

# Strategic Metals & Rare Earths Letter

## INTERNATIONAL

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### Western REE industry wiped out by policy changes in China

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Heavy Rare Earths Oxides (HREO)		Light Rare Earth Oxides (LREO)	Critical Metals and Special Minerals	
europium (Eu)	erbium (Er)	lanthanum (La)	yttrium (Y)	lithium (Li)
gadolinium (Gd)	thulium (Tm)	cerium (Ce)	scandium (Sc)	graphite (C)
terbium (Tb)	ytterbium (Yb)	praseodymium (Pr)	niobium (Nb)	tungsten (W)
dysprosium (Dy)	lutetium (Lu)	neodymium (Nd)	tantalum (Ta)	titanium (Ti)
holmium (Ho)		promethium (Pm)	beryllium (Be)	zirconium (Zr)
		samarium (Sm)	gallium (Ga)	hafnium (Hf)
			indium (In)	antimony (Sb)
			germanium (Ge)	cobalt (Co)

**China** gradually has entered the international market for rare earths since the 1980s and its rare earth production has maintained an absolute leading position since 1986, and after the closing of Molycorp's US Mountain Pass Mine in California in mid-2015, currently controlling roughly 90% of world total REE production.

**China** remains the largest exporter and sets prices and availability through a system of state ownership production quotas and regular mining closures.

The rare earths used in permanent magnets (REPM's) account for >75% of all rare earths demand by value, and are the key driver of the rare earths market. The estimated production of sintered NdFeB magnet alloys in China in 2015 was 140,0000 tonnes.

**China** produced 88% of total supply, highlighting how its dominant position is being maintained. The bonded magnet market was 6,000 tonnes NdFeB in 2015, of which China produced 4,000 tonnes.

Market estimates allowing for recycling are approximately 10-15% less than these figures, indicating that illegal production of these rare earths is approximately 40% of total production.

Rare earth prices remain largely steady throughout 2016 tracing an "inverted parable" trend by hitting bottom levels in Q3, while gradually rebounding during Q4. For the full year prices for most rare earths extracted in **China** dropped by around 10% due to overcapacity in the market.

As for exports, the Chinese rare earth export market continued the trend of increasing exports but declining average prices. Rare earth production totalled 46,740 tonnes in 2016, up by 34% year-to-year, compared with the figure of 34,832 tonnes during 2015.

In aspect of average export price, Chinese rare earth export prices stood at only US\$ 7.31/kg in 2016, down by 32% year-to-year from US\$ 10.71/kg during 2015.

In early 2014, **China's Ministry of Industry and Information Technology** ("MITT") singled-out 6 different industry leaders, promising them support to create large rare earth producers by buying-up small scale operations.

On January 1, 2015, after losing its battle in the final ruling in the World Trade Organization (WTO), **China** ended its 16 year-old rare earth export quota system, and on May 1, 2015 it eliminated export tariffs on rare earth elements, including tungsten, molybdenum, iron and steel particles and their products, as part of the QTO ruling requirements.

The abolition of the decades' long rare earth export quota and tariffs, lead to important policy changes in China's rare earth industry, as well as huge impact on the world's rare earth industry and market.

**China** started to implement this policy, which consolidates all the country's mining and smelting of rare earth separating enterprises into those 6 government-owned and controlled large Rare Earth Groups in the middle of 2015.

The policy is believed to strengthen China's internal integration and coordination control from the production source. This will also let the Chinese rare earth industry to form a joint force to facing the outside world to change the current rare earth oversupply situation, effective control the rare earth production and marketing.

With the advocacy of "supply-side" reform in China, related department acting strictly regulated illegal behaviour and foul play in the industry, establishing the environmental inspection mechanism and tried to relieve the imbalance situation between market supply and demand by ways of natural reserves.

The Brexit and depreciated euro deteriorated the **European rare earth market**, Fed's raise in interest rate imposed no stir on the **US market**. The global economy market slowly on the way to recovery and consumers in **Japan** and **South Korea** still stand and watch for the market.

## ► The fall of the Western REE industry

Due to the fall of prices in the last few years, the rare earth industry outside China struggled to survive. In June 2015, **Molycorp**, which mined rare earth elements at Mountain Pass, California, the only miner and producer of rare earth elements in the US, filed for Chapter II bankruptcy after failing to turn a profit since 2011 and failed to arrive at an agreement with creditors to restructure its US\$ 1.7 billion debt.

Five years earlier, **Molycorp** had a market value of US\$ 6 billion when China restricted its exports and it was expected by market watchers that the Western world would be capable to break China's dominance.

Currently, Australia-based **Lynas Corporation** is the only operating rare earth miner outside of China. It operates the Mt Weld mine and concentration plant in Western Australia, and is home to the world's largest rare earth refinery Lynas Advanced Materials Plant (LAMP) in Malaysia.

Due to the strong reduction of export quotas, rare earth prices more than 20-folded since the end of 2009 from US\$ 10.32/kg at the end of 2009 to a peak of US\$ 232.68/kg as at 1 August 2011, followed by a steep correction by more than 90% to S\$ 22.62/kg at year-end 2013.

Meanwhile, hundreds of millions of dollars were invested in Western REE projects and up to 10 REE companies expected to achieve production by 2018-2020. However, due to the important policy changes China succeeded to keep control over the market.

This resulted in a strong decline of REE prices in the last few years. All Western REE companies, with the exemption of **Lynas Resources**, as the only publicly listed producer outside of China, lost view of achieving production targets earlier than 2020.

The material impact of continuing challenging market conditions are visualised by the collapse in market valuation of today's major listed REE companies in the last three years, as reflected in the overview below. The overview shows a collapse of the market valuation of 59% from US\$ 1,467 million at year-end 2013 to US\$ 604 million at year-end 2016, without the impact of the bankruptcy of **Molycorp**, which had a market valuation of \$ 6 billion in 2010 when China restricted its exports, not being accounted for.

Global Top-10 listed REE companies										
Company	Trading symbol		Share price year-end				Change in % period 2016-2013	Market cap.		Change in % period 2016-2013
			2016	2015	2014	2013		US\$ million		
			A\$	A\$	A\$	A\$		2016	2013	
Lynas *	ASX	LYC	0.070	0.100	0.070	0.300	-77	178	897	-80
Alkane Resources	ASX	ALK	0.340	0.230	0.220	0.340	0	124	125	-1
Greenland Min. and Energy	ASX	GGG	0.090	0.030	0.070	0.210	-57	65	125	-48
Northern Minerals	ASX	NTU	0.120	0.080	0.230	0.190	-37	62	75	-17
Arafura Resources	ASX	ARU	0.060	0.060	0.050	0.090	-33	19	35	-46
Hastings Technology Metals	ASX	HAS	0.070	0.070	0.070	0.050	40	27	15	80
Peak Resources	ASX	PEK	0.070	0.090	0.070	0.070	0	24	20	20
			C\$	C\$	C\$	C\$				
Ucore Rare Metals	TSX.V	UCU	0.310	0.235	0.230	0.240	29	53	42	26
Leading Edge Materials **	TSX.V	LEM	0.510	0.150	0.500	1.080	-53	32	63	-49
Avalon Rare Metals	TSX	AVL	0.145	0.240	0.130	0.580	-75	20	70	-71
								604	1,467	
* only current producer										
** name change from <i>Tasman Metals</i> effective 25 August 2016										

### Comments on REE and Strategic Metals / Special Minerals investment recommendations:

Despite the REE market's overall challenging market conditions, 6 out of the 10 REE companies included in my 2016 shortlist of recommendations, thanks to a highly successful selective investment policy, showed an outstanding market performance.

It is striking to see that in particular 2 companies focused on **Europe** were by far the best market performers in 2016, including **Leading Edge Minerals** (formerly Tasman Metals) and **Greenland Minerals and Energy**, focused on Sweden and Greenland, respectively, achieving gains of 233% and 202%, respectively.

Also, 2 of the 3 Australian companies, notably **Alkane Resources** and **Northern Mineral**, showed a strong market performance.

The 2016 Shortlist of REE and Strategic Metals /Special Minerals, besides 8 REE companies, included 4 lithium companies with **Neometals Mining** showing an outstanding gain of 28% in US\$; 3 graphite companies with **Magnus Resources** by far outperforming the market with a gain of 95% in US\$; 2 tungsten companies, with the market leader **Wolf Minerals**, focused on the UK, showing a critical market loss of 66% in US\$.

In contrast, the 2 titanium companies included in my 2016 shortlist, including **FinnAust Mining**, focused on Greenland/Sweden and **Mineral Deposits** focused on Senegal/Norway, by showing gains of 299% and 135%, respectively, were belonging to the overall best market performers of the companies selected by me.

**The overall market performance of my 2016 Shortlist showed a respectable gain of 69%.**

In the **February 2017 Market Outlook**, I'll publish an update on the status of the REE and Strategic Metals/Special Minerals companies covered by me, including a **2017 Shortlist of investment recommendations**.

## 2016 Shortlist of REE and Strategic Metals/Special Minerals Investment recommendations as at 30 December 2016

Company	Trading symbol		Share price		Change in %		Market cap. (million)		Market cap. (in million)		Change MC in % 2016/2015	
			Year-end 2016	Year-end 2015	local	US\$	Year-end 2016	year-end 2015				
<b>REE companies (8)</b>												
			<b>US\$</b>	<b>US\$</b>			<b>US\$</b>	<b>US\$</b>	<b>US\$</b>			
<b>US (1)</b>												
Rare Element Resources	OTC US	REEMF	0.060	0.151	-60	-60	3.2	3.2	8.0		-60	
<b>Canada (1)</b>												
			<b>Cdn\$</b>	<b>Cdn\$</b>			<b>Cdn\$</b>					
Avalon Rare Metals	TSX	AVL	0.145	0.130	12	11	27.2	20.1	15.4		31	
<b>Australia (3)</b>												
			<b>A\$</b>	<b>A\$</b>			<b>A\$</b>					
Alkane Resources	ASX	ALK	0.340	0.230	48	48	171.8	123.7	67.7		83	
Northern Minerals	ASX	NTU	0.120	0.080	50	51	73.5	52.9	27.3		94	
Arafura Resources	ASX	ARU	0.060	0.060	0	0	26.5	19.1	18.8		2	
<b>Greenland (1)</b>												
			<b>A\$</b>	<b>A\$</b>			<b>A\$</b>					
Greenland Minerals and Energy	ASX	GGG	0.09	0.03	200	202	89.9	64.7	16.8		285	
<b>Sweden (1)</b>												
			<b>Cdn\$</b>	<b>Cdn\$</b>			<b>Cdn\$</b>					
Leading Edge Materials	TSX.V	LEM	0.510	0.15	240	233	42.8	31.7	12.4		156	
<b>Tanzania (1)</b>												
			<b>A\$</b>	<b>A\$</b>			<b>A\$</b>					
Peak Resources	ASX	PEK	0.070	0.09	-22	-22	33.4	24.1	24.8		-3	
<b>Lithium companies (4)</b>												
<b>Argentina (1)</b>												
			<b>A\$</b>	<b>A\$</b>			<b>A\$</b>					
Altura Mining	AJM	ASX	0.140	0.17	1)	-18	-18	172.9	124.5	157.1	1)	-21
<b>Australia (1)</b>												
Neometals	NMR	ASX	0.340	0.15	127	128	191.4	137.8	57.4		140	
<b>US (1)</b>												
			<b>Cdn\$</b>	<b>Cdn\$</b>			<b>Cdn\$</b>					
Pure Energy Minerals	PE	TSX.V	0.600	0.56	7	7	39.7	29.4	20.0		47	
1) included as at 1 August 2016												
<b>Graphite companies (3)</b>												
<b>Tanzania/Australia (1)</b>												
			<b>A\$</b>	<b>A\$</b>			<b>A\$</b>					
Magnis Resources	ASX	MNS	0.760	0.390	95	96	341.9	246.2	95.9		157	
<b>Tanzania (1)</b>												
Kibaran Resources	ASX	KNL	0.190	0.170	12	12	46.1	33.2	21.0		58	
<b>Canada (1)</b>												
			<b>Cdn\$</b>	<b>Cdn\$</b>			<b>Cdn\$</b>					
Zenyatta Ventures	TSX.V	ZEN	0.850	0.88	-3	-3	51.4	38.1	35.2		8	

Company	Trading symbol		Share price		Change in %		Market cap. (million)		Market cap. (in million) year-end 2015	Change MC in % 2016/2015
			Year-end 2016	Year-end 2015	local	US\$	Year-end 2016	Year-end 2015		
<b>Tungsten companies (2)</b>										
<i>England (1)</i>										
Wolf Minerals	ASX	WLF	A\$ 0.080	A\$ 0.23	-65	-66	A\$ 86.8	62.5	135.9	-54
<i>Spain (1)</i>										
Almonty Industries	TSX.V	All	Cdn\$ 0.270	Cdn\$ 0.280	-4	-4	Cdn\$ 28.4	21.0	17.6	19
<b>Titanium companies (2)</b>										
<i>Senegal / Norway (1)</i>										
Mineral Deposits	ASX	MDL	A\$ 0.49	A\$ 0.21	133	135	A\$ 50.8	36.6	18.9	94
<i>Greenland (1)</i>										
FinnAust Mining	LSE	FAM	GBP 6.78	GBP 1.53	343	299	£ 41.1	50.3	10.1	398
<b>Removed as at:</b>										
					Change in %	Change MC 2015/16				
					local	US\$				
<b>August 1, 2016:</b>			29/7	31/12						
Galaxy Resources	ASX	GXY	0.47	0.12	300	288	322			
<b>Market performance 2016 (in US\$) as at 30 December 2016: 68.9%</b>										
<b>Market capitalization increase 2016 (in US\$) as at 30 December 2016: 92.4%</b>										