



# *Greenland and Arctic Mineral Exploration and Exploitation Forum*

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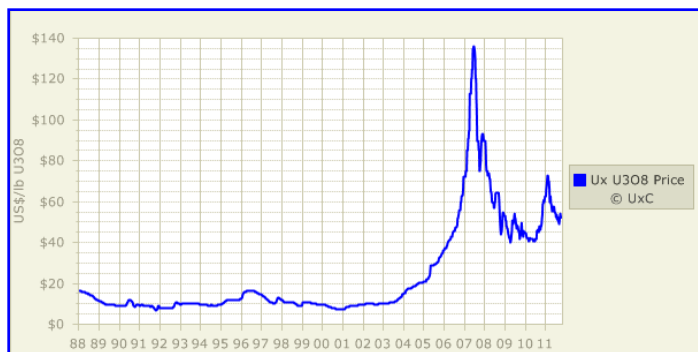
**Uraniumletter International and REE Letter International**

**Overview metal / oil prices (in US\$)**  
**gold price related to total metal market complex**

	Oct28 2011	June 30 2011	Year-end 2010	Change in %	June 30 2010	Year-end 2009	Year to Year 2010 / 2009 (change in %)	Year-end 2008	Year-to-year 2009/08 (change in %)	June 30 2008	Year-end 2007	Year-to-year 2008/07 (change in %)
Gold	1,744	1,506	1,410	24	1,244	1,104	28	865	28	932.75	837	3
Silver	35.16	34.69	30.45	15	18.59	16.99	79	10.79	57	17.85	14.76	-27
Palladium	666	761	797	-16	448	407	96	185	120	472	368	-50
Platinum	1,637	1,729	1,755	-7	1,532	1,475	19	912	62	2069	1532	-40
Copper	8,143	9,300	9,740	-16	6,513	7,346	33	2,902	153	8,775	6,676	-57
Lead	2,018	2,622	2,587	-22	1,690	2,395	8	949	152	1,735	2,532	-63
Nickel	19,880	23,100	24,925	-20	19,933	18,480	35	10,810	71	21,675	25,805	-58
Zinc	1,926	2,314	2,433	-21	1,760	2,570	-5	1,121	129	1,875	1,875	-40
Brent oil	109.96	111.98	92.59	19	74.62	77.20	20	41.76	85	139.30	93.89	-56
2008: low \$ 39.23 (5/12)												
high \$ 147.00 (7/7)												
Uranium (U3O8) spot price pre-Fukushima 2011 (High)	51.75	54.25	62.50	-17	41.75	44.50	40	53.00	-16	59.00	90.00	-41
pre-Fukushima 2011 (Low)	67.75											
April 6, 2009 (Low)						40.00						
Long-term contract price pre-Fukushima 2011 (High)	64.50	68.00	65.00	-1	58.00	60.00	8					
pre-Fukushima 2011 (Low)	73.00											

source: Goldletter International

## 15 year price graph



## 2 year price graph



### HISTORICAL OVERVIEW U308 PRICES

(in US\$ per pound)

<b>Old historic high</b>	<b>1979</b>	<b>43.00</b>
Year end (historic low)	2000	7.10
Year end	2003	14.45
Year end	2004	20.60
Year end	2005	36.25
Year end	2006	72.00
<b>June - (new historic high)</b>	<b>2007</b>	<b>135.00</b>
Year end	2007	90.00
Year end	2008	53.00
April 7 (low)	2009	40.00
June 30	2009	47.50
<b>Year-end</b>	<b>2009</b>	<b>44.50</b>
June 30	2010	41.75
<b>Year-end</b>	<b>2010</b>	<b>62.50</b>
pre-Fukushima	2011	67.75
October 29	2011	51.75

### HISTORICAL OVERVIEW BRENT-OIL PRICES

(in US\$ per barrel)

Average	1979	25.10
Average	1998	11.91
Year end	2000	26.00
Year end	2003	30.17
Year end	2004	40.25
Year end	2005	58.87
Year end	2006	60.14
Year end	2007	93.89
June 30	2008	139.30
<b>July 7 - (historic high)</b>	<b>2008</b>	<b>147.00</b>
December 5 (low)	2008	39.23
Year end	2008	41.76
June 30	2009	68.21
<b>Year-end</b>	<b>2009</b>	<b>77.20</b>
June 30	2010	74.62
<b>Year-end</b>	<b>2010</b>	<b>92.59</b>
October 28	2011	109.96

**Uraniumletter**  
INTERNATIONAL

## Why Uranium ?

Uranium is the most cost effective and environmental friendly large scale alternative for electricity generating as the only viable alternative to fossil fuels

Climate change :

***Kyoto protocol (1997) has paved the way for nuclear renaissance***

Growing public concern over global warming will lead to increasing dependence on nuclear-fuelled power plants as power utilities and governments strive to reduce greenhouse gas emissions of CO<sub>2</sub> from fossil fuel power stations.

Nuclear power is one of the cleanest methods of producing electricity because it doesn't produce greenhouse gas.

- **1 gram of uranium** produces the same amount of electricity as **3 million tonnes of coal**
- Burning 3 tonnes of coal leads to 7 tonnes of CO<sub>2</sub> emission

An average cost of US\$ 1.76 kWh for nuclear power compares to: US\$ 2.47 kWh for coal fired and US\$ 6.28 kWh for gas fired

**Nuclear Power provides 16% of the world's total electricity and 28% of European Union's needs, compared to:**

**fossil fuel 56%, water power 10%, wind 3%, biomass 3%**

- **France** receives 78% of its electricity from nuclear energy, **Belgium** almost 56%, **Sweden** close to 50%, **South Korea** 40%, **Switzerland** 40%, **Japan** 29%, **Germany** 28% and the **United States** 20%
- **China** receives 1.9% of its electricity from nuclear, **India** 2.2%, **Brasil** 3% and **Russia** 8%.



## Shortage in future supply is expected to keep uranium oxide price (U<sub>3</sub>O<sub>8</sub>) rising

Production :

### *Primary supply:*

International Nuclear's most recent "Scheduled Uranium production Forecast" shows world-wide uranium production increasing from current levels of approximately 107 million pounds U<sub>3</sub>O<sub>8</sub> to as much as **115 million pounds per year by 2010-2011**, before declining as some mines reach reserve depletion.

### *Secondary supply :*

Growing demand temporarily met by secondary supply, particularly from down-blending of Russian weapons' highly enriched uranium into commercial grade fueling being consumed in the United States (20 million pounds from 2009 to 2013).

Russia will not renew the HEU contract after 2013.

New agreement between Russia's **Fenex** with US utilities firm **Fuelco**, worth a reported \$ 1 billion. The deal will allow Fenex to supply uranium to US companies from 2014 to 2020.



# Looming Uranium shortage

- **All uranium consumed today goes into electricity generating**  
Uranium demand utility-like in nature and only modestly impacted by economic weakness
- **Nuclear power is competitive economically**
  - High capital costs of \$ 4 billion  
(2-3 times as high as coal-fired and 5-6 times as high as gas-fired)  
are offset by low ongoing fuel, operating and maintenance costs

An average cost of US\$ 1.76/kWh for nuclear power compares to:

US\$ 2.47/kWh for coal fired and US\$ 6.28/kWh for gas fired

Unlike the alternatives, nuclear plants are fairly insensitive to feedstock pricing, as the costs of uranium accounts for less than 10% of the cost of producing electricity

As **China** and **India** continue to industrialize, their need for low-cost base load Electricity will grow  
Combined, the two account for 60% of the 62 reactors currently under construction worldwide

# Future of uranium demand

- **Globally 440 nuclear power plants operating today with a generating capacity of 377 GWe**

annually consuming some 168 million pounds of uranium to produce 16% of the world's electricity

- **62 plants are under construction plus a further 155 planned and 341 more reactors proposed**

adding only those being built or planned would yield a dramatic 35% increase in the number of plants worldwide

As a result, the industry must source an **additional 59 million pounds of uranium per year** on an ongoing basis and likely within the next decade.

This represents a staggering 55% increase in mine output from today's levels.

Moreover, the startup of a new reactor causes a surge in demand as initial cores typically require 2-3 tonnes annual requirements during the ramp-up phase.

**WORLD NUCLEAR ELECTRICITY GENERATION CAPACITY** (as at September 13, 2011)

Country	Operating reactors	MWe net	% total electricity generation	Under construction	MWe net	Planned * MWe net	Proposed * MWe net	Uranium required 2011 in tonnes *
<b>North America:</b>								
USA	104	101,421	20	1	1,218	7	8,640	37,400
Canada	17	12,044	15	3	2,190	3	3,300	3,800
<b>Asia:</b>								
Japan	51	44,642	29	2	2,756	10	13,772	6,760
South Korea	21	18,785	35	5	5,800	6	8,400	-
Taiwan	6	4,927	21	2	2,700	-	-	1,350
China	14	11,271	2	26	28,710	52	59,990	123,000
India	20	4,385	2	6	4,600	17	15,000	49,000
Pakistan	3	725	3	1	340	1	340	2,000
<b>Western Europe:</b>								
France	58	63,130	75	1	1,720	1	1,720	1,100
Germany	17	20,339	26	-	-	-	-	-
UK	18	10,745	18	-	-	4	6,680	12,000
Sweden	10	9,399	35	-	-	-	-	-
Spain	8	7,448	18	-	-	-	-	-
Switzerland	5	3,252	40	-	-	-	3	4,000
Finland	4	2,741	33	1	1,700	-	2	3,000
Belgium	7	5,943	52	-	-	-	-	-
<b>Eastern Europe:</b>								
Russia	32	23,084	18	10	8,960	14	16,000	28,000
Ukraine	15	13,168	49	-	-	2	1,900	22,800
Slovakia	4	1,816	50	2	880	-	1	1,200
<b>Latin America:</b>								
Brazil	2	1,901	3	1	1,405	-	4	4,000
Argentina	2	935	7	1	745	2	773	740
Mexico	2	1,600	5	-	-	-	2	2,000
South Africa	2	1,800	5	-	-	-	6	9,600
Others	18	11,290	-	-	-	36	37,020	76,705
<b>Total</b>	<b>440</b>	<b>376,791</b>		<b>62</b>	<b>63,724</b>	<b>155</b>	<b>173,535</b>	<b>388,455</b>

68,971 tU = 81,338 tU3O8 (uranium oxide)

\* Future reactors envisaged in specific plans and proposals and expected to be operating by 2030

# No material impact from Fukushima disaster on future nuclear power demand

<b>COUNTRIES with strongest world nuclear power growth</b>							
Country	Nuclear electricity generating 2009 (billionkWh)	in % total electricity consumption	Operable reactors	Under construction	Planned	Proposed	Uranium required 2011 (in tonnes U)
China	65.7	1.9	13	27	50	110	4,402
India	14.8	2.2	20	5	18	40	1,053
Russia	152.8	17.8	32	10	14	30	3,757
USA	798.7	20.2	104	1	9	23	19,427
<b>Subtotal</b>			<u>169</u>	<u>43</u>	<u>91</u>	<u>203</u>	
<b>World total</b>			<b>443</b>	<b>62</b>	<b>158</b>	<b>324</b>	
<b>Top-4 in % world total :</b>			<b>38</b>	<b>69</b>	<b>57</b>	<b>63</b>	



# China

- **China** plans to **quadruple its nuclear output by 2020** and to **triple or quadruple output again by 2030**
- **China** currently produces **10GWe** through nuclear power (13 reactors), which supplies about 2.4% of the country's electricity
- **China** expects to produce **40 GWe of capacity by 2020** (26 reactors under construction), **200 GWe by 2030** (172 reactors planned or proposed) and **400 GWe by 2050**

The **US** uses 19 million tonnes of uranium per year to produce **101 GWe** from its **104 reactors**.

