RM Research

24th September 2012

ASX Code: GGG

Speculative Buy

Medium term target A$0.90-A$5.0

UPDATE

Greenland Minerals and Energy Ltd

GGG ticking the boxes: Positive Pre-Feasibility, new Zone 3 resource... Process Flow Sheet Optimisation.

Capital Structure	
Sector	Materials
Share Price (A$)	0.35
Fully Paid Ordinary Shares (m)	416.4
Perf Opt (ex $1.75 exp 8/13) (m)	7.0
Perf Opt ($1.5/$1.85, $2.5 5/14) (m)	16.45
Empl Opt (ex $0.25, 3/13) (m)	0.75
Market Cap (undil) (A$m)	145.7
Share Price Year H-L (A$)	0.65-0.34
Approx Cash (A$m)	3.4

Directors & Management	
Michael Hutchinson	Chairman
Roderick McIllree	Managing Director
Dr John Mair	Exec Director
Jeremy Whybrow	Exploration Director
Simon Cato	Exec Director
Tony Ho	Non-Exec Director

Major Shareholders	
Directors, Manag, Employ	15.5%
Citigroup Noms Aust P/L	14.8%
JP Morgan Noms Aust P/L	12.8%
HSBC Custody Noms	9.6%
Quadrant Capital (NY)	5.1%

Analyst	
Guy T Le Page	+61 8 9488-0800

Share Price Performance

Key Milestones...giant leap forward

Key milestones flagged in the last report (**RMR**, 16/4/2012) and in particular the robust project economics, continue to be supported by impressive results from the Pre-Feasibility study. Key developments for **GGG** in the last few months include:

- Publication of the Kvanefjeld Pre-Feasibility Study which indicates the potential for a cost competitive, long life, strategic mining asset producing uranium and rare earths generating a pre-tax NPV > US$4b;
- Zone 3, (satellite of Kvanefjeld), has added 63Mlb U_3O_8 and 1.11mt TREO to JORC Resources which now stands at > 575Mlbs and 10.3Mt TREO;
- Advances in beneficiation test-work that produces a high-grade mineral concentrate where 82% of the REE are concentrated in about 8% of the original mass using a much simplified flotation circuit confirmed in recent trials;
- Announcing a commercial and legal resolution with JV partners Westrip/Rimbal that requires a more modest cash component than previously flagged to move to 100% ownership of the Kvanefjeld Project; and
- Recent share market weakness and a downturn in commodity prices across the board has seen a series of project delays announced and risk on-risk off volatility – the project delays are setting the stage for a serious rebound in the medium term, especially for uranium.

Definitive Feasibility Study kicks into gear

So with these critical penultimate milestones completed successfully, attention will now turn to the timing of the DFS and the securing of the exploitation/mining license that in turn will hinge on a politically acceptable Environmental and Social Impact Assessment. Based on **GGG's** track record so far and the manner in which it has professionally delivered each milestone, **RM Research** has high confidence that the company will navigate its way through the regulatory process and deliver for its shareholders.

Kvanefjeld could rival the giant Olympic Dam deposit

As flagged in our last report, the Kvanefjeld system could ultimately rival Olympic Dam (**BHP Billiton**) in size with sufficient JORC Resources to potentially sustain a 50+ year operation.

Price Catalysts

Investors are now seeking guidance from **GGG** on how the project will be financed. **RM Research** estimates that significant leverage is possible if **GGG** can sell down 30% or more of the project and debt fund about 30-40% of the capital cost. On a fully diluted basis valuation approaches A$7/Share. We are maintaining a short-term share price target of A$0.90 with a medium term target A$5.0 if **GGG** can achieve a suitable financing structure. As the project moves closer to commissioning and with the emphasis moving to cash flow based valuations **GGG** may ultimately trade well in excess of this level in the longer term.

