

**Today's Notes:**

1. **The article below was written by Chris Berry and was published by Streetwise Inc. in The Gold Report yesterday.**

**We will be speaking at several conferences in the coming weeks. They are listed below this article for your convenience and we hope see some of you at either the US-based events or the European events.**

**The Great Reset – What Economic Uncertainty Means for the Rare Earth Sector and the Way Forward**

What began as a footrace, evolved into a full-on stampede, and is now unraveling is the race by non-Chinese junior mining companies to successfully mine rare earth elements (REEs) and establish a viable domestic supply chain. The primary reasons for this change are twofold: slower global economic growth indicating lower future aggregate demand and the sheer number of junior exploration companies involved in rare earth exploration. We have seen estimates of over 300 companies globally involved in this search and when you factor in the relatively tiny size of the rare earth market (approximately 130,000 tonnes produced in 2010 according to the USGS) we still stand by what we've said all along – there is room here for a few major players and not much else. We believe the rare earth industry is in the beginning stages of a phase we call **"The Great Reset"**. We base this theory on four ideas:

1. Everything reverts to the mean. This includes rare earth oxide (REO) prices. While we believe we will see a permanently higher price for select REOs, this is not the case for the entire suite of oxides and prices cannot continue rising indefinitely. The laws of supply and demand have proven this historically.
2. Demand projections for REOs are being re-evaluated downwards due to anemic global economic growth prospects. With a tremendous debt overhang in the United States and Europe and evidence of growth slowing in China (the three biggest economies in the world), lower aggregate demand for finished goods that use REOs is a given. We have seen forecasts for REO demand in 2015 that are higher than they are today, and don't disagree but the downward revision is indicative of lower demand for most REOs.
3. Companies such as Toyota and General Motors are actively researching [substitutes for REOs in their products](#). This type of research has been ongoing for some time and we think that these companies would not be spending the R&D dollars if they didn't want to avoid a potential problem on the horizon regarding high REO prices.

4. Demand projections for “green” or “clean tech” applications such as hybrid electric vehicles, wind turbines, and solar cells are not factoring in whether or not manufacturers of these goods can ensure a steady supply of raw materials (specifically REOs) to spec to meet their production forecasts. The rare earth industry is a customer-driven business in that the customer needs REOs of a highly specific type and purity. If a wind turbine manufacturer can't procure a specific purity of neodymium oxide, for example, the wind turbine may get built without neodymium, implying demand destruction. We have seen estimates of the use of up to one tonne of neodymium needed to produce one megawatt of generating capacity from a wind turbine. China alone has plans to install 100 gigawatts of generating capacity from wind (up from 12 gigawatts in 2009). When you factor in European and American projections for wind power (not to mention other parts of the world), this begs the question of whether or not there is enough neodymium to go around and if there currently is not, will there be enough to satisfy these growth targets in wind generating capacity? We are well aware of the benefits of neodymium-iron-boron magnets in miniaturization and efficiency, but think that if a good can be manufactured economically without REOs, then the manufacturer will choose that path or abstain from building the product at all.

To be clear – we have not “thrown in the towel” on REOs and the important role they play in certain sectors of the economy. What we are saying is that the role will be different from what many in the sector currently suggest. Like many other facets of life, the rare earth sector is Darwinian in nature will evolve to equilibrate supply and demand. The gratification that comes along with healthy and growing demand for a product (in this case REOs) will be delayed, to the chagrin of investors and rare earth mining company CEOs alike. This “reset” shapes how we think about the rare earth space now and in the future and in deciding how and where to invest. Below is a price chart of the [Bloomberg Rare Earth Mineral Resources Index](#) and its one year performance.



Source: Bloomberg

## THE ONE SECTOR WHERE SUPPLY AND DEMAND DON'T MATTER

There is one area of the economy, however, which we think is immune to the vagaries of supply and demand of REOs: the military. While the potential for substitution exists with consumer products, we believe there is no such “wobble room” when analyzing a country’s defense capabilities. The neodymium-iron-boron magnets we mentioned above are critical in actuators of precision-guided bombs and are designed specifically around these [magnets](#). Actuators are responsible for control of the bomb and this is just one of several products (lasers and radar being two significant other products) that must use rare earths to function optimally. Without the magnets in the bombs, performance is reduced – implying an inferior product - something nobody should be willing to accept. The US Military is responsible for a small overall percentage of REO demand in the United States, but it is significant nonetheless.

