Strategic Metals & Rare Earths Letter

INTERNATIONAL

the independent information and advisory publication on investing in Strategic Metals & Rare Earths

Update February 2014

➢ Rare Earths Materials
play key role in advanced environmental and modern technical products

The **"REE"** Rare Earth Elements group, known as the lanthanide series, consists of 15 elements, of which 9 HREO and 6 LREO elements.

Heavy Rare Earths Oxides (HREO)		Light Rare Earth Oxides (LREO)
europium (Eu)	erbium (Er)	lanthanum (La)
gadolinium (Gd)	thullium (Tm)	cerium (Ce)
terbium (Tb)	ytterbium (Yb)	praseodymium (Pr)
dysprosium (Dy)	lutetium (Lu)	neodymium (Nd)
holmium (Ho)		promethimium (Pm)
		samarium (Sm)

The elements yttrium (Y) and scandium (Sc) are also lumped in with Rare Earths because they have similar chemical properties making 17 REE's in total.
In the oxide form, the group is collectively known as Rare Earths Oxides (REOs).

REE's are frequently found associated with radioactive elements, such as uranium and thorium, making mining them dangerous and subject to environmental restrictions.

Rare Earths play a key role in advanced green environmental products from energy efficient compact fluorescent light bulbs to hybrid cars, automotive catalytic converters and wind turbine generators. They are also essential in the development and manufacturing of many high-technological products from hard disc drives to flat panel displays, iPods and magnetic resonance imaging (MRI) scans.
Many defence applications, including missile guidance systems, mine detection, anti-missile defence and communication systems, also require rare earths elements.

Because of the large number of high-technology and defence applications that require rare earths, dependable, quality resources, are important to the Western economies and critical to continued manufacturing and production.

➢ Historical overview of Rare Earths prices

Due to the global economic slowdown which began in the fourth quarter of 2008, many industries have been experiencing inventory destocking as customers use existing inventory to preserve cash. This has caused raw material process to slump significantly at the upstream end of the supply chain.

The June 2008 Rare Earths price for Lynas' average Mount Weld composition was US$ 15.22/kg REO on a FOB basis, by June 2009 this dropped to US$ 9.52/kg REO, a decline of 37%. In the same period the average composition price for China's Baotou Mine declined 40% form US$ 12.67 to US$ 7.65/kg REO.

When export quota costs, export tariff and value added taxes are taken into account a Chinese company is estimated to receive less than US$ 5.00/kg. These price levels are believed to be at the cash cost of production within China, which have increased from approximately US$ 3.50/kg REO in 2002/03 to approximately US$ 5.50/kg over the last five years due to higher energy, chemical reagents, labour and environmental compliance costs.

Pricing

Rare Earth Oxide (Purity 99% min)	Price June 2001	Price June 2002	Price June 2003	Price June 2004	Price June 2005	Price June 2006	Price June 2007	Price June 2008	Price June 2009	Price change 2008 – 2009
Lanthanum Oxide	7.00	2.30	1.50	1.62	1.45	2.15	2.82	8.83	5.90	-33%
Cerium Oxide	4.00	2.25	1.68	1.62	1.37	1.65	2.63	4.38	3.80	-13%
Neodymium Oxide	11.00	4.35	4.42	5.75	6.05	11.07	31.15	32.88	14.50	-56%
Praseodymium Oxide	6.20	3.94	4.19	8.00	7.55	10.70	30.37	32.61	14.50	-56%
Samarium Oxide	9.00	2.98	2.67	2.67	2.60	2.40	3.12	4.80	4.75	-1%
Dysprosium Oxide	35.00	20.00	14.60	30.30	36.40	70.44	88.30	120.80	112.00	-7%
Europium Oxide	310.00	240.00	235.40	310.50	286.20	240.00	311.00	491.00	495.00	1%
Terbium Oxide	135.00	170.00	170.00	398.20	300.00	434.00	575.40	740.00	360.00	-51%
Av. Mt Weld Composition	7.81	3.97	3.48	4.45	4.15	5.50	11.40	15.22	9.52	-37%
Av. Baotou Composition	6.66	3.17	2.68	3.29	3.08	4.33	9.42	12.67	7.65	-40%

Due to the strong reduction of export quotas, Rare Earth prices, since the end of 2009, more than twenty-folded from US$ 10.32/kg at the end of 2009 to a peak of US$ 232.68/kg as at August 1, 2011 (average Mt Weld Composition – FOB China basis), but were followed by a steep correction by more than 90% to US$ 22.62/kg at year-end 2013.

Rare Earth Prices (US$/kg)

Rare Earths Oxide	China Domestic Average Price					
	2010	2011	2012	2013	Q3/13	Q4/13
Lanthanum Oxide	4.30	16.26	11.46	5.40	4.75	4.23
Cerium Oxide	3.55	19.58	11.76	5.40	4.65	4.17
Neodymium Oxide	29.28	132.06	74.72	51.20	52.55	54.04
Praseodymium Oxide	27.60	104.60	70.51	73.10	80.68	95.07
Samarium Oxide	2.47	11.85	10.44	5.60	5.24	3.71
Dysprosium Oxide	166.48	944.33	620.73	313.60	345.69	313.40
Europium Oxide	410.42	2,025.00	1,178.34	741.00	720.93	768.45
Terbium Oxide	388.80	1,596.82	949.04	584.30	622.35	612.62

Source : Metal Pages

The China Domestic Price, at US$ 66.49 by the end of 2009, was US$ 3.82 lower than the FOB China Price of US$ 10.32, before it increased to US$ 55.44 by the end of 2011, followed by a steep decline to US$ 23.00/kg during Quarter 1, 2013. The gap between these two prices was narrowed from US$ 92.52 as at the end of 2011 to US$ 14.22/kg during Quarter 1, 2013.

Based on the big gap between both prices being closed, with on the one hand the Chinese marker better under control by reducing the number of mining licences and on the other hand the international market better balanced by the growing importance of Western production in the next few years, we expect the overall REE market to have bottomed, but also to be more selective with regard to demand and supply forecast by applications and related demand for individual rare earth elements.

Supply-demand balance for individual elements

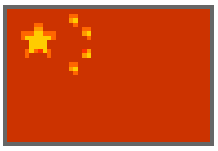
The supply-demand balance is likely to remaining varying considerably over time for individual elements and between light rare earth elements LREEs and heavy rare earth elements HREEs.

An earlier criticality study, based on a combination of importance to the clean energy economy and risk of supply disruption by the US Department of Energy ranked dysprosium as the most critical REE in both the short (0-5 years) and medium term (5-15 years).
Neodymium, terbium and yttrium were ranked next in the short term, followed by europium.

In the medium term neodymium and terbium were ranked below dysprosium, followed by europium and yttrium.

FORECAST, GLOBAL DEMAND AND SUPPLY FOR INDIVIDUAL RARE EARTHS IN 2016

	Demand		Supply/production		
	REO tonnes	%	REO tonnes	%	Surplus/ deficit
Lanthanum	36,750	23.0	52,000	26.7	15,250
Cerium	**65,000**	**40.4**	**81,000**	**41.5**	16,000
Praseodymium	7,500	4.7	9,500	4.9	2,000
Neodymium	**30,000**	**18.8**	**31,500**	**16.2**	1,500
Samarium	1,000	0.6	3,750	1.9	2,750
Europium	**780**	**0.5**	**500**	**0.3**	-280
Gadolinium	2,225	1.4	2,750	1.4	525
Terbium	**450**	**0.3**	**350**	**0.2**	-100
Dysprosium	1,650	1.0	1,450	0.7	-200
Erbium	**1,000**	**0.8**	**800**	**0.4**	-200
Yttrium	13,350	8.3	10,000	5.1	-3,350
Ho, Tm, Yb, Lu	**250**	**0.2**	**1,400**	**0.7**	1,150
Total	**159,955**	**100.0**	**195,000**	**100.0**	**35,045**



China controls the world's Rare Earths industry

The strategic value of secure Rare Earth supplies has been much better and earlier understood in China than in the Western world. Already the late Chinese leader Deng Xiaoping once said "There is oil in the Middle East, there is Rare Earth in China". He foresaw the West's growing dependence on these elements for high-tech industries and put China on course to become the world's dominant supplier today with more than 90% of Rare Earths production.
However, China holds only 3% of the world's rare earth reserves and decades of excessive exploitation have greatly damaged the environment.

However, the path that has led China to a virtual monopoly has not been without its own issues. The Chinese State-Owned Enterprises (SOE) that gained the processing technology could not protect this intellectual property.

As a result, the Chinese Rare Earths industry grew rapidly in the 1990s as many smaller Chinese enterprises set up Rare Earths processing plants. This lead to intensive competition between Chinese producers which in turn drove down prices of rare Earths from the high prices associated with "specialty chemicals" to significantly lower "commodity" prices in a few short years.

Accurate production figures are unavailable due to the artisanal mining in this region. However, estimates range from 35,000 – 55,000 tonnes REO.

The fragmented Rare Earths mining and processing industry in China suffered from inefficient extraction techniques leading to low recovery and in addition poor environmental protection compliance was prevalent across the industry. The Chinese authorities realized the industry had to change and rationalization of the industry began in 2003 when export quotas on Rare Earths were introduced and issued to approved local operators.

To protect the fragile Rare Earths resources base within China over mining with low recovery processes and to enforce the environmental standards within the mining industry, the Chinese Government introduced "production quotas" in 2007.

The tonnage of this export quota has been decreasing every each year, primarily in response to increasing domestic demand. In 2006, the volume dropped to 48,000 tonnes from a record of more than 65,000 tonnes, in 2007 to 43,574 tonnes, in 2008 to 40,987 tonnes and in 2009 to 33,300 tonnes.

Export quotas for the Chinese rare-earth industry (tonnes)
Source: Chinese Ministry of Commerce

Year	Period	Chinese-owned	Chinese / Non-Chinese JV	Sub-Total	TOTAL
2009	H1	15,043	6,685	21,728	50,145
	H2	18,257	10,160	28,417	
2010	H1	16,304	5,978	22,282	30,258
	H2	6,208	1,768	7,976	
2011	H1	10,762	3,746	14,508	30,246
	H2	12,221	3,517	15,738	
2012	H1	16,066	5,160	21,226	30,996
	H2	6,340	3,430	9,770	
2013	H1	11,136	4,363	15,499	30,999
	H2	11,163	4,337	15,500	
2014	H1	10,756	4,354	15,110	21,586e
	H2	-	-	*6,476e*	

In addition to this export quota for local companies, foreign joint ventures secured export quotas from the Chinese Ministry of Commerce (MOFCOM). In 2009, these quotas equalled 16,845 tonnes, giving a grand total of 50,145 tonnes. These annually declining quotas, in conjunction with tightening of environmental regulation compliance, has led to the closure of many small processing operations.
The production quota for Rare Earths concentrates was 82,320 tonnes of REO in 2009, down 6% from 87,620 tonnes in 2008. The quota consisted of 72,300 tonnes for light rare earths from Baotou and Sichuan, down
7.9% as compared to 2008, and 10,020 tonnes for medium and heavy rare earths from the southern ionic region, up 8.87%.

➢ Export Quota 2011 - 2013

In 2011, MOFCOM set the REE export quotas at 14,508 tonnes for the first half of the year and 15,750 tonnes for the second half of 2012, giving a total of 30,258 tonnes.
Although the export quota for 2011 appears only marginally lower than in 2010, the figures are not directly comparable to the previous years because for the first time these quotas include REE ferro-alloys. It has been suggested that this will result in a 20% net decline in the amount of REE metal and oxide being exported.

In August 2012, a total of 9,770 tonnes was allocated of rare earth export quotas for 2012 bringing the total for 2012 to 30,996 tonnes. In order to find a market balance and stop the overall decline of the REE market MOFCOM issued separate allocations for light (LRE) metals, making up 85% of the overall quota and medium heavy (M/HRE) metals, making up 15% of the overall quota for the first time and allocated quota on the basis of whether or not companies had passed new pollution control standards.

China also imposes export duty on REE leaving the country: Neodymium, yttrium, europium, dysprosium, terbium and scandium have an export tariff rate of 25%, whilst the other REEs have a 15% levy. Dysprosium and neodymium-alloys are subject to a 20% export tariff.

First set of allocations of rare-earth export quotas, issued to individual companies for 2014. Source: Chinese Ministry of Commerce

Exporting Company	Allocation (tonnes)		
	LRE	M/HRE	Total
Baotou Rhodia Rare Earth	1,099	97	1,196
Grirem Advanced Materials *	974	197	1,171
China Nonferrous Import-Export (Jiangsu Branch)	972	165	1,137
Gansu Rare Earth New Materials	1,028	61	1,089
Yixing Xinwei Leeshing Rare Earth	696	136	832
Leshan Shenghe Rare Earth Technology	722	42	764
Yiyang Hongyuan Rare Earth	729	25	754
China Minmetals Corporation **	621	122	743
Ganzhou Chenguang Rare Earth New Materials	638	62	700
Liyang Rhodia Rare Earth New Materials *	504	186	690
Xuzhou Jinshi Pengyuan Rare Earth Materials	606	64	670
Ganzhou Qiandong Rare Earth Group	543	114	657
Guangdong Rising Nonferrous Metals Group	547	80	627
Jiangyin Jiahua Advanced Material Resources *	475	142	617
Zibo Jiahua Advanced Material Resources *	540	11	551
Jiangxi Rare Earth & Rare Metals Tungsten Group	506	3	509
Sinosteel Corporation ***	407	36	443
Baotou Huamei Rare Earth Hi-Tech ***	356	17	373
Chalco Rare Earth (Jiangsu)	236	92	328
Inner Mongolia Baotou Steel Rare Earth Hi-Tech ***	314	8	322
Shandong Pengyu Industrial	260	30	290
Baotou Tianjiao Seimi Rare Earth Polishing Powder ***	172	8	180
Huhhot Rongxin New Metal Smelting *	135	10	145
Baotou Santoku Battery Materials	136	7	143
Guangdong Zhujiang Rare Earth	65	40	105
Ganxian Hongjin Rare Earth **	28	41	69
Xi'an Xijun New Materials	5	0	5
Sub-Total: Chinese-Owned	**9,557**	**1,199**	**10,756**
Sub-Total: Chinese / Non-Chinese JVs	**3,757**	**597**	**4,354**
Total	**13,314**	**1,796**	**15,110**

x Chinese/non-Chinese joint venture companies

xx Part of China Minmetals Group, which was allocated a confirmed total of 812 tonnes

xxx Part of Baogang Group, which was allocated a confirmed total of 875 tonnes (significantly lower than in previous allocations because Inner Mongolia Baotou Hefa Rare Earths Co. was not assigned quota at this time)

In December 2012, the MOFCOM announced the first round of rare earth export quota for 2013. The first batch of quotas total 15,501 tonnes, about half of the quota set for all of 2012. Of the total 13,563 tonnes (87%) are allocated for LREs, while 1,938 tonnes (13%) are for M/HREs.
Twenty four companies will share the quota, including Inner Mongolia's Baotou Steel Rare Earth High-Tech Co., China's largest rare earth producer and its light rare earth output accounting for more than half of the world market. The MOFCOM also announced that it will half some of its production for a third month to help stabilizing tumbling prices.

On December 27, 2012, Inner Mongolia Baotou Steel Rare-Earth (Group) Hi-Tech Co. ("REHT") signed framework agreements on gaining control of and restructuring with 12 other rare earth firms in inner Mongolia. Under these agreements the 12 firms and their shareholders will transfer 51% of the companies' combined equity to REHT for free while REHT will plan their management and production.

In August 2012, China launched its first spot trading platform for rare earths, in the country's latest effort to improve price discovery and regulate the market better. The dispute is still pending.
The platform, led by China's largest producer **Baotou Steel Rare Earths Hi Tech**, will only allow physical trading.

On January 6, 2014 it was announced that China's largest rare earths producer, the Inner Mongolia Baotou Steel Rare Earth Company, has bought 9 regional Mining companies as part of the country's plan to consolidate its rare earth industry. Baotou will receive 51% stakes in each company at no cost.
The large rare earth groups will get preferential policies to better develop the mineral resources, such as production quota, mandatory plan, mining licence. REE companies will also have to submit reorganization plans to the Ministry of Industry and Information Technology.
China has shut 14 illegal mines over the past two years. In November 2013, smugglers attempted to take 130 tonnes of rare earth products valued at $ 2.3 million out of China.

China under pressure from the international community on controlling rare earth exports

Mid-September, 2010, China blocked shipments of raw rare earths minerals to Japan due to a diplomatic dispute, and to the United States and Europe in mid-October.
However, by the end of October the export embargo to the United States and Europe was ended.

In August 2011, the World Trade Organization (WTO) panel ruled that China had breached international trade rules by restricting exports of magnesium, manganese, silicon carbide and silicon metal. However, Chen Deming, Minister of Commerce, said that he was not concerned about possible WTO challenges to Beijing's policy of Rare Earths.

In July 2012, the World Trade Organization (WTO) said that it was establishing a panel to examine China's export restrictions on rare earths, tungsten and molybdenum.

The **EU** in its compliant documents stated that the export restrictions constituted a violation of China's WTO commitments under the General Agreement on Tariffs and Trade (GATT) and commitments under China's Accession Protocol. **Japan** noted that development restrictions were inconsistent with China's obligations under GATT. China has denied the charges, saying product quality variations account for the price gap between the metals it produces for export and domestic use. The dispute is still pending.

In September 2012, the Ministry of Land and Resources said that it had issued 67 mining licences for rare earths and 10 exploration permits, thereby reducing the number of permits to mine rare earths by 41%, tightening production of the metallic elements used in batteries and magnets.
The goal of the strong cut in mine permits appears to be to gain greater control over the production of Rare Earths by putting that production largely into the hands of bigger companies to prevent manipulation on production or export quotas.
China's eastern province of Jiangxi, which focuses on the production of mid-to-heavy rare earths, has the most number of mining licences withdrawn.

➢ Western hemisphere urged to respond to China's Rare Earths monopoly

With China further tightening supply regulations to shore up prices, there is growing urgency to ensure own supplies in the Western hemisphere particularly for Heavy Rare Earth Elements (HREEs), indispensable for high-tech manufacturing.

As to actually producing HREE rich ores and refining them no facilities exist today in the Western world that are extracting and/or refining HREEs to separate and justify them for high technology end uses. All such facilities today are in China.

For the **United States**, it will be necessary to develop, prove-out and construct at least one North American facility to produce the Rare Earth metals and their alloys in metallic form before anyone can make rare earths based magnets for any application.

Molycorp Minerals has been the first company in the western hemisphere to challenge Chinese domination in the production of REE's by reopening its Mountain Pass Mine in California with mining targeted to go full scale by 2013.

Lynas Corp., owing the richest deposit of Rare Earths in the world at Mount Weld in Western Australia has become the next producer, but the operational licence for its Lynas Advanced Material Plant ("LAMP") has been interrupted due to an environmental investigation.

Historically the balance of demand and supply in the world rare earth market has been fairly stable. However, in recent years the market has changed substantially from a position of oversupply to demand shortages. Total REO demand in 2008 was 124,000 tonnes, an increase of 45% compared to 2003 when demand was only 85,000 tonnes.

Total demand is predicted to reach 190,000-210,000 tonnes by 2015. Significant growth is forecast in most sectors of REE consumption, particularly for magnets and metal alloys which have a predicted consumption of up to 50,000 tonnes and 55,000 tonnes, respectively by 2015.

2014 FORECAST SUPPLY ASSUMPTIONS

SUPPLY SOURCES	
• Baotou	60,000t
• Sichuan	20,000t
• Ionic Clay Regions	30,000t
• Recycling in China	4,000t
China Total	**114,000t**
• Mount Weld	22,000t
• Mountain Pass	20,000t
• Others (India & Russia)	12,000t
• Recycling outside China	1,800t
Outside China Total	**55,800t**
Grand Total	**169,800t**

KEY UNDERLYING ASSUMPTIONS

- Baotou – 10% production increase 2010 / 2014
- Sichuan – full production quota to be utilised
- Iconic Clay – 2010 reduced from 2008 reported levels due to news reports. 2014 reduced to double current production quota (conservative estimate, could be lower)
- Mountain Pass – full production (20,000tpa) achieved
- Recycling – 20% Nd, Pr & Dy recycled from previous year's magnet production (~30% SWARF losses)

Source: Lynas Corp.

China's domestic demand for rare earths is rapidly increasing. It is predicted to be more than 100,000 tonnes by 2015 compared to about 70,000 tonnes in 2010.

With China's domestic supply being restricted as a result of decreasing production quotas and increasing government legislation covering illegal mining, China might become a net importer of heavy rare earths by 2015. This appears to offer plenty of opportunities for new producers in the Western hemisphere.

The British Geological Survey projected two years ago that total potential new production will increase from just 3,000 tonnes in 2011 outside China - with total production coming from Molycorp's Mountain Pass Deposit - to 129,000 tonnes in 2015, which would be more than 50% of total predicted demand.

Due to challenging market circumstances these assumptions probably have to be adjusted.

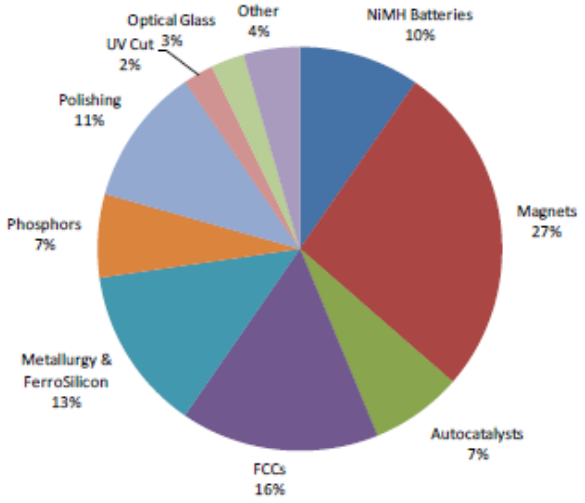
Based on available company reports new resources are expected to increase further in 2017 by 76,500 tonnes, including **Greenland Minerals and Energy** (20,000 tonnes), **Tanbreez Mining** (20,000 tonnes), **Quest Rare Minerals** (12,500 tonnes), **Avalon Rare Metals** (10,000 tonnes) and **Rare Element Resources** (10,000 tonnes).

Consequently, total projected REO production for the next six years could lead to a position of oversupply again.

Projected REO demand by sector

Sector	CAGR 2012-2018	Rare Earths used
NiMH Batteries	3.3%	La, Nd
Magnets	10.1%	NdPr, Dy
Autocatalysts	6.0%	Ce
FCCs	8.0%	La
Metallurgy & FerroSilicon	3.4%	CeLa
Phosphors	-1.2%	Eu, Tb, Y, Ce, La
Polishing	4.8%	CeLa
UV Cut	3.0%	Ce
Optical Glass	5.0%	La, Gd
Other	3.0%	La, Ce, Nd, Pr, Sm, Gd, Y
Total demand	**5.8%**	

2015 projected REO demand by application



Rare Earths demand is expected to grow above-GDP rates over the medium term, driven by increases in demand from key sectors such as Rare Earths permanent magnets, auto catalysts and fluid cracking catalysts (FCCs).
These three markets are projected to account for around half of global Rare Earths demand by 2015.

By the end of the decade, it is projected that these sector demand growth profiles could create supply shortages in certain Rare Earths element markets, most likely in Neodymium/Praseodymium and to a lesser extent, Lanthanum.

Differing rare earth distribution makes benchmarking difficult, thereby not only considering the economic value of the separate size of TREO elements in the total resource, but also the share of higher valued heavy rare earths elements in the total resource. Moreover, companies are using different cut-off grades while deposits can also include other minerals/metals like uranium, base metals and fluoride. Also, potential environment complications should be considered, particularly in case of higher levels of thorium and uranium.

More specifically, comparisons of rare earth projects based on TREO and HREO can be misleading. Some Light REOs are low value, but some are high value and have high demand growth (neodymium and praseodymium).Some Heavy REOs are high value, but many are low value (gadolinium) or are produced in small quantities to special order, so do not have a regular market price holmium (Ho), erbium (Er), terbium (Th), ytterbium (Yb) and lutetium (Lu).

Metal equivalent grade is a better metric as it allows comparisons to be made between multi-commodity deposits containing different distributions of minerals with different values by connecting individual mining grades into a single, dominant mineral grade. This provides for relative ranking of projects.
Metal equivalent grade is widely used measure and common in other multi-commodity deposit environments.

U.S. Department of Energy Critical Materials Strategy

In December 2011, the US Department of Energy (DOE) published its second Critical Material Strategy report following up on the 2010 report which found that 5 rare earths metals (dysprosium, neodymium, terbium, europium and yttrium) and Indium are most critical in the short term for clean energy technologies.
The fundamental factors described o the 2010 Critical Metals Strategy still shape the role of rare earth metals and other materials in the energy economy, although three have been changed in material markets, technologies, research and development, investments and the geopolitical climate.

The 2011 Critical Material Strategy addresses the short-term through 2015 and medium-term (2015-2025) development of wind turbines, electric vehicles, solar cells and energy-efficient lighting.

Sixteen elements and related minerals were selected in the critically assessment. These include elements and related minerals selected for the 2010 Critical Metals Strategy, as well as two elements used in batteries (nickel and manganese).

Eight of the elements are rare earth metals, which are valued for their unique optical and catalyst properties.