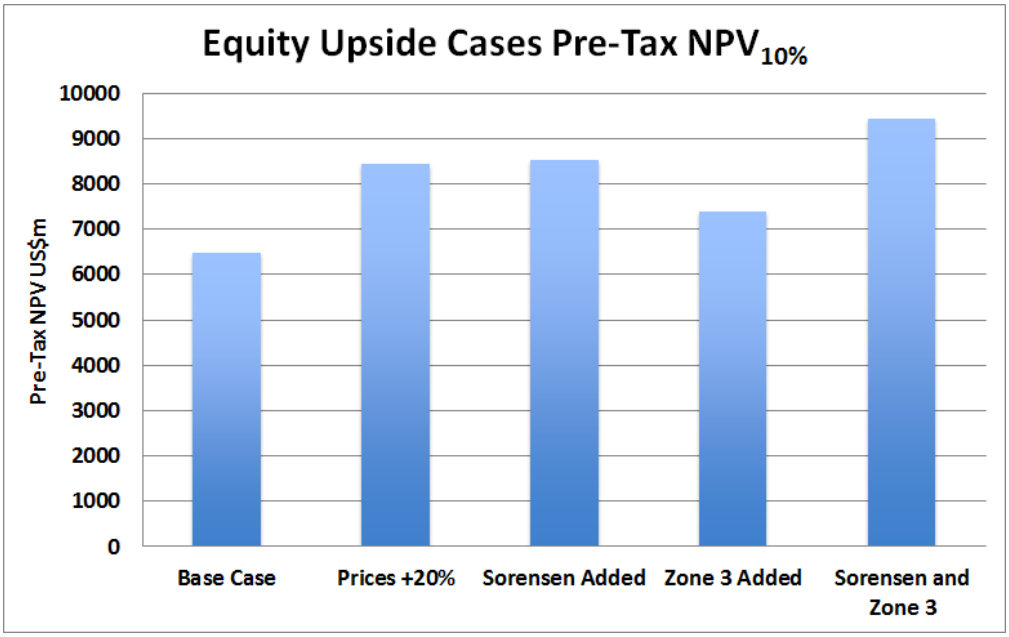
Action and Recommendation

RM Research retains its **Speculative Buy** rating on **GGG.**

INVESTMENT CASE

Pre-tax NPV estimates are north of $6 billion

POSITIVE PRE-FEASIBILITY INDICATES VERY ROBUST ECONOMICS: **RM Research** modelling indicates a base case valuation of over $6 billion, significant leverage to uranium and rare earth prices and value accretion from bringing Sorensen and Zone 3 into the schedule. Including all resources **RM Research** can see valuations north of $8 billion longer term.



Despite defining a overall project inventory of 956Mt there still remains resource upside

GIANT WORLD CLASS REE + URANIUM RESOURCE AND STILL UPSIDE: Indisputably world class, Kvanefjeld just keeps on getting bigger. The Ilmaussaq Complex, encompassing Kvanefjeld, Sorensen, Zone 3 and Steenstrupfjeld underpins a resource approaching a billion tonnes at roughly 270ppm U_3O_8 and 1.08% TREO. **RM Research** can ultimately see several billion tonnes of resources supporting a mining operation for many decades to come.

RM Research believes the project is incredibly leveraged to project expansion or increased scale and modest commodity price increases...

LEVERAGE TO REE AND URANIUM PRICES: Our cash flow analysis suggests a 20% lift in rare earth and uranium prices would drive NPV_{10} calculations past A$8b an increase of 35% on the base case. As **GGG** moves the project closer to production underlying valuations and the share price will start to reflect these cash flow valuation methods.

Stage	# of companies	43-101/JORC EV/lb U_3O_8
Producer	6	$4.45
Developer	4	$3.62
Feasibility	9	$0.44
Pre-feasibility	8	$0.85
Exploration	30	$0.62
All Categories	**57**	**$1.09**

PEER ANALYSIS - MISPRICING: **RM Research** believes the market is discounting **GGG** due to the various issues that have plagued it in the past (ownership, Greenland regulatory issues, complex metallurgy, expensive development cost). As these issues are being dealt with we expect the companies underlying multiple (currently A$0.25/lb) to approach its peers, at A$ 1/lb requiring an uplift of 400%, or $1.50/share.

Consolidated project ownership should see a re-rating of Greenland Minerals and Energy

CONSOLIDATED PROJECT OWNERSHIP: with **GGG** moving to 100% ownership and with the uncertainties surrounding the JV partner being put to rest, **RM Research** expects the market to re-rate the Company. Taking a 100% ownership proposition to a potential strategic partner should provide important negotiation leverage and see good value extracted for shareholders.

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COMPANY OVERVIEW

Greenland Minerals and Energy Ltd ("**Greenland Minerals and Energy**", "**GGG**" or "the Company") (ASX: **GGG**) is an exploration and development company focusing on the Kvanefjeld rare earth-uranium-zinc deposit in southern Greenland of which it currently holds a 61% JV interest. The other 39% interest in Kvanefjeld is held through a joint venture with Westrip Holdings Limited, a UK domiciled private company. **GGG** have recently announced a resolution of past disputes and commercial terms to allow **GGG** to move to 100% ownership.

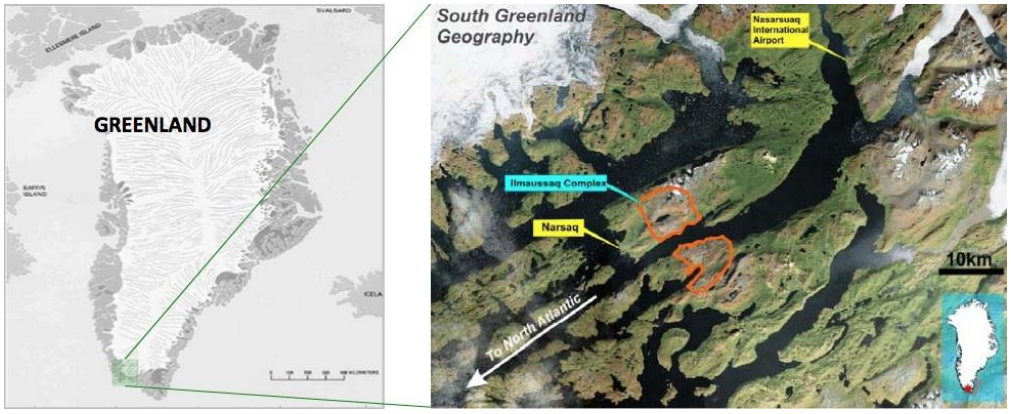


FIGURE 1: Location of the Ilmaussaq Complex in Southern Greenland, centre of **Greenland Minerals and Energy's** activities (*source*: **Greenland Minerals and Energy** Presentation, September 2012).

Kvanefjeld is one deposit within a larger geological unit called the Ilmaussaq Complex located not far from the southern tip of Greenland near the town of Narsaq. In addition to Kvanefjeld the wider project area also includes Sorensen (Zone 2), Zone 3 and Steenstrupfjeld deposits.

FIGURE 2: Detailed regional view of the Ilmaussaq Complex illustrating the project area and the 4 current zones of interest (*source*: **Greenland Minerals and Energy** Presentation, September 2012).

The broader project area encompasses an area of 7km x 8km or 56 square kilometres

GREENLAND

Greenland is an autonomous country within the Kingdom of Denmark that holds the right to exploit its mineral and hydrocarbon resources. While the country is still reliant on grants from Denmark, the development of its resources is seen as a natural way to establish fiscal independence.

The current elected government has made great strides in overturning a previous resistance to uranium mining. The exploration license issued in 2010 was issued with the inclusion of uranium and **GGG** has consistently maintained that the uranium and rare earths are co-mingled and therefore must be co-processed.

The Company now has the appropriate context in which to apply for an exploitation license (mining license) to produce uranium as a by-product of a multi-commodity operation. The key to securing this license will be politically acceptable Social and Environmental Impact Assessments.

The preparation of benign Social and Environmental Impact Assessments will be critical to secure mining rights

GEOLOGY AND RESOURCES

At Kvanefjeld, mineralization is hosted in a rock called lujavrite with the mineral steenstrupine, a rare form of sodic phosphor-silicate mineral, being the main host to both rare earths and uranium. The lujavrite occurs as part of a layered intrusive sequence comprised predominantly of syenite and peralkaline granites.

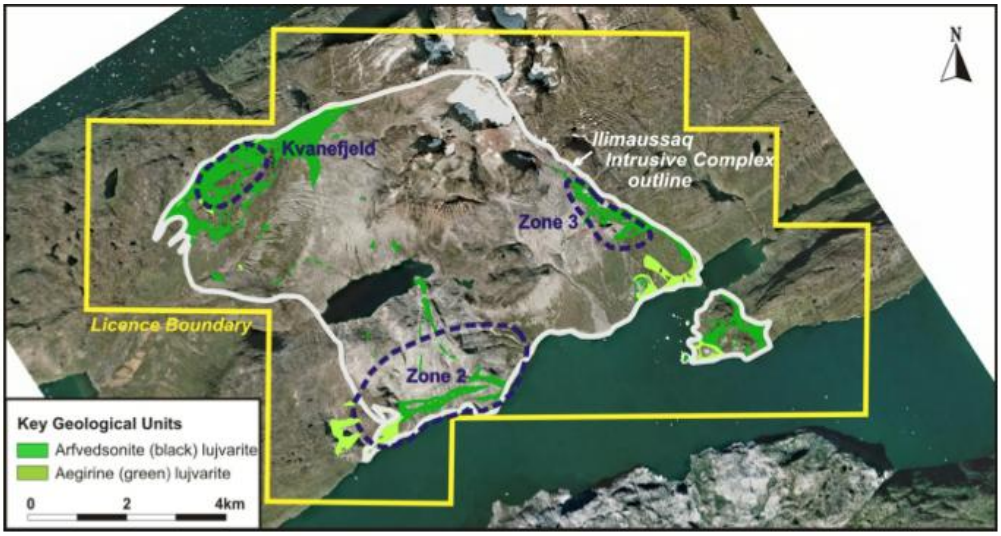


FIGURE 3: Lujvarite distribution at Kvanefjeld, Sorensen and Zone 3. (*source*: **Greenland Minerals and Energy** Prefeasibility report, May 2012).

TABLE 1: JORC Resources at Kvanefjeld only (*source*: **Greenland Minerals & Energy**, September 2012).

Kvanefjeld Only	Tonnes and Grade				Contained Metal		
U_3O_8 150ppm cut-off	Tonnes Mt	TREO ppm	U_3O_8 ppm	Zn ppm	TREO Mt	U_3O_8 mlb	Zn Mt
Indicated	437	10929	274	2212	4.77	263	0.97
Inferred	182	9763	216	2134	1.78	86	0.39
Totals	**619**	**10585**	**257**	**2189**	**6.55**	**350**	**1.36**

Sorensen Only	Tonnes and Grade				Contained Metal		
U_3O_8 150ppm cut-off	Tonnes Mt	TREO ppm	U_3O_8 ppm	Zn ppm	TREO Mt	U_3O_8 mlb	Zn Mt
Inferred	242	11022	304	2602	2.67	162	0.63

Zone 3 Only	Tonnes and Grade				Contained Metal		
U_3O_8 150ppm cut-off	Tonnes Mt	TREO ppm	U_3O_8 ppm	Zn ppm	TREO Mt	U_3O_8 mlb	Zn Mt
Inferred	95	11609	300	2768	1.11	63	0.26

Global Resource	Tonnes and Grade				Contained Metal		
U_3O_8 150ppm cut-off	Tonnes Mt	TREO ppm	U_3O_8 ppm	Zn ppm	TREO Mt	U_3O_8 mlb	Zn Mt
Indicated	437	10929	274	2212	4.77	263	0.97
Inferred	520	10687	272	2468	5.55	312	1.28
Totals	**956**	**10798**	**273**	**2351**	**10.33**	**575**	**2.25**

Note: TREO refers to Total Rare Earth Oxide and includes the rare earth elements in the lanthanide series plus yttrium. Uranium is used as a cut-off due to the greater coverage of historical spectral assays across the deposit.

The Global Resource now approaches 1 billion tonnes and contains 575mlb of uranium and 10.33mt of rare earths.

At more than 10mt of rare earth oxides, Kvanefjeld is the largest code compliant resource outside of China. It is of such a scale as to be strategically significant to the REE market in particular due to its high proportion of the more valuable heavy rare earths.

Given the scale of the deposit, its ease of access and the unique mineralogy that gives it advantