) is to cut the exports quota by 72% to ensure sustainability. And the Financial Times reported that an index of shares in RE companies, from research firm Kaiser Bottom-Fish Online, has increased 12-fold in less than two years and by more than a third in the last month.

Key Rare Earth Fundamentals:

China is currently driving the RE metals market, despite only having 37% of known reserves. 60% of China's production is currently being set aside for domestic consumption, but it could very well be that this percentage continues to rise in the next few years, particularly if predictions made by the Chinese Rare Earths Industry Association that demand will rise by almost two-thirds within five years become the basis for near term policy in the People's Republic. A wholly unpalatable scenario is the view from Molycorp that China will become a net importer of RE metals by 2015, with world consumption up to 190–210 000 tonnes.

The problem of shortages has arisen because in 2002 the world's main producing mine owned by Molycorp (MCP: NYSE) in the U.S. at Mountain Pass, California shut down as at that time it was uneconomic to run. The mine reopened in 2007, and although bastnäsite concentrates are now being mined and supplied, at least for the time being the shortage is set to continue and the spike in RE prices looks here to stay. The typical lead in time to get rare earths out of the ground is 7 – 15 years, coupled with correspondingly high costs that can run into hundreds of millions of pounds.

The implication is that even if a "treasure trove" of RE metals ultimately materialises in the south west of Greenland it could be a decade or more before the resulting RE's make it to market. In addition, despite the new sources of supply, demand could be many times a current level if RE hungry technology continues to develop at the current pace.

Currently there are three companies most in focus for new potential RE resources:

1. **Great Western Minerals (CVE:GWG) at Steenkampskraal, S Africa.**
2. **Avalon Rare Metals Inc. (TSX:AVL) at Thor Lake, Canada.**
3. **Lynas (ASX:LYC) at Mount Weld, Australia.**

London Listed Rare Earth Companies:

For the press and financial markets observers, the current RE metals phenomenon has acquired status on a par with anything from the 21st Century Gold Rush to Dotcom Bubble II. But however this market develops, for those looking at this sub sector, the initial challenge will be deciding on the correct level of exposure to the market via UK listed companies, even though Australia, Canada and South Africa all offer potential candidates. Intriguingly indicative of the sheer potential in the sector are several well documented cases concerning London listed resource companies, where the possibility of gaining a license or obtaining a stake in a company which is involved in rare earth metals mining has sent share prices of the companies in question soaring.

Kenmare Resources (KMR): 49p
FTSE 250 Mining
Market Cap £1.2bn

Company Description: Explorer of commercial deposits of natural resources and the development / operation of mines.

Latest Newsflow: January 20th 2011 Moma Mine Update - Kenmare said that the production of heavy mineral concentrate had increased by 8% in the second half of 2010, limonite production increased by 12% and Zircon by 21%

in the second half of 2010. The production expansion project was said to be proceeding on schedule and the company had successfully negotiated significant price increases with customers for 2011.

Company Summary: Kenmare's entry into the FTSE 250 last September saw it acquire something of a "blue chip" status among London listed RE groups, with significant holdings by major mining funds such as Blackrock and JP Morgan Asset Management. The flagship Moma project in Mozambique is principally a Titanium and Zircon mine, but also produces Monazite (Thorium, Lanthanum, Cerium) and Xenotime (Yttrium).

Thor Mining (THR): 2.78p
FTSE AIM All Share Mining
Market Cap £14m

Company Description: Minerals exploration and development company focused on tungsten, molybdenum and uranium projects.

Latest Newsflow: April 6th 2011 Thor Mining said peak values of 0.25% copper and 0.17 grams/tonne (g/t) gold were reported from Thor's first drilling program at the Dundas Gold Project in Western Australia. The company added that these initial results were encouraging and further drilling was planned.

Company Summary: Thor was a big winner in the Uranium stock market boom of 2006 – 2008 when it's Hart's Range Project in Northern Territory, Australia not only revealed a substantial Uranium presence, but also significant RE's in the form of Niobium, 6.25% Tantalum and 2.68% Yttrium. In light of the RE metals boom, Thor has now returned to its Hart's Range Project.

African Consolidated Resources (AFCR): 7p
FTSE AIM All Share Mining
Market Cap £26.5m

Company Description: Mineral exploration company operating in Zimbabwe, Zambia and Mozambique. It specialises in gold, diamond and base metals assets.

Latest Newsflow: December 16th 2010 – Interim report. The company said that it made progress across its portfolio of assets during the period, utilising its first mover advantage in Zimbabwe and technical capabilities to develop its current range of projects, including gold, rare earth elements and diamonds. The company reported a loss of \$1.8m, but with cash in hand of \$7.4m.

Company Summary: Although ACR's exposure to the political / economic situation in Zimbabwe will be a source of discomfort for some, it is a relative

sideshow when taking into account the market focus on the joint venture with Rare Earths International of Australia in Zambia. This project could potentially unveil a source of Cerium, Lanthanum, Neodymium, Praseodymium and Gadolinium.

Forte Energy (FTE): 5.5p
FTSE AIM All Share Mining
Market Cap £37m

Company Description: Minerals / energy projects group focused on the exploration and development of uranium and energy-related projects in Guinea and Mauritania.

Latest Newsflow: March 16th 2011 Forte Energy losses narrowed to \$1.15m in the half-year to end-December from \$1.7m the year before. Cash at the end of 2010 stood at \$1.06m, down from \$4.09m at the end of June 2010. February 15th 2011 Forte said it had discovered further significant intersections after drilling 10 new holes at its A238 uranium prospect in Mauritania.

Company Summary: Forte Energy has been in the spotlight for RE fans since revealing in December that tests at its Firawa uranium project in Guinea suggested the possible presence of widespread rare earths including Cerium, Neodymium and Terbium Oxide.

Creat Resources Holdings (CRHL): 5.25p

FTSE AIM Mining
Market Cap £35m

Company Description: Creat Resources Holdings is an investment company involved in the exploration and operation of mineral operations largely focused on Western Tasmania, Australia and the nickel presence in that area.

Latest Newsflow: April 6th 2011 Galaxy Resources Limited (ASX: GXY) (20% owned by Creat Resources) announced it had identified potential new exploration target areas at its Ponton Rare Earths Project (Ponton project) in the eastern Goldfields region of Western Australia. Initial data suggested the anomaly is significantly larger than the area previously tested.

Company Summary: The November Hong Kong listing of Galaxy Resources has helped underpin the valuation of the Creat Resources' stake, while the latest upgrade to the RE presence in Ponton, Western Australia has also kept the group in focus.

Red Rock Resources (RRR): 11.5p

FTSE AIM All Share Mining
Market Cap £79m

Company Description: Red Rock Resources is a mineral exploration and development company, focused on iron ore, uranium and manganese projects in Australia and East Africa.

Latest Newsflow: April 4th 2011 Red Rock Resources announced that its 24.9% associate Resource Star Limited (ASX: RSL) had begun an exploration joint venture with Thundelarra Exploration Limited (ASX: THX) on Thundelarra's Spinifex Uranium project in Western Australia. Highly anomalous Uranium rock chip samples have been located adjacent to the Revolver Creek Fault Zone.

Company Summary: The 25% stake in Resource Star and the large Malawi strike containing Niobium and several other RE's is the potential jewel in the crown for Red Rock Resources, over and above its other mining interests.

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Jim Dolan, *Retail Broking Director*

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Relevant Disclosures: **6**

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