The magnetic materials used in clean energy technologies are as follows:

- Electric vehicles (EV): lanthanum, cerium, praseodymium, neodymium, nickel, manganese, cobalt and lithium
- Magnets for EVs and wind turbines: neodymium, praseodymium and dysprosium, with samarium and cobalt as potential substitutes
- Phosphors for energy-efficient lighting: lanthanum, cerium, europium, terbium and yttrium
- Thin films for solar cells: indium, gallium and tellurium

The National Defensive Authorization Act, which addresses the increasing lack of availability of rare earth production and magnet-making materials for domestic military and defense applications, is currently on the Senate Legislative Calculation for fiscal year 2014. The Act proposes to authorize the National Defense Stockpile Manager to acquire several materials determined to be strategic and critical materials required “to meet the defense, industrial and essential civilian needs of the United States”. The materials to be acquired under the new Act are using up to US$ 41 million of the National Stockpile Transaction Fund.

In January 2014, it was disclosed that the Pentagon had temporarily waived laws banning the use of Chinese-built components in the U.S. weaponry in 2012 and 2013. The waive was for the purpose of keeping the US$ 392 billion F-35 Fighter program on schedule.
Specifically, Chinese built magnets were used during the last 24 months in violation of the import transactions in order to avoid further delays with the delivery of the jets.

An investigation has now been ordered into three instances involving the use of prohibited Chinese components in the F-35 program. The investigation, authorized by US lawmakers, is expected to be completed by March 1, 2014.

Europe's raw material diplomacy hampered by bureaucracy

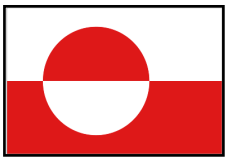
In June 2010, a study conducted by the European Commission (EC) for the EC facing shortages of 14 critical raw materials needed for mobile phones and energy technologies such as synthetic fuels. The 14 materials are antimony, Beryllium, cobalt, fluorspar, gallium, indium, germanium, graphite, magnesium, niobium, platinum group metals, rare earths, tantalum and tungsten.

However, the irony is that just as the EC was ringing the alarm bell on raw materials, China controlling more than 90% of world supply commenced to tighten its control over REEs by cutting export quotas and allowing just a handful of state-owned companies to dominate the market.

In January 2013, the EU initiated the EURARE project with the aim to identify potential sources of REEs in Europe and develop processes to secure supply to the European industry with the minerals it needs.

However, EURARE's set-up is not coming up to its mark, as from the 23 partner organizations 19 are represented by universities and government bodies, with a highly technical focus. The remaining 4 members are REE development companies, including Greenland Minerals and Energy, which owns the Kvanefjeld project and Tanbreez Mining, which owns the Kringlerne project.

These two projects in Greenland are by far Europe's most advanced projects located in the Ilimaussaq Complex in south Greenland, which have the potential to exceed China's REE production and could control at least 30% of the world's future supply by 2020 (see my article published in the Arctic Journal "EU dithers on critical metals http://arcticjournal.com/opinion/eu-dithers-critical-metals).



Greenland to emerge to the Western world's leading supplier of rare earths – production target 2020: 60,000 tonnes

Greenland, part of the Kingdom of Denmark, was granted Self-Rule in June 2009 following a national referendum in Greenland. Self-rule will unlock Greenland's rich mineral potential and the development of a mining sector will provide the means to secure full independence from Denmark (half of its public spending still funded by grants from Denmark – approximately US$ 540 million).

To date, two gigantic mineable deposits located in the **Ilimaussaq Complex** have been identified in Greenland:

- The **Kvanefjeld Project** is located in the Northern Ilimaussaq Complex located in the southwest tip of Greenland, 100%-owned by **Greenland Minerals and Energy** (**GMEL**), which company is publicly listed on the Australian Stock Exchange under the symbol GGG.
- The **Tanbreez (Kringlerne) Project**, 100% privately owned by **Tanbreez Mining Greenland ALS,** is located in southern Greenland between two major cities Narsaq and Qaqortoq.

Other notable REE projects are **Hudson Resources'** Sarfartoc and Tiqiusaaq projects, **Ram Resources**' Motzfeldt Project and **CGRG**'s Milneland Project.

Greenland has a Critical Rare Element Oxide (CREO) resource of 9.5 million tonnes. Most of the REE deposits in Greenland have CREO elements.

TREO Resources in Greenland

NAALAKKERSUISUT
GOVERNMENT OF GREENLAND

Locality	Geology	Tonnage	Grade	TREO resources	LREE	HREE+Y	Comments
		Mill.t.	%	kt	%	%	
Niaq (Karrat)	Hydrothermal	26	1,02	265	87,2	12,8	
Kuannersuit/Kvanefjeld	Alkaline rocks/Luvjarite	956	1,07	10.229	88,0	11,8	+ 0,4% U_3O_8 and 0,23% Zn
Sarfartoq	Carbonatite	14	1,51	216	96,0	4,0	Up to 25% Nd_2O_3 + Pr_2O_3 (ST 1)
Qeqertaasaq	Carbonatite	45	4,2 (Main Vein), 0,42 (Bulk) - average 1	450	99,0	1,0	Average 14,3% Nd_2O_3 (Main Vein)
Tikiusaaq	Carbonatite	N/A	4,00	200	99,0	1,0	Target resource
Motzfeldt Sø	Alkaline rocks/Syenite	N/A	1,08	N/A	81,5	18,5	+ 3,1% ZrO_2, 0,6% Nb_2O_5 and 0,08% Ta_2O_5
Milne Land	Fossil placer	5	1,00	50	87,3	12,7	+ 2% ZrO_2
Killavaat/Kringlerne	Alkaline rocks/ Kakortokite	4.000	0,49	19.600	73,0	27,0	+ 2% ZrO_2
Total		**5.046**		**31.010**			

CREO Resources in Greenland (Nd2O3+Eu2O3+Tb2O3+Dy2O3+Y2O3)

NAALAKKERSUISUT
GOVERNMENT OF GREENLAND

Locality	Geology	Tonnage	Grade of CREO	CREO resources	CREO of TREO	Comments
		Mill.t.	%	kt	%	
Killavaat/Kringlerne	Alkaline rocks/ Kakortokite	4.000	0,16	6.280	32,0	+2% ZrO_2
Kuannersuit/Kvanefjeld	Alkaline rocks/ Luvjarite	956	0,30	2.915	30,5	+ 0,4% U_3O_8 and 0,25% Zn
Sarfartoq	Carbonatite	14	0,60	86	40,0	Up to 25% Nd_2O_3 + Pr_2O_3 (ST 1)
Niaq (Karrat)	Hydrothermal	26	0,27	70	26,0	
Qeqertaasaq	Carbonatite	45	0,15	65	14,5	Average 14,3% Nd_2O_3 (Main Vein)
Milne Land	Fossil placer	5	0,21	11	21,0	+ 2% ZrO_2
Tikiusaaq	Carbonatite	N/A	N/A	N/A	N/A	
Motzfeldt Sø	Alkaline rocks/ Syenite	N/A	N/A	N/A	N/A	+ 3,1% ZrO_2, 0,6% Nb_2O_5 and 0,08% Ta_2O_5
Total		**5.046**		**9.428**		

Greenland can secure full future supply of critical raw materials to the European Union

In May 2012, the European Commission published a Mid-Term Review of the EU/Greenland Partnership 2007 – 2013. As the main conclusion the Commission said that it recognises the geostrategic importance of Greenland, both in terms of its location in the Arctic and in regards to the possibilities for exploitation of natural resource which it represents.

The EC is aware of the possibilities of Greenland to become a significant partner with the EU in the future, in regards to the specific raw materials known as Rare Earth Elements, and particularly Critical Rare Elements, which are of increasing importance to the European industry's competitiveness in the global market.

The current support to Greenland is allocated on the basis of the Council Decision, defining the framework for cooperation between the parties. The support amounts to € 25 million annually.
The aid modality is Sector Budget Support based on the Greenland Education programme (GEP), which is a 14-year strategy development by the Government of Greenland.

For the period 2014 – 2020 the European Commission will examine the opportunity to propose the renewal and revision of the current cooperation.

In June 2012, Antonio Tajani, Vice President of the European Commission, visited Greenland. At this occasion he said that the EU is willing to offer hundreds of millions Euros in REE development in exchange for guarantees that Greenland would not give China exclusive access to its rare earth metals, calling his trip "raw material diplomacy".

In January 2013, the European Union (EU) initiated the EURARE Project "Development of a sustainable exploitation scheme for Europe's rare earth deposits", with the aims to characterize the potential sources of REE minerals in Europe and to develop processes that will supply the European industry with the REE minerals they need

Russia can change the world's REE balance of power

There are **five main projects** in Russia on which there is information publicly available. The most extraordinary is near the city of Yekaterinburg in the Ural. There is a large occurrence of monazite concentrate that would be available to process the concentrate to produce 2,500 tonnes a year of total rare earth oxide (REO). Concentrate is chemical content in several lots differing in chemical content and was stored in 1956 in wooden boxes placed in metallic sheets. The boxes average 54% REOs, 22.2% phosphate, 7.8% thorium, along with uranium, zirconium and titanium oxide, plus oxides of iron, aluminium, silicon, calcium and magnesium.

The Russians have four possible sites for processing the concentrate. This could be between them produce lanthanum carbonate and oxides, cerium, neodymium, praseodymium, samarium terbium, dysprosium, europium, erbium, gadolinium and yttrium.
Production at one plant in the Sverdlovsk region will include manufacturing magnets. It is expected that production of magnets containing REE will be possible from 2016.

Potential mining operations are:

Tantor in Yakutia, is located well inside the Arctic Circle and with only three months a year not covered in snow. The temperatures range over the year from 13C in the summer to -50C in winter.
The resource of 150 million tonnes of REE is spread over three main deposits. The Russian documents show that it could be mined by open pit down to a depth of 70 metres with operations taking place between October and April.

Production would be possible from 2015 with annual output of 11,000 tonnes of TREOs, 9,000 tonnes of niobium oxide and 4,000 tonnes of titanium oxide. The transport options are northwards by road to a seaport or south by road to the railway at Lena.

The Lovozeskoe deposit is located near the northern city of Moermansk (180 km by highway) and is part of a group of mining and processing facilities geared to produce rare earth materials as well as niobium, tantalum, titanium and magnesium.
The area was discovered in the 1920s and magnesium production began in the 1930s. Rare earth "raw materials" production began in 1971. The potential production of REEs is 3,600 tonnes a year.

Two projects are located near the important Siberian city of Irkutsk. The Katuginskoe deposit, northeast of Irkutsk, is expected to produce REEs, niobium, tantalum and zirconium. Temperatures range from over 30C in the summer to about -60C in winter.
Infrastructure is being developed to serve the nearby Udkan copper project and 45 km away there is a coal deposit.
Preliminary assessments are that annual production could amount to 5,000 tonnes a year of TREOs, 4,000 tonnes of niobium, 300 tonnes of tantalum and 33,000 tonnes of zirconium.

Northwest of the city of Irkutsk is the Chukhukonskoe deposit which Russia believes the capacity to produce 9,000 tonnes a year of TREOs, 1,000 tonnes of niobium and 18,000 tonnes of magnesium.
Just 110 km away a hydro power plant is under construction.

Overview of major Western REE companies

January 31, 2014		Trading symbol		Share price Current	Share price Year-end 2013	Change in %	12 months prices H	12 months prices L	Total shares issued million	Market cap. million
Producers:										
US: (1)				*US$*	*US$*		*US$*	*US$*		*US$*
Molycorp		MCP	NYSE	4.85	5.46	-11	8.17	4.51	233.6	1,133.0
Australia: (1)				**A$**	**A$**		**A$**	**A$**		**A$**
Lynas		LYC	ASX	0.29	0.30	-3	0.70	0.26	1,961.2	558.9
Potential producers (2015-2020)										
US: (2)				*Cdn$*	*Cdn$*		*Cdn$*	*Cdn$*		*Cdn$*
Rare Element Resources		RES	TSX.V	1.70	1.65	3	3.60	1.24	47.6	80.9
Ucore Rare Metals		UCU	TSX.V	0.28	0.24	17	0.48	0.18	173.8	47.8
Canada: (2)				*Cdn$*	*Cdn$*		*Cdn$*	*Cdn$*		*Cdn$*
Avalon Rare Metals		AVL	TSX	0.60	0.58	3	1.34	0.48	109.9	65.9
Quest Rare Minerals		QRM	TSX.V	0.51	0.51	0	1.06	0.40	67.2	34.3
Australia: (2)				**A$**	**A$**		**A$**	**A$**		**A$**
Alkane Resources		ALK	ASX	0.43	0.34	26	0.83	0.25	372.6	160.2
Northern Minerals		NTU	ASX	0.20	0.19	5	0.29	0.10	407.0	79.4
Western Europe: (3)				**A$**	**A$**		**A$**	**A$**		**A$**
Greenland Minerals. and Energy	(Greenland)	GGG	ASX	0.19	0.21	-10	0.46	0.18	574.6	106.3
Tanbreez Mining	(Greenland)	private company								
				Cdn$	*Cdn$*		*Cdn$*	*Cdn$*		*Cdn$*
Tasman Metals	(Sweden)	TSM	TSX.V	1.28	1.08	19	1.65	0.51	61.0	78.1
South Africa:				*Cdn$*	*Cdn$*		*Cdn$*	*Cdn$*		*Cdn$*
Great Western Minerals		GWG	TSX.V	0.12	0.07	64	0.31	0.07	418.7	48.2
Frontier Rare Earths		FRO	TSX	0.37	0.39	-6	0.80	0.28	89.6	32.7

Molycorp Inc. is the only advanced material manufacturer in the world that both controls the **Mountain Pass** world class rare earth resource in **California**, USA and can produce high-purity custom engineered rare earth products to meet increasingly demanding customer specifications.

As globally integrated manufacturer, the Company produces a wide variety of specialized products from 13 different rare earths ((Light and Heavy), 5 rare metals (niobium, gallium, indium, rhenium and tantalum) and the transition metals (yttrium and zirconium).

With 27 locations across 11 countries, Molycorp produces rare earth magnetic materials through its Molycorp Magnequench subsidiaries, including neodymium-iron boron (NdFeB) magnet powders, used to manufacture bonded NdFeB permanent rare earth magnets.
Through its joint venture with Daido Steel and the Mitshibishu Corporation, Molycorp manufactures next generation, sintered NdFeB permanent rare earth magnets. The Company also markets and sells a line of rare earth-based water treatment products through its Molycorp Advanced Water Technologies subsidiary.

On December 19, 2013, Molycorp announced that the final unit of its multi-stage Cracking Plant at Mountain Pass has now completed commissioning and is operational.

On January 20, 2014, Molycorp announced that its **tantalum smelter facility** in Sillamac, **Estonia**, has been certified by the Electronic Industry Citizenstry Coalition (EICC) ad the Global e-Sustainability Initiative (GeSi) as compliant with the Conflict Free Smelter (CFS) program assessment protocol.

Tantalum is used widely in electronic capacitors in mobile phones, DVD players, video game systems and conjunctions, as well as in high-power engine components, chemical process equipment, nuclear reactors and missile parts. It also is widely used in surgical instruments and orthopaedic implants.

In the third quarter of 2013, Molycorp sold 3,620 metric tons, a 19% increase over the second quarter, at an average selling price of (ASP) of $ 41.18 per kilogram. Net revenue for the quarter was $ 149.1 million, up 9% from the second quarter of the year and generated a gross los of $ 18.5 million during the second quarter of 2013.

For the remainder of 2013, the Company estimates that its capital expenditures will total approximately $ 60 million compared to $ 68.9 million in the third quarter of 2013.

The Company reported negative cash flows from quarterly activities of $ 90 million during the first nine months of 2013, and had $ 173.9 million in cash and cash equivalents as of September 30, 2013.

Lynas began initial production at its operations in **Kwantan Malaysia** – known as the **Lynas Advance Materials Plant** (LAMP) in November 2013 and shipped its first batch of 144 tonnes of REO equivalents in the June quarter.

On September 30, 2013, Lynas provided an update regarding the LAMP in Malaysia. A series of work programs including equipment changes and materials handling to improve the capability of the cracking and leaching units of Phase I of the LAMP to operate continuously at nameplate production capacity, were planned in the second half of 2013. These programs do not involve significant capital investments and are being progressively implemented.

Commercial production of REO products from the LAMP remains at reduced volume until these work programs are concluded. Production is expected to build up through the December quarter with a target of completing all changes by the end of 2013.

Lynas commenced commercial production during the June 2013 quarter. Total production was 144 tonnes on an REO equivalent basis. Total tones produced for the September 2013 quarter were 253 tonnes on an REO equivalent basis and total tones stripped were 218 tonnes.

The average selling price increased to around US$ 22.70/kg REO (revenue bas) from around US$ 8.00 REO, largely due to a more favorable product mix that included neodymium/praseodymium product sales. The basket rice averaged US$ 21.80/kg on a China domestic basis during the quarter.

In September 2013, Lynas announced that it had executed a deed of amendment on the US$ 225 million Sijitz/JOGMEC loan facility such that the terms are and conditions of the facility are restricted to better suit the expected production and sales ramp up at the LAMP.

Raw materials are transported to Malaysia from the Company's **Mount World mine** in Western Australia. Lynas announced in June 2013 it would limit production to 11,000 tonnes per year at Mount Weld, one of the world's richest deposits of rare earths due to low demand and depressed REO prices.

Government permitting, de lays and legal challenges from environmental groups and local residents dogged the project for several years and LAMP still only has a temporary operation licence from Malaysian authorities, which was recently jeopardized due to a fatality at its plant in Malaysia.

Lynas' shares are trading close to a 52-week low according it a market capitalization of A$ 559 million compared to a value peak at close to A$ 5 billion in April 2011.

Alkane Resources is progressing with the preconstruction phases of its 100%-owned **Dubbo Zirconia Project (DZP),** near Dubbo**,** New South Wales, Australia**.** The DZP is based upon the large in-ground resources of metals zirconium, hafnium, niobium, tantalum, yttrium and rare earth elements.
The most significant improvements over the last six months have been with recoveries in the rare earths circuit. These have been dramatic, particularly in the heavy rare earths, which has improved by over 40% at no additional capital costs or operating costs.

At a base case throughput of 1 million tonnes of ore per annum, zirconium products are expected to account for 30% of annual revenue (15,800 tonnes), niobium 16% (1,970 tonnes), light rare earths 24% (4,665 tonnes), and heavy rare earths at 30% (1,309 tonnes).

Annual revenues for the DZP are expected to be around A$ 450-500 million based on a US$ to A$ exchange rare of 0.85, with operating costs at around A$ 200-220 million.

Development of the DZP is on track and the key now is the project approval in the middle of this year. The Environmental Impact Statement (EIS) has been through public exhibition which has closed on November 18, 2013 and the Company is working through the review process. The next important event is the appointment of a contract engineer to undertake the Front End Engineering and Design (FEED), which will be a detailed program over 6-9 months in 2014. This will allow a bankable capital cost to be determined, also to fine tune the operating cost and put together construction plans.

These will continue in parallel with the financing program to be staged over 2014, with the total financing package in place by the end of the year. As it will be staged, Alkane believes that it will be able to commence construction in Q4, 2014 and with production in the first half of 2016.

In the meantime, the **Tomingley Gold Project** (**TGP**) will come into production in February 2014 and provide a solid free cash flow of $ 20 million per annum. Total resources within the TGP are now 14.20 million tonnes grading 2.0 g/t gold for 901,000 ounces.

Northern Minerals is focused on development of rare earth elements, with a large and prospective landholding in Western Australia and the Northern Territory. The Company's flagship project is **Browns Range**, located in northern Western Australia, where it has a number of prospects with high value HRE in xenotime mineralization.
In particular, the mineralization includes high levels of dysprosium and yttrium, which are in short supply globally and expected to be increasingly sought.

In October 2013, following a 24,000 metre drilling program completed between April and July, Northern Minerals announced a substantial increase in the JORC compliant Mineral Resource Estimate at Browns Range. The upgrade represented a 165% increase in metal tonnes (of 17,584 tonnes TREO) from the initial Mineral Resource Estimate announced in December 2012 (10,500 tonnes TREO).

The increase took the total estimated Mineral Resource at Browns Range to 4.13 million tonnes grading 0.68% TREO comprising 28,084 tonnes contained TREO (using a cut-off grade of 0.15% TREO).
At the Wolverine deposit the total Mineral Resource is now estimated at 2.14 million tonnes at 0.86% TREO comprising 18,404 tonnes TREO.

Northern Minerals is advancing Browns Range toward production using a relatively simple and low cost processing flow sheet to produce a high-grade mixed REO.
Work on the Scoping Study and the inclusion of the October 2013 resource upgrade is now largely complete. Internal reviews are currently continuing, but the positive outcomes from the Scoping Study activities have strongly supported the Company moving ahead with the Pre Feasibility Study (PFS).

Northern Minerals' production target for Browns Range is by 2016.

Northern Minerals also has a HREO exploration program underway at the geologically similar **John Galt** and **Boulder Ridge projects.**

Rare Element Resources is advancing development of the **Bear Lodge Critical Rare Earth Project** located in northeast Wyoming, USA. Permitting and feasibility work on the project is currently underway.

On December 13, 2013, the Company announced that drilling completed during 2013 has expanded the resource at the **Whitetail Ridge deposit** by nearly 80%, resulting in the project-wide TREO increasing by 10%.
The project-wide Measured and Indicated resources increased to 6.8 million tons (15.2 million tons) at an average grade of 2.11% TREO, using a 1.5% cut-off grade, representing 1,043 million pounds (473 million kilograms) of contained TREO.
Drilling confirmed the HRE enrichment at Whitetail, which elevated europium, terbium, dysprosium and yttrium.

The expanded Whitetail resource will be incorporated into the project's overall mine plan as part of the Feasibility Study

Ucore Rare Metals is currently focusing its exploration activities on its **Bokan Mountain / Dobson Ridge property** in **Alaska** (United States), while exploring various options for advancement of its other properties.

In November 2012, the Company realised a Preliminary Economic Assessment (PEA), prepared by Tetra Tech on the Bokan property, which estimated a Net Present Value (NPV) of $ 77 million at a 10% discount rate and an Internal Rate of Return (IRR) of 43% based on a mine life of 11 years at a capital cost of $ 221 million.

On October 21, 2013, Ucore announced an upgraded resource estimate for the Bokan property which was prepared by Aurora Geoscience (Alaska). The base case renders an Inferred mineral resource of 2.0 million tonnes grading 0.61% TREO and Indicated mineral resource of 2.9 million tonnes grading 0.61% TREO, with a skew of approximately 40% HREO.

Avalon Rare Metals is focused on the development of rare metal deposits in Canada. Its 100%-owned **Nechalacho deposit**, **Thor Lake**, **North West Territory** (NWT), is exceptional in its large size and enrichment in the scarce heavy rare earth elements, key to enabling advances in clean technology and other growing high-tech applications.

With a positive feasibility study and environmental assessment completed, geological modelling of the resource continues and a new resource model will be incorporated into an updated mine plan.

Significant improvements have been made to the concentrated flow sheet and a promising new hydrometallurgical process has been developed to increase heavy rare earth recoveries and reduce the perceived rich marketing the specially enriched zirconium concentrate product.

This work will result in an updated technical report which is targeted for completion in Q1, 2014.
However, major challenge remains in securing the $ 1.5 billion in project financing needed to start building the Nechalacho project.

Quest Rare Minerals is focused on the advancement of its flagship **Strange Lake property** (rare earth, zirconium, niobium) in northeastern **Quebec** and the construction of a processing facility in Betancourt, Quebec.
The Company's ongoing exploration program led to the doubling of resource tonnage of the B-Zone deposit and in October 2013, Quest announced the results of a Pre-Feasibility Study (PFS) for this deposit. The PFS results show positive cash flows and a robust internal rate of return. With projected average annual REO concentrate production of 13,650 tonnes, Quest has the potential to become a significant long-term global supplier of HREE.

In addition, the Company has announced the discovery of an important new area of REE mineralization on its **Misery Lake project**.

Quest has calculated a number of process improvement
s for its planned processing facility in Betancourt, which will be part of its upcoming Feasibility Study (FS). These improvements include the production of heavy rare earths plus yttrium chloride concentrate in stead of oxide concentrates.

Strange Lake is projected to generate an average $ 1.047 billion of revenue per year comprised of 55.8% from the sale of HREE + Y concentrate, 17.3% from the sale of zirconium product, 12.9% from the sale of niobium product and 13.9% from the sale of light rare earth (LREE) concentrate.

The PFS shows a robust internal rate of return (IRR) of 25.6% pre-tax and 21.2% post-tax. The net present value (NPV) of the project pre-tax unlevered with a 10% discount rate is $ 2.9 billion and $ 1.8 billion post-tax. Total project construction capital costs are $ 2.57 billion based on a minimum mine life of 30 years.
Capital operating costs average $ 432 million per year based on $ 300 per tonne milled.

Average annual product output is a mixed HREE + Y oxide concentrate containing 2,100 tonnes of HREE oxide and 2,400 tonnes of yttrium oxide, 24,650 tonnes of ZrO2 contained in 3,200 tonnes of high purity niobium oxide and a mixed LREE double-sulphate concentrate containing 7,300 tonnes of LREE oxide equivalent.

Great Western Minerals Group ("GWMG") is a leader in the manufacturing and supply of rare earth element-based metals and metals alloys and holder of the low cost, high-grade critical rare earth **Steenkampskraal project** in **South Africa**.

In November 2013, GWMG announced that its new NI 43-101 compliant technological report and mineral resource estimate for Steenkampskraal shows a significant increase of tonnes in the Indicated category and the addition of the newly defined tonnes in the Measured category.
Total TREO Measured and Indicated resources in the in-situ and tailings increased 171% or 54,800 tonnes to 86,900 tonnes grading 14.36%.

On January 15, 2014, GWMG announced that it has completed a mini pilot test with its proposed process flow sheer with very successful results, which confirmed the results from laboratory scale testing. The Company now has a process flow sheer that is being engineered in its ongoing feasibility study, which remains on track for completion around the end of the first quarter of 2014.

Frontier Rare Earths is focused on the development of its flagship asset, the **Zandkopsdrift Rare Earth Project**, which is located in the Northern Cape Province of **South Africa** and is one of the largest undeveloped rare earth deposits worldwide classified under international resource reporting standards.
After Molycorp's Mountain Pass and Lynas' Mount Weld projects, the Zandkopsdrift B Zone has the highest TREO grade and the highest grade of high value HREO's of significant advanced deposits outside China.

With a TREO resource of close to 1.0 million tonnes already estimated in place, the resource at Zandkopsdrift is already considered by Frontier to a large enough to target supplying up to 20,000 tonnes per annum of separated REOs and to become one of the largest producers of high demand critical rare earths oxide ("CREOs"),

The highest value rare earth oxides, namely europium, terbium and dysprosium, are contained at elevated levels at Zandkopsdrift compared to several other deposits being evaluated elsewhere.
In addition, the low levels of thorium (225 ppm) and uranium (65 ppm) in both absolute and relative terms in Zandkopsdrift compare favourably to many of the more advanced rare earth projects worldwide and reduces the potential environmental complications that would arise in the event of mine development being undertaken at Zandkopsdrift.

In March 2012, Frontier filed a positive NI 43-101 compliant Preliminary Economic Assessment ("PEA"), in which the Net Present Value ("NPV") of the project was estimated to $ 3 billion with a capital cost, excluding contingencies of $ 910 million and a post tax IRR of 52.5%.
The PEA Report included a resource estimate for Zandkopsdrift of approximately. 43 million tonnes at an average grade of 2.2% containing approximately 950,000 tonnes Total Rare Earth Oxide ("TREO"), applying a 1% cut-off and of which 76% is in the Indicated resource category.

In December 2012, Frontier completed a definitive strategic partnership agreement with KORES for an initial 10% interest in Zandkopsdrift, including off-take rights for 10% of the rare earths production by KORES, for a paid cash amount of Cdn$ 23.78 million.

In Q3, 2013 individual consultants' reports for input to the Pre-feasibility Study (PFS) were completed and reviewed by Frontier. Significant process improvements were identified by ongoing feasibility study testwork and are planned to be integrated into the PFS and expected to materially improve current PFS cost estimates. Also value engineering and process optimization studies are underway in parallel with several areas of additional improvement already identified.

PFS flow sheet is expected to result in a high proportion of higher value CREOs and higher priority being produced, resulting in a basket price for Zandkopsdrift production at a current in-situ basket price of $ 36/kg.

The PFS is to be finalised after the current testwork on process improvements and completed in Q1, 2014.

Frontier has submitted an application to the Department of Mineral Resources ("DMR") in South Africa for a 30-year mining right for Zandkopsdrift. The time required for consideration, approval and issuance of a mining right in South Africa is typically 12-18 months and will include a review of the environmental impact assessment and environmental management program proposed for Zandkopsdrift.

Tasman Metals is a Scandinavian focused exploration company with extensive claim holdings in Sweden, Finland and Norway that are prospective for strategic metals, including REEs and iron ore.
Many REEs in the region were first discovered in Sweden, including cerium, erbium, holmium, lanthanum, scandium, terbium, thulium, ytterbium and yttrium.

Tasman's flagship project is the **Norra Kärr heavy rare earth and zirconium project**, was discovered by the Company in 2009. The project is located approximately 300 kilometres south of Stockholm.
Additional work is underway at the nearby **Yx Sjöberg tungsten project**, historically northern Europe's largest tungsten production.
In July 2013, Tasman Metals released an updated Preliminary Economic Analysis for the Norra Kärr deposit demonstrating a robust Net Present Value (NPV) of $ 1.46 billion and using a conservative metal price assumption. The PEA utilized an in-pit NI 43-101 compliant mineral resource with 41.6 million tonnes of pre grading 0.57% TREO (51% HREO/TREO and 1.7% zirconium in the Indicated category, as well as 16.5 million tonnes of ore grading 0.64% TREO (40% HREO/TREO) and 1.7% zirconium in the Inferred category.
At the estimated mining rate in the PEA of approximately 6,800 tonnes per year, this revenue provides for a 40-year mine life, though the deposit remains open at depth.

The PEA also estimates initial capital requirements of $ 286 million for mine construction and start-up working capital which includes a contingency of $ 42.8 million or 20%. Operating costs are very competitive and estimated at $ 10.93 per kg of mixed TREO concentrate output.

The majority of the Tasman's future revenue (over 85%) is expected to come from only 4 major elements that are referred to as the CREOs or critical rare earth elements. These include dysprosium (high temperature, high strength magnets), neodymium (high strength magnets), terbium (low power lighting) and yttrium (low power lighting and alloys).
Tasman is not reliant upon revenue from lower value light rare elements such as cerium and lanthanum and this does not compete directly with any existing operating projects in the Western world.

On December 12, 2013, Tasman announced to have initial preliminary negotiations with regard to a potential merger with Flinders Resources (FDR – TSX.V) by which Tasman may acquire all of the outstanding shares of Flinders, which owns 100% of the **Woxma Project**, a unique and strategic European **graphite project** in **central Sweden**, which has a rated capacity of 10,000+ tonnes per year.
The project is on target to be one of the first projects in the junior graphite including to begin production, scheduled for the third quarter in 2014.

Greenland Minerals and Energy ("GMEL") is focused on the development of its 100%-owned **Kvanefjeld Project**, located on the southwest tip of **Greenland**, and is recognised as the world's largest undeveloped multi-element occurrence of REE-uranium-zinc.

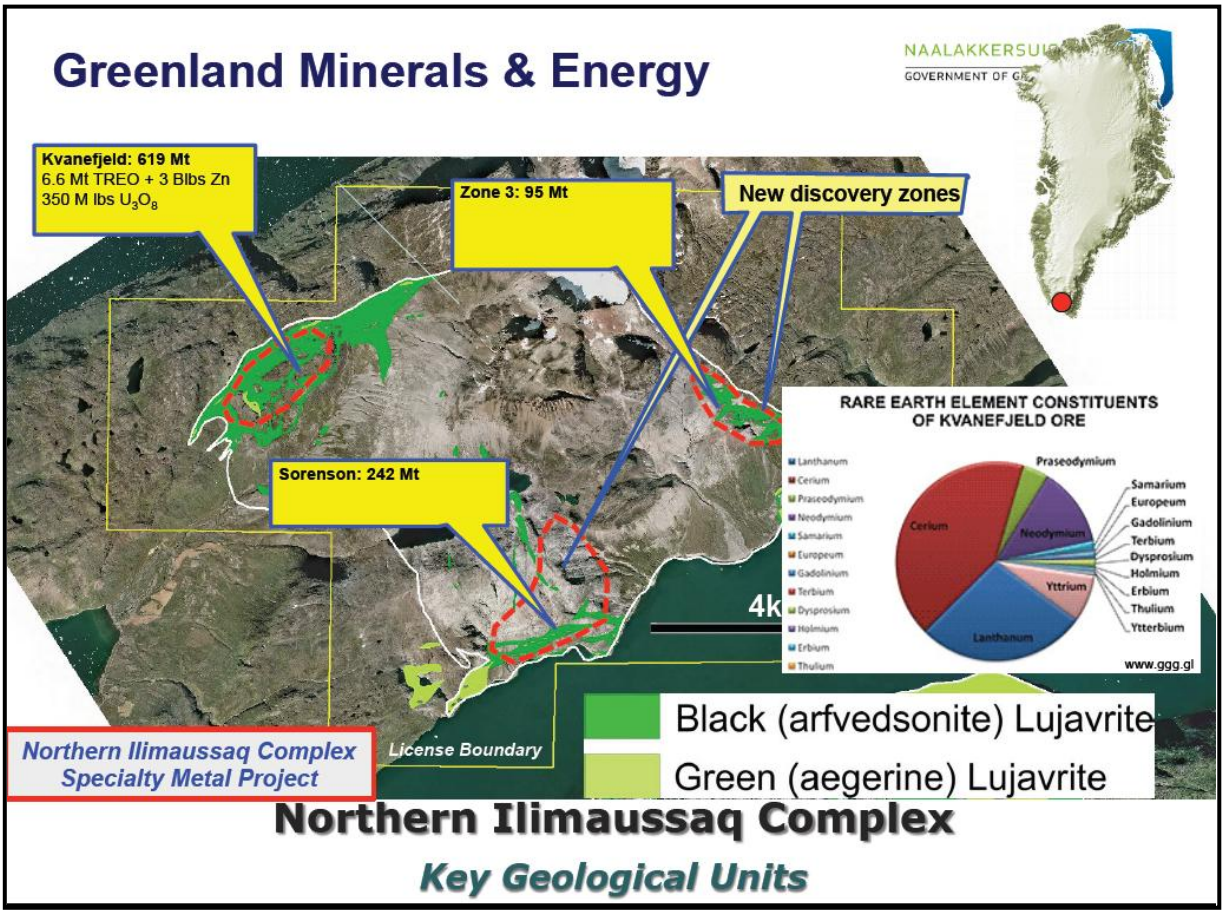
Greenland Minerals and Energy ("GMEL") is focused on the development of its 100%-owned **Kvanefjeld Project**, located on the southwest tip of **Greenland**, and is recognised as the world's largest undeveloped multi-element occurrence of REE-uranium-zinc.

In March 2011, GMEL announced a new JORC-compliant resource estimate being prepared by SRK Consulting which showed an increase of 162 million tonnes to a total resource of 619 million tonnes and an increase of the Indicated resource of 72 million tonnes to 437 million tonnes (at a 150 ppm U_3O_8 cut-off). The resource estimate includes 350 million pounds U_3O_8.

In March 2012 and June 2012, GMEL released the results of two other significant deposits (**Zone 2** and **Zone 3,** respectively) within the broader Kvanefjeld Project area, including a mineral resource of 244 million tonnes and 95 million tonnes, respectively.
As a result the total resource of the broader project area has increased to 956 tonnes.

Global metal inventory is now 575 million pounds U_3O_8, 10.3 million tonnes TREO and 2.24 million tonnes zinc (at 150 ppm U_3O_8 cut-off).

In October 2011, Greenland announced a technical breakthrough in the beneficiation of the REE-uranium minerals proposed to be mined at Kvanefjeld. That offers the potential to effectively increase the ore grades by more than 10 times through a simple beneficiation step. Continued development of the beneficiation process has led to major project developments being released in august and September of this year.



In August 2012, GMEL released an updated Prefeasibility Study based on a staged development strategy with an initial mill throughput of 3 million tonnes per annum expanding to 6 million tonnes per annum.

Key outcomes of the completed Mine and Concentrator Study include the REE-uranium mineral concentrate containing 14% total REO and 0.24% **U_3O_8**, which will be treated in a dedicated refinery **to produce 23,000 tonnes per annum of high priority mixed rare earth hydro-oxide and 1.1 million pounds U_3O_8.**
Unit costs of production are less than $ 6.40 kg TRE (after by-product credits), which will make Kvanefjeld one of the lowest cost REE producers worldwide.

With a targeted expanded annual production of 44,000 tonnes TREO by 2020, representing 20% of total world production, GMEL has the potential to become the Western world's largest REE-uranium producer.

The new Siumut-led government has been quick to identify Kvanefjeld as a priority project and signal a clear intent to remove the zero-tolerance policy toward uranium exploitation and replace it with regulatory frame work that allows uranium production from multi-element deposits (i.e Kvanefjeld).

By lifting the uranium ban in October 2013, GMEL will to apply for a mining licence in Q1, 2014. It will probably take two years, including radioactive minerals, to get all regulations and guidelines in place concerning security, safety, environment, transportation and health issues to receive the approval.

Tanbreez Mining – private company

The Tanbreez ore body (**Kringlerne**) has a low content of uranium and thorium and is a multi-element deposit with more than 4.3 billion tonnes of ore.

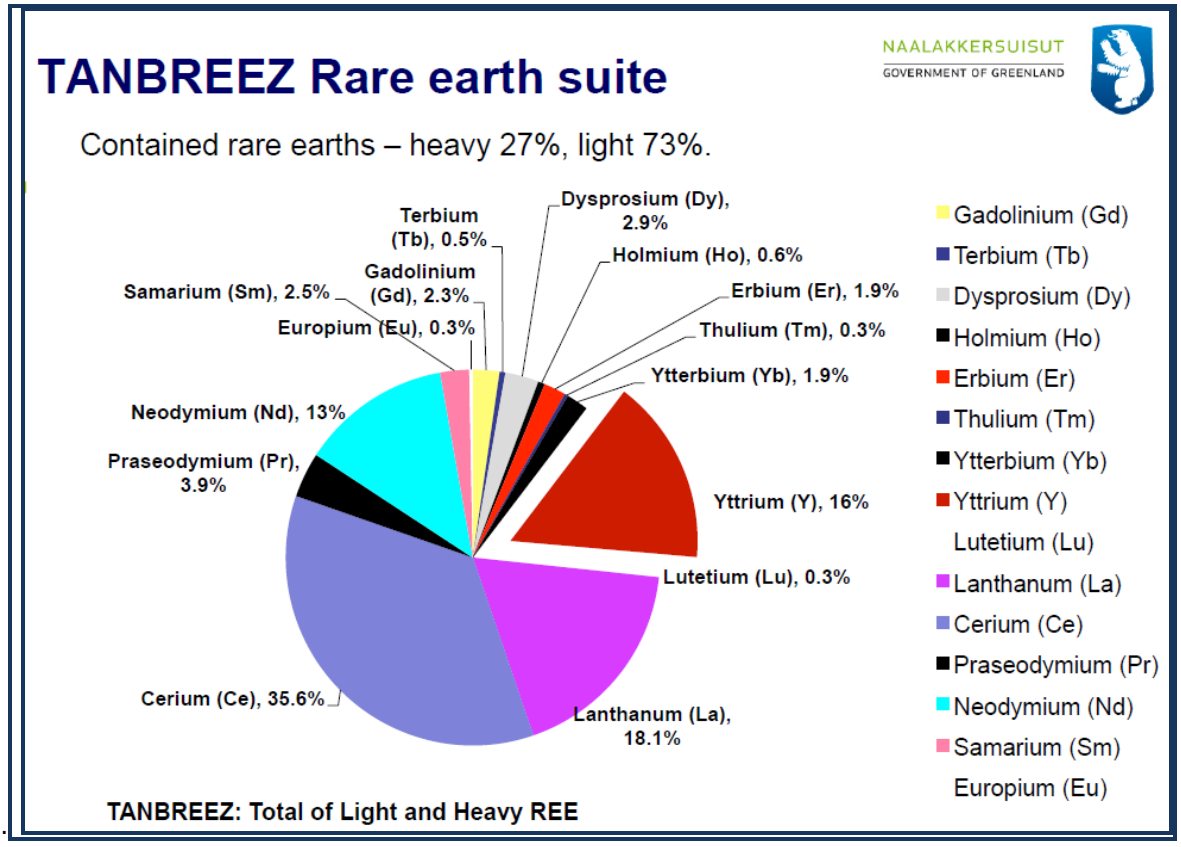
The Tanbreez Project is based on initially mining the ore body at a rate of 500,000 tonnes per year of ore from two open cut mines increasing to 3 – 5 million tonnes as the need arises.

Ore is mined and hauled to the treatment plant located on the adjacent fjord.
Initially 100,000 tonnes per year of eudialyte concentrate will be produced, together with 200,000 tonnes per year of feldspar concentrate and 200,000 tonnes per year of arfvedsonite.
Plans are to extend beyond this as markets develop. The estimated cost of design, construction, management, installation, etc. is US$ 186 million.

In March 2012, Tanbreez submitted an exploitation application including full SIA and EIA to the Greenlandic Government.
In November 2013, the Company, along with the government, conducted a series of public information meetings in South Greenland to explain the application.
The exploitation licence is expected to be issued in Q1, 2014.

Tanbreez' parent company Rimbal is exploring a large portion of the complex adjoining the Tanbreez development. This has resulted in some new exploration targets, including high-grade Eudialyte and the **Siorarsuit deposit**, which represents a big hydrothermal REE system (300 metres).
Detailed mapping and drilling will be the next step.

Tanbreez has indications of similar systems elsewhere on the licence.



Strategic Metals & Rare Earths Letter International, a publication by **Goldletter** International ● Postal address: P.O. Box 76988, 1070 KG Amsterdam, the Netherlands ● Marino G. Pieterse, Publisher and Editor ● Information and investment comments are independently and thoroughly researched and believed correct. No guaranty of absolute accuracy can be given however ● Investment decisions are fully made for own risk ● KvK 58330445 ● tel.:+31-72-7432437 ● www.goldletterint.com ● e-mail: info@smreletterint.com