## THE RARE EARTH SUPPLY CHAIN – THE KEY TO IT ALL

So at this point, we believe two things: first, demand for most REOs will decrease in the near term and second, we believe it will be exceedingly difficult for the majority of the junior mining companies involved in rare earth exploration to achieve commercial production of REOs. Despite this, the singular crucial issue that put the rare earth story on the front page of every newspaper around the world in the first place still haunts us - Western dependence on a critical resource from a strategic adversary. While a seemingly endless amount has been written about China’s control of the supply of REEs, what we think is most important (and most often missed by the pundits) is the fact that China also effectively owns the entire mine to magnet supply chain. This is the crucial vulnerability. The mining of rare earths is the easy part. It is the resulting steps where intellectual property is created that really matter. In 2010, the United States Government Accountability Office (GAO) was commissioned to deliver a report on the use of rare earth elements in the Department of Defense supply chain. Regarding military capabilities, the [report](#) states (Ed. Note: bold text is ours),

*“For example, the M1A2 Abrams tank has a reference and navigation system that uses samarium cobalt (SmCo) permanent magnets. **The samarium metal used in these magnets comes from China.**”*

Whether we’re discussing heavy rare earth elements (HREEs) or light rare earth elements (LREEs) a particular concern is the fact that the West is realistically years away from having a supply chain built which can act to diminish foreign dependence on REOs. Viewed that way, reduced demand for certain REOs could be a blessing in disguise in that it can give Western policymakers more time to formulate a viable strategy, though based on recent behavior in Washington DC (think about the debt ceiling debate), we’re not holding our breath. The chart below shows the supply chain for rare earth permanent magnets used in wind turbines and hybrid vehicle motors amongst other products. China is responsible for the entire upstream portion of this chain and has designs through mercantilist export policies on owning the entirety of the downstream portion of the chain as well.

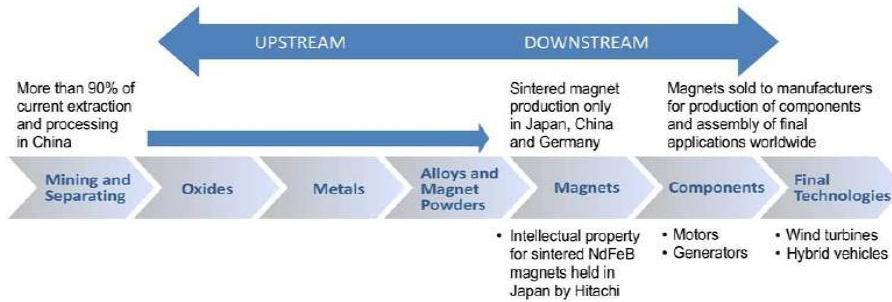


Figure 2-1. Supply chain for rare earth element PM applications

There are myriad issues surrounding China’s trade policies and her seeming inability to “play fair” on the world stage. The World Trade Organization recently found that [China was in violation](#) of international trade rules for curbing exports of rare earths. The Chinese government is likely to appeal this ruling, effectively kicking the can down the road and prolonging export curbs of rare earths from China indefinitely. Though one could infer higher prices for REOs due to this, we still believe that slower economic growth and potential for substitution point to lower REO prices going forward.

To get a sense of how Chinese export quotas of REOs have decreased in recent years and the resulting increases in prices of REOs, see the charts below:

	Export Quotas (tonnes REO)	Change From Previous Year	ROW Demand (tonnes)
2005	65,609		46,000
2006	61,821	-6%	50,000
2007	59,643	-4%	50,000
2008	56,939	-5%	50,000
2009	50,145	-12%	25,000
2010	30,258	-40%	48,000

Source: IMCOA

Here are the YTD percentage increases in prices of select REOs. This, more than anything else, we believe, makes the case for our thoughts on mean reversion and demand destruction described above:

REO	Oxide Price FOB Jan 4,2011 (\$/kg)	Oxide Price FOB Sept 29,2011 (\$/kg)	% Change
Cerium	\$60	\$71	18%
Lanthanum	\$59	\$79	34%
Praseodymium	\$85	\$219	157%
Neodymium	\$86	\$263	205%
Samarium	\$34	\$109	219%
Europium	\$620	\$3,790	511%
Gadolinium	\$43	\$163	278%
Terbium	\$595	\$3,210	439%
Dysprosium	\$285	\$2,290	704%

Source: metal-pages.com; all prices rounded

## WHAT TO FOCUS ON IN THE RARE EARTH SPACE GOING FORWARD

There are numerous important factors to consider when undertaking due diligence of a mining opportunity (management capability, grade, tonnage, etc.) that we use in the Discovery Investing Ten Point Factor Model, but we think that there are three keys one must consider initially before looking further at a given rare earth exploration company as an investment.

Despite the fact that we believe the “easy money” has already been made in this sector, we do believe that opportunities for profit exist. Much has been made in recent months of “critical” or “strategic” metals and what constitutes a metal joining this group. We would certainly include rare earths here and, in fact, take this one step further. We consider rare earths to be “political metals”. In the rare earth sector, geopolitics trumps all and this is the first factor to consider when investing in the junior mining rare earth sector. It should be clear that we have our doubts about permanently increasing demand for REOs. However, due to the significant enhancements REOs provide in military applications, access to a reliable supply of these metals is now on the radar (pardon the pun) of politicians from Brussels, to Ottawa, to Beijing, to Washington DC. In the United States, Senator Lisa Murkowski (R-Alaska) has been an ardent supporter of rebuilding the US industrial base and supply chain for critical minerals including rare earths. Rare earth deposits are of strategic significance. A deposit in a safe and stable political jurisdiction is an absolute must.

Second, when comparing rare earth deposits, a decidedly large slant towards HREE mineralization is also a must. After all, the HREEs are truly “rare” and forecast to be in deficit going forward. In our opinion, investing in a large LREE deposit that promises tens of thousands of tonnes of REO production per year, when the Chinese dominate this portion of the market and are set to do so going forward, is not a wise move. In the price chart we

printed above, dysprosium oxide and terbium oxide (two of the most sought after HREOs) have increased in price by 704% and 439% respectively year-to-date. We do not expect continued triple-digit gains in these REO prices, but do believe that deposits with a high percentage of HREEs have potential to outperform going forward.

Finally, while the geopolitics and HREE content are important, without a solid understanding of the metallurgy of a deposit, you could quite literally be investing in moose pasture. This is one of the ultimate differences between rare earths and other metals. Separating seventeen metals from each other is an enormously difficult task both technically and financially. This is also a competitive advantage the Chinese have over the West – they have “cracked” the metallurgy of their primary rare earth deposits. While we don’t expect miracles, we do want to see Western rare earth companies making steady progress into understanding the mysteries of the metallurgy. This is one of the biggest risk factors when analyzing a rare earth exploration company.

## **THE FUTURE IS NEVER CERTAIN BUT THERE WILL ALWAYS BE A PLACE FOR REOs**

It appears to be a rather hazy future for the rare earth sector as slow economic growth, potential for substitution, manufacturers potentially misreading demand for their own products which use REOs, and price mean reversion all come together to take some of the “froth” out of this market. We think this is a good thing. Regardless, the big picture issues surrounding the need for REOs in various military and clean tech applications are going to keep the industry front and center, but it will evolve much differently than many expect. The Great Reset will ensure that.

### **2. Speaking Schedule**

**On October 15th Dr. Berry will be speaking at the Chicago Resource Conference being held October 14th and 15th. Please see [www.chicagoresourceexpo.com](http://www.chicagoresourceexpo.com) for the agenda. This is always a great gathering of companies and experts - see you there.**

**On October 20th Dr. Berry will be keynoting at the Silver Summit in Spokane. He will host a brown bag lunch and discuss his views on “What's Happening in the World”. A Q&A session will follow. No holds barred.**

**From October 30th to November 7<sup>th</sup> Chris Berry will be traveling to Europe with Zimtu Capital and a select group of junior resource companies. He will be presenting his views on the state of the gold, rare earth, potash, and coal markets. We will be presenting in several cities including Zurich, Geneva, Munich, and Vienna. For more information and to attend, please follow the link:  
<http://roadtrip.zimtu.com/#>**

**Hope to see you there.**

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