**China** will need more than **60 million pounds U3O8 per year** by 2030  
(based on current uranium requirements)

# China's power supply

- total 360 gigawatt per annum -

Coal	74,0%	70% transported by rail :
Oil	14,0%	- 24% of global rail traffic
Domestic Hydro-Power	8,2%	- 6% of world rail tracks
Nuclear energy	1,1%	
Natural gas	0,3%	Bottle necks in transport network will be
Others (solar, windpower)	<u>2,4%</u>	followed by regional power shortages
	100,0%	▼

China has committed US\$ 248 billion to rail expansion over the next 15 years

Environmental pollution problems



Call for a diversification away from coal



Plans to reduce coal's contribution to the power supply to around 60% by 2020

## Nuclear energy must replace the share of natural gas in **Russia's** energy balance

- **Federal Agency for Nuclear Power.**  
There is no alternative to the development of nuclear power in Russia, which must replace power generated using natural gas
- **Russia** has the world's largest reserves of natural gas and has become a crucial exporter, particularly for Europe
- **Russia's** reserves of coal and natural gas could be depleted in 50 years
- **Russia** is planning to build 42-58 nuclear power units for its own needs by 2030 and 40-50 units abroad in the next 30 years
- **Russia**, currently has 10 operational nuclear plants with 31 reactors, but it would need another 300 giga watts for new plants to cover a projected energy deficit in the next 30 years.
- With around 8% of the world's uranium output, **Russia** is planning to mine 60-70% of its uranium needs by 2015, with the remainder to come from joint ventures in former Soviet Republics, particularly **Kazakhstan**, which holds 18% of world's uranium reserves

## MIDDLE EAST going nuclear

- ▶ The **United Arab Emirates** (UAE), the world's third largest oil exporter, signed a \$ 40 billion agreement with a South Korean consortium headed by state-owned **Kepeco** to help constructing and operating 4 nuclear reactors capable of producing 5,600 MW of electricity.

Construction on the new reactors, the first in the region, will commence in 2012 and begin supplying power by 2017 and are expected to be fully completed by 2020

- ▶ The UAE anticipates domestic electricity demand to rise from 15,000 MW in 2008 to 40,000 MW in 2020 and has said it will need to build more nuclear plants down the road

The move to nuclear power generation will allow the UAE to export more of its oil resources to the world, as well as the electricity it generates to its neighbours.

# 11 countries account for 97% of global uranium production

## World uranium production by country

Country (in tonnes)	2010	2009	2010 in %
Kazakhstan	17,803	14,020	33
Canada	9,783	10,173	18
Australia	5,900	7,982	11
Namibia	4,496	4,626	8
Russia	3,562	3,564	7
Niger	4,198	3,243	8
Uzbekistan	2,400	2,429	4
USA	1,660	1,453	3
Ukraine	850	840	2
China	827	750	2
South Africa	583	563	1
Others	1,601	1,129	3
<b>Total</b>	<b>53,663</b>	<b>50,772</b>	<b>100</b>

source: WNA

## Growth leaders:

**Kazakhstan** - forecasts uranium production (100% ISL) to surge uranium to 27,000 tonnes by 2015-16  
- home to about 20% of global reserves

**Russia** - seeking to boost output to 20,000 tonnes by 2024  
- looking for strong exposure abroad **ARMZ**  
acquired 51.4% interest in Uranium One in 2010  
valued at US\$ 1.5 billion  
- acquisition of Mantra Resources focused on Tanzania  
valued at US\$ 1.6 billion

**Namibia** - expects to increase production by about a third, thanks to the development of the Paladin's **Langer Heinrich Deposit**

**Niger** - Areva's **Imouran Project** is expected to increase the country's uranium output to 5,000 tonnes U per year from late 2013

## Top-10 company producers account for 87% of global uranium production

<b>Company</b>	<b>tonnes U</b>	<b>%</b>
Cameco	8,758	16
Areva	8,319	16
KazAtomProm	8,116	15
Rio Tinto	6,293	12
ARMZ	4,311	8
Uranium One	2,855	5
Navoi	2,400	4
BHP Billiton	2,330	4
Paladin	2,089	4
Sopamin	1,450	3
Other	6,742	13
Total	53,663	100

## Top-10 largest producing Mines in 2010

Mine	Country	Main owner	Type	Production tonnes U	% of World
McArthur River	Canada	Cameco	Underground	7,654	14
Ranger	Australia	Rio Tinto	Open pit	3,216	6
Olympic Dam	Australia	BHP Billiton	Underground/by product	2,330	4
Rossing	Namibia	Rio Tinto	Open pit	3,077	6
Priargunsk	Russia	ARMZ	Conventional	2,920	5
Tortkuduk	Kazakhstan	Katco JV/Areva	ISL	2,439	5
Arlit	Niger	Areva/Somair	Open pit	2,650	5
Budanovskoye 2	Kazakhstan	Karatou JV/Kazatomprom	ISL	1,708	3
Betpak/Dala JV	Kazakhstan	Uranium One	ISL	1,701	3
Inkai	Kazakhstan	Inkai JV/Cameco	ISL	1,642	3
<b>Top ten total</b>				<b>29,337</b>	<b>55</b>
<b>World total</b>				<b>53,663</b>	<b>100</b>

source: World Nuclear Association

## World production by mine type

Mine type	in %
Conventional underground and open pit	54
In situ Leach (ISL)	41
By-product	5
<b>Total</b>	<b>100</b>

source: World Nuclear Organization

**Uraniumletter**  
INTERNATIONAL

# Market valuation of the world's major uranium producers (in US\$ million)

<i>in US\$ million</i>		October 30 2011	Year-end 2010
<b>Canada</b>	<b>Cameco</b>	8,869	15,866
	<b>Denison Mines</b>	623	1,248
<b>Canada/Niger</b>	<b>Areva Resources *</b>	2,885	5,969
<b>Australia</b>	<b>Energy Resources of Australia (68% Rio Tinto)</b>	872	2,165
<b>Namibia</b>	<b>Paladin Energy</b>	1,253	3,649
<b>Kazakhstan</b>	<b>Uranium One</b>	2,900	4,541
<b>United States</b>		none	none
<b>Total</b>		17,402	33,438

\* total mining assets calculated at 35% of total assets Areva

# Market valuation of the world's next generation uranium producers (in US\$ million)

		October 30, 2011	Year-end 2010
Canada	UEX	148	456
	Strateco *	61	137
United States	Uranium Energy *	259	421
	Uranerz	175	278
	Ur-Energy *	135	303
	Uranium Resources	121	315
Australia	Toro Energy	80	151
	Mega Uranium *	85	274
	Laramide *	62	133
	Alliance Resources *	46	177
Namibia	Extract Resources	1,938	2,333
	Deep Yellow *	141	379
	<b>Total</b>	<b>3,251</b>	<b>5,357</b>

*\* featured by Uraniumletter International*

## Geographical overview of the world's major uranium exploration and development companies

(market capitalization in million dollars as at September 30, 2011)

Canada (10)	Cdn\$	United States (10)	US\$	Australia (10)	A\$
Hathor Exploration	499	<b>Uranium Energy *</b>	199	Northern Minerals <b>x</b>	75
UEX	118	Uranerz	105	Toro Energy	73
<b>Strateco Resources *</b>	65	Peninsula Energy	99	Uranex NL <b>xx</b>	64
Fission Energy	57	<b>Ur-Energy *</b>	94	Encounter Resources	59
Asimut Exploration	33	Uranium Resources	64	<b>Alliance Resources *</b>	55
Kivalliq Energy	31	Royal Resources	43	Energy Metals	51
Pele Mountain <b>xx</b>	23	Wildhorse Energy	40	Energy & Minerals Australia	39
<b>Crosshair * x</b>	20	Strathmore Minerals	33	Rum Jungle Uranium	38
Titan Uranium	18	Energy Fuels	30		
Virginia Energy Resources	18	Black Range Minerals	17	<b>x also REE assets</b>	
<b>x also uranium assets in the US and vanadium assets in Canada</b>				<b>xx also uranium assets in Tanzania</b>	
<b>xx also REE assets</b>		<b>South Korea (1)</b>	<b>A\$</b>		<b>Cdn\$</b>
		Stonehenge Metals	15	<b>Mega Uranium * xx</b>	62
				<b>Laramide Resources *</b>	52
<b>Namibia (4)</b>	<b>A\$</b>	<b>Mongolia (1)</b>	<b>Cdn\$</b>	<b>xx also major uranium assets in Canada and Cameroon</b>	
Extract Resources	1,916	<b>Khan Resources *</b>	13		
<b>Deep Yellow *</b>	141				
Bannerman Resources	74				
Marenica Energy	13	<b>Peru (2)</b>	<b>Cdn\$</b>		
		Macusani Yellowcake	15	<b>Europe (6)</b>	<b>A\$</b>
Forsys Metals	46	Southern Andes Energy	9	<b>Greenland Minerals and Energy * x</b>	201
				Berkeley Resources (Spain)	58
<b>Tanzania (1)</b>	<b>A\$</b>	<b>Argentina (1)</b>	<b>Cdn\$</b>	Aura Energy (Sweden) <b>xx</b>	28
Uranex NL <b>x</b>	64	Wealth Minerals	10	<b>x major focus rare earth elements</b>	
<b>x also uranium assets in Australia</b>				<b>xx also uranium assets in Mauretania</b>	
					<b>Cdn\$</b>
<b>Botswana (1)</b>	<b>A\$</b>	<b>Guyana (1)</b>	<b>Cdn\$</b>	Mawson Resources <b>x</b> (Finland/Sweden)	67
A-Cap Resources	40	U308 Corp. <b>x</b>	36	<b>Tournigan Energy *</b> (Slovakia)	16
		<b>x also uranium assets in Argentina and Columbia</b>		Continental Precious Minerals (Sweden)	12
<b>Zambia (1)</b>	<b>A\$</b>			<b>x also gold-copper assets in Peru and Columbia</b>	
<b>African Energy Resources * x</b>	108				
<b>x major focus on coal assets in Botswana</b>					

## Major recent Merger & Acquisition activities

### October 2010

**Berkeley Resources** announced a possible takeover bid and interim funding agreement with **Severstal of Russia**, to be followed by takeover bid at A\$ 2.00 per share, valued at A\$ 284 million.  
Offer expired in January 2011.

### December 2010

**ARMZ** completes in June 2010 announced acquisition of controlling stake of 51.4% in **Uranium One** contributing its 50% interest in JV Akbastan; 49.67% interest in JV Zarechnoye (valued at \$ 907.5 million) and \$ 610 million in cash.

**Paladin Energy** acquires the uranium assets of **Aurora Energy**, a wholly-owned subsidiary of **Fronteer Gold**, valued at Cdn\$ 260.9 million in **Paladin** shares.

### March 2011

**CGNPC Uranium Resources** of China offers \$ 1.2 billion for **Kalahari Minerals**, which owns about 43% of **Extract Resources**.  
Offer withdrawn in May 2011.

### June 2011

**ARMZ** completes its takeover of **Mantra Resources**, focused on Tanzania, for A\$ 890 million in cash.

### July 2011

**Bannermann Resources** receives a highly conditional proposal from **Hanlong Mining Investment**, a subsidiary of the Chinese conglomeration Suchuan Hanlong Group, for A\$ 143 million in cash.

### August 2011

On August 30, 2011, **Cameco** makes hostile all cash take-over bid for **Hathor Exploration** at a price of Cdn\$ 3.75 per share ( 40% premium).  
Offer rejected by Hathor valued at Cdn\$ 520 million..

### October 2011

On October 19, 2011 **Bannerman** announced that due to Hanlong requiring additional due diligence to be undertaken, whilst it remains willing to consider a less conditional proposal from Hanlong, the Company will now focus on its existing discussions with other parties regarding developing joint ventures and alternative corporate arrangements

On October 24, 2011, **Hathor** and **Rio Tinto** have agreed that Rio Tinto will make an offer for Hathor for Cdn\$ 4.15 in cash per common share, representing a market value of Cdn\$ 578 million and a premium of approximately 11% to Cameco's unsolicited offer of Cdn\$ 3.75 per common share and a premium of 55.4% to Hathor's closing price of Cdn\$ 2.67 on the TSX on August 25, 2011.

# Rare Earth Elements Letter

## INTERNATIONAL

### ➤ 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:

lanthanum (La)	terbium (Tb)
cerium (Ce)	dysprosium (Dy)
praseodymium (Pr)	holmium (Ho)
neodymium (Nd)	erbium (Er)
promethium (Pm)	thulium (Tm)
samarium (Sm)	ytterbium (Yb)
europium (Eu)	lutetium (Lu)
gadolinium (Gd)	

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 modern technological products from hard disc drives to flat panel displays, iPods and magnetic resonance imaging (MRI) scans.

Many defense applications, including missile guidance systems, mine detection, anti-missile defense and communication systems, also require rare earths elements.

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

## 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%

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Note: Mt Weld distribution totals 98.9%, the balance is made up of Gadolinium, Holmium, Erbium and Yttrium oxides. Regular pricing information is not available for these metals.

Rare Earth Oxide	Mt Weld Distribution	2008	2009	2010	Q1 2011	Q2 2011	31/10/11
Lanthanum Oxide	25.50%	8.71	4.88	22.40	75.87	135.02	65.00
Cerium Oxide	46.74%	4.56	3.88	21.60	77.52	138.29	60.00
Neodymium Oxide	18.50%	31.90	19.12	49.50	130.23	256.15	250.00
Praseodymium Oxide	5.32%	29.48	18.03	48.00	119.65	220.08	220.00
Samarium Oxide	2.27%	5.20	3.40	14.40	72.75	125.60	103.00
Dysprosium Oxide	0.124%	118.49	115.67	231.60	412.90	921.20	2120.00
Europium Oxide	0.443%	481.92	492.92	559.80	719.20	1830.00	3800.00
Terbium Oxide	0.068%	720.77	361.67	557.80	717.60	1659.20	3020.00
<b>Av. Mt Weld Composition</b>		<b>14.87</b>	<b>10.32</b>	<b>31.35</b>	<b>92.84</b>	<b>173.20</b>	<b>127.78</b>

Note: Mt Weld distribution totals 98.9%, the balance is made up of Gadolinium, Holmium, Erbium and Yttrium oxides. Regular pricing information is not available for these metals.



# DOMESTIC CHINESE PRICE

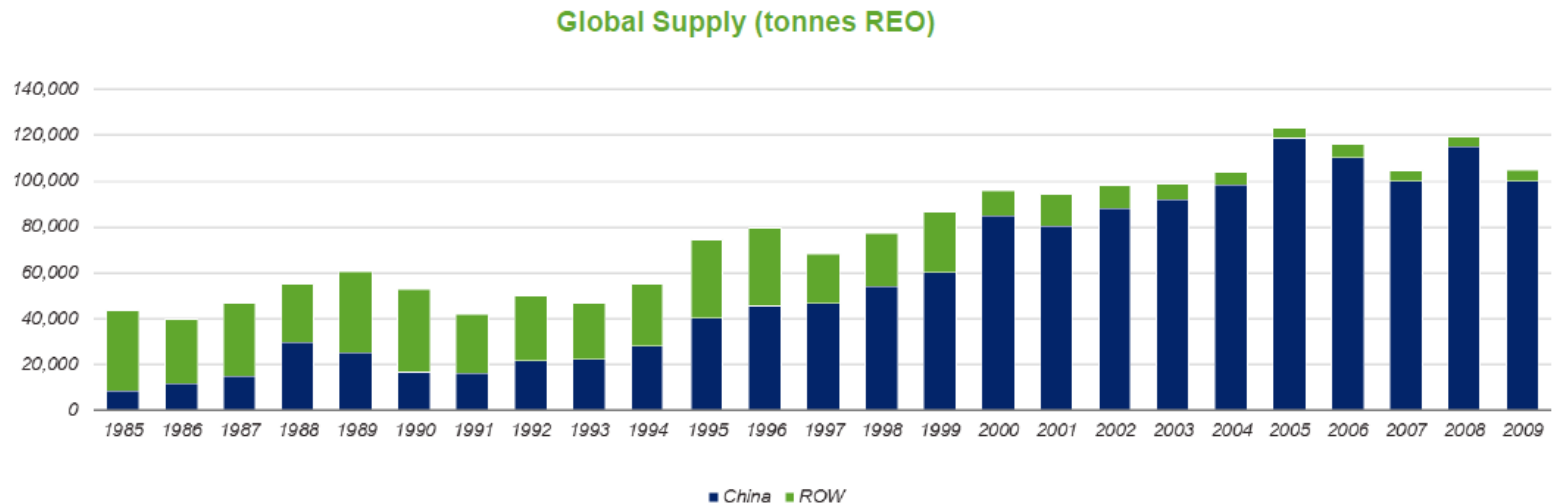
The table below shows the domestic Chinese price (the price inside China) for Rare Earths in US\$/kg; this price is related to the FOB price and can be calculated by taking FOB price less VAT, less export taxes from 15% to 25%), the export quota cost; there may be some timing differences between the movement of internal and external China prices. The average price shown is based on the Mt Weld distribution:

Rare Earth Oxide	Mt Weld Distribution	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sep 2011
Lanthanum Oxide	25.50%	16.77	23.02	25.93	24.77	23.75	23.44
Cerium Oxide	46.74%	24.39	28.96	30.86	28.64	25.00	24.69
Neodymium Oxide	18.50%	105.49	140.24	242.28	236.84	193.75	193.75
Praseodymium Oxide	5.32%	91.46	103.66	163.58	164.09	140.63	140.63
Samarium Oxide	2.27%	11.43	11.43	20.06	21.67	20.78	20.31
Dysprosium Oxide	0.124%	512.96	769.82	1929.01	2058.82	1562.50	1562.50
Europium Oxide	0.443%	960.37	1676.83	4475.31	4489.16	3250.00	3125.00
Terbium Oxide	0.068%	975.61	1448.17	3549.38	3482.97	2375.00	2375.00
Av. Mt Weld Composition		46.36	61.14	100.72	98.60	83.80	79.54

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## Rare Earths – Historical Supply

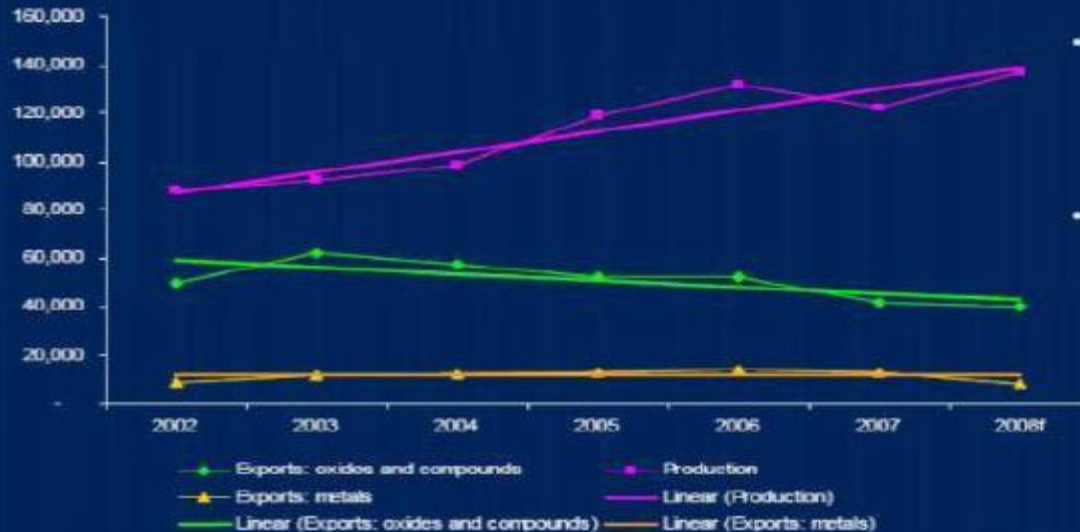
- ▶ China has dominated world rare earths supply since mid 1990's; currently controls 97% of supply
- ▶ No increase since 2005 despite steadily increasing demand
- ▶ China's supply dominance likely to continue



Source: Roskill (2010)

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## China: A widening gap between production and exports, 2002-2008



- Decreasing availability of REOs and rare earth metals to processors outside China
- Decline in exports of metals and alloys has not been as steep as exports of oxides and compounds but forecasts for 2008 show a significant decline.

Source: Global Trade Atlas, Roskill estimates

**Roskill**

EXPANDING THE WORLD'S KNOWLEDGE OF METALS AND MINERALS MARKETS

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## The world's top-10 REE companies (by market capitalization)

Company	Name project	Country project	Estimated annual production target (in tonnes)	From year	Market cap. (US\$ mln.)
Molycorp	Mountain Pass	US	19,000	2012 x	3,284
Lynas	Mt Weld	Australia	11,000	2012 xx	2,209
Avalon Rare Metals	Nechalacho	Canada	10,000	2017	351
Alkane Resources 1)	Dubbo	Australia	10,000	2014	340
Arafura Resources	Nolans Bore	Australia	20,000	2017	320
Rare Element Resources 1)	Bear Lodge	US	NA	NA	284
Great Western Minerals 2)	Steenkampskraal	South Africa	5,000	2013	247
Greenland Minerals and Energy	Kvanefjeld	Greenland	44,000	2016	233
Quest Rare Minerals	Strange Lake	Canada	NA	NA	203
Frontier Rare Earths	Zandkopsdrift	South Africa	20,000	2016	113
<b>Top ten total</b>			<b>139,000</b>		<b>7,584</b>

1) also major gold assets

x 40,000 (2014)

2) integrated RE producer

xx 22,000 (2013)

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## 2014 FORECAST SUPPLY ASSUMPTIONS

### SUPPLY SOURCES

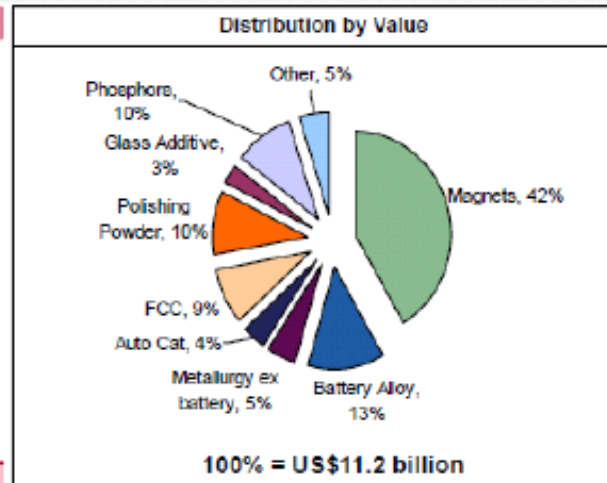
• Baotou	60,000t
• Sichuan	20,000t
• Ionic Clay Regions	30,000t
• Recycling in China	4,000t
<b>China Total</b>	<b>114,000t</b>
• Mount Weld	22,000t
• Mountain Pass	20,000t
• Others (India & Russia)	12,000t
• Recycling outside China	1,800t
<b>Outside China Total</b>	<b>55,800t</b>
<b>Grand Total</b>	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

### KEY UNDERLYING ASSUMPTIONS

- Baotou – 10% production increase 2010 / 2014
- Sichuan – full production quota to be utilised
- Ionic 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)

## 2014 GROWTH RATE AND DEMAND FORECAST BY APPLICATION

Application	Growth rate p.a. (%)	Demand (t)
• Magnets	12%	55,100
• Battery Alloy	15%	32,500
• Metallurgy ex batt	2%	12,700
• Auto catalysts	8%	12,200
• FCC	4%	24,900
• Polishing Powder	10%	28,000
• Glass Additives	0%	7,800
• Phosphors	8%	10,800
• Others	8%	6,100
<b>Total</b>	<b>9%</b>	<b>190,100t REO</b>



Member Companies on the Bloomberg Rare Earth Mineral Resources Index  
and their weightings (at Dec 21, 2010)

<b>Company</b>	<b>Ticker Symbols</b>	<b>Weighting (%)</b>
Molycorp Inc.	NYSE:MCP	16.4
Lynas Corporation Ltd.	ASX:LYC, PK:LYSCF	15.0
Avalon Rare Metals Inc.	TSX:AVL, AMEX:AVL	11.4
Rare Element Resources Ltd.	TSX.V:RES, AMEX:REE	11.2
Arafura Resources Ltd.	ASX:ARU, PK:ARAFF	10.0
Greenland Minerals and Energy Ltd.	ASX:GGG, PK:GDLNF	6.7
Quest Rare Minerals Ltd.	TSX.V:QRM, PK:QSURD	6.3
Frontier Rare Earths Ltd.	TSX:FRO	5.9
Alkane Resources Ltd.	ASX:ALK, PK:ALKEF	5.0
Tasman Metals Ltd.	TSX.V:TSM, PK:TASXF, F:T61	4.6
Great Western Minerals Group Ltd.	TSX.V:GWG, OTCBB:GWMGF	4.2
Navigator Resources Limited	ASX:NAV	2.1
Matamec Explorations Inc.	TSX.V:MAT, PK:MTCEF	1.2

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## Overview of major Rare Earths companies

September 30, 2011	Trading symbol		Share price		Change in %	12 months prices		Net shares issued million	Market cap. million
			current	Ult.2010		H	L		
<b>Rare Earths:</b>									
			US\$	US\$		US\$	US\$		US\$
Molycorp Minerals	MCP	NYSE	32.87	49.90	-34	79.16	26.02	83.9	2,757.8
Texas Rare Earths Resources	TRER	OTCQB	1.94	3.25	-40	10.00	0.80	34.5	66.9
			Can\$	Can\$		Can\$	Can\$		Can\$
Avalon Rare Metals	AVL	TSX	2.77	6.21	-55	9.65	2.6	102.6	284.2
Great Western Minerals	GWG	TSX.V	0.68	0.58	17	1.23	0.32	383.5	260.8
Rare Element Resources	RES	TSX.V	5.40	15.95	-66	17.85	5.27	44.1	238.1
Quest Rare Minerals	QRM	TSX.V	2.36	5.53	-57	8.88	2.24	61.7	145.6
<b>Frontier Rare Earths *</b>									
Frontier Rare Earths *	FRO	TSX	1.05	3.35	-69	3.75	0.91	89.6	94.1
Tasman Metals	TSM	TSX.V	2.16	4.40	-51	5.98	1.20	41.9	90.5
Stans Energy	HRE	TSX.V	0.59	1.30	-55	3.40	0.45	130.0	76.7
Ucore Rare Metals	UCU	TSX.V	0.47	0.67	-30	1.28	0.36	151.4	71.2
Commerce Resources	CCE	TSX.V	0.38	0.79	-52	1.08	0.21	130.6	49.6
Hudson Resources	HUD	TSX.V	0.51	1.64	-69	1.86	0.50	80.2	40.9
Midland Exploration	MD	TSX.V	1.50	1.90	-21	2.05	1.50	23.0	34.5
Matamec Explorations 1)	MAT	TSX.V	0.26	0.64	-59	0.70	0.24	118.2	30.7
Pele Mountain Resources 2)	GEM	TSX.V	0.17	0.33	-48	0.69	0.16	133.9	22.8
Eagle Plains Resources	EPL	TSX.V	0.26	0.64	-59	1.28	0.18	83.0	21.6
Bon Terra Resources	BTR	TSX.V	0.28	0.45	-38	0.71	0.11	68.4	19.2
Quantum Rare Earth Dev.	QRE	TSX.V	0.16	0.50	-68	0.72	0.16	80.6	12.9
Rare Earth Metals	RA	TSX.V	0.16	0.40	-60	0.50	0.16	76.7	12.3
Silver Spruce Resources 3)	SSE	TSX.V	0.08	0.20	-60	0.36	0.07	106.6	8.5
Paget Minerals	PGS	TSX.V	0.11	0.21	-48	0.35	0.11	63.0	6.9
Bohler Resources * 4)	BRU	TSX.V	0.17	0.52	-67	0.58	0.17	36.0	6.1
Canadian Int. Minerals	CIN	TSX.V	0.14	0.62	-77	0.78	0.13	38.1	5.3
Alix Resources	AIX	TSX.V	0.15	0.22	-32	0.30	0.14	26.3	3.9
Cache Exploration	CAY	TSX.V	0.16	0.32	-50	0.45	0.15	21.2	3.4
Kirrin Resources *	KYM	TSX.V	0.05	0.15	-67	0.16	0.05	46.5	2.3
Int. Montoro Resources *	IMT	TSX.V	0.04	0.14	-71	0.18	0.04	54.9	2.2
Electric Metals	EMI	TSX.V	0.04	0.16	-75	0.26	0.04	48.0	1.9
			A\$	A\$		A\$	A\$		A\$
Lynas	LYC	ASX	1.09	2.06	-47	2.70	0.86	1,713.8	1,868.0
Alkane Resources * 5)	ALK	ASX	1.14	1.00	14	2.73	0.44	269.3	307.0
Arafura Resources	ARU	ASX	0.57	1.48	-61	1.79	0.46	368.0	209.8
Greenland Min. and Energy * 6)	GGG	ASX	0.49	1.20	-59	1.41	0.48	410.4	201.1
Northern Minerals 2)	NTU	ASX	0.43	0.41	5	1.08	0.28	175.0	75.3
Metallica Minerals	MLM	ASX	0.29	0.30	-3	0.52	0.21	140.3	40.7
Globe Metals and Mining 2)	GBE	ASX	0.17	0.33	-48	0.51	0.16	223.8	38.0
Gippsland x	GIP	ASX	0.03	0.05	-40	0.07	0.02	812.7	24.4
Kimberley Rare Earths * 7)	KRE	ASX	0.12	0.20	-40	0.24	0.10	125.6	15.1
Hastings Rare Metals	HAS	ASX	0.17	0.37	-54	0.42	0.13	58.5	9.9
Ram Resources *	RMR	ASX	0.01	0.03	-67	0.04	0.01	954.9	9.5
1) also gold and base metal assets									2) also uranium assets
3) also uranium and gold/silver assets									7) listed as at May 18, 2011
5) also major gold assets									4) also gold assets
									6) also major uranium assets
* featured as Special Situation									

## *Self-rule will unlock Greenland's rich mineral potential*

- ▶ Greenland, the world's biggest island, has had "Home rule" since 1979, and "Self Rule" since June 21, 2009, which means that the country has assumed the political decisions and competences that were previously issued from Denmark.  
Under "Self Rule", Greenlandic is the nation's official language.
- ▶ Greenland has 57,000 inhabitants, of which approximately 15,000 live in the capital Nuuk.
- ▶ Greenland is part of the Danish Kingdom and the two countries are still united on affairs concerning foreign and defence policy, currency, the police and the courts.
- ▶ The inland ice, which is up to 3 km thick covers some 80% of Greenland – the ice-free zone around this area is up to 300 kilometres wide and covers an area of 410,000 km<sup>2</sup>, which by comparison is more than Germany's 357,000 km.
- ▶ Greenland's GNP approximates US\$ 1,000 million with a further US\$ 400 million annually received as subsidies from Denmark. The island's exports, amounting to US\$ 250 million, derive mainly from fishing and related industries. Other prevailing industries are trade service, construction, tourism and mineral exploration.

## *Greenland's mineral potential driven by REEs and uranium*

On January 31, 2010, the Mineral Resource Act approved by the government of Greenland came into effect. The step is considered to be a key milestone for Greenland on its path to self-rule.

There exists a general acceptance within Greenland that the mining industry holds the key to the country's future economic stability and growth.

The new era of self-rule will witness increased potential revenue from the untapped rich mineral wealth potential in Greenland.

## History of mining and exploration in Greenland

The most important mine in recent times was the Maarmorilik mine, which produced zinc, lead and silver during the period from 1973 to 1990.

In total more than 20 different mining operations are known from the last 150 years.

The period since 1990 has been the first for many years with no active mines operating in Greenland. This was one of the reasons why the Mineral Resources Act was changed in 1991 in an attempt to attract investment from renewed mineral exploration.

- ▶ In 1998, when the Bureau of Minerals and Petroleum (BMP) took over from the Danish authorities, the mineral industry in Greenland had a decline in the number of licences, but also the general interest in exploring in Greenland and the mineral potential.  
The trend continued to the all-time low in 2002.
- ▶ In 2002, the Bureau of Minerals and Petroleum (BMP) designed a marketing strategy where the Greenland mineral potential was to be promoted on a systematic continuous basis.
- ▶ From 2002 and onwards the tendency of licences issued, combined with relinquishments has resulted in a growing number of granted mineral licences.  
From 17 exclusive licences in 2002, the number has grown to more than 70 in 2010, and in April 2011 the number was grown to 94 exclusive licences including current applications.  
In the same period the number of non-exclusive prospecting licences went from 6 in 2002 to 20 in April 2011.  
Along with the growth in numbers of licences the activities also grew.
- ▶ From 2003 to 2010 the Government of Greenland has issued 4 exploitation licences for mining activities. One is in production (Angel Mining – lead and zinc), Angel Mining (Gold), one is waiting for higher market prices (Quadra FNX Mining – molybdenum) and one is temporarily closed (Minelco – industrial mineral olivine).
- ▶ As the number of drillings rose in the years 2002 to 2010, the exploration expenditures spend exploring Greenland has followed to more than DKK 524.5 million (US\$ 99 million)  
On top of this comes the amount spent on in mine construction and preparation to begin the exploitation.

## Overview of Uranium and Rare Earths companies active in Greenland

October 30, 2011		Trading symbol		Share price		Change in %	12 months prices		Net shares issued million	Market cap. million	
		current	Ult.2010	H	L		local	US\$			
<i>Location of listing</i>											
<i>Australia:</i>				A\$			A\$	A\$		A\$	US\$
Greenland Minerals and Energy	GGG	ASX	0.53	1.20	-56	1.41	0.42	410.4	217.5	233	
Ram Resources	RAM	ASX	0.006	0.03	-80	0.01	0.03	954.9	5.7	6	
<i>Canada:</i>				Cdn\$			Cdn\$	Cdn\$		Cdn\$	US\$
Hudson Resources	HUD	TSX.V	0.55	1.64	-66	1.86	0.40	80.2	44.1	45	
<i>Denmark:</i>				DKK			DKK	DKK		DKK	US\$
NunaMinerals	NUNA	OMX	142	301	-53	332	130	1,292	183	35	

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*the international independent information and advice bulletin for gold and related investments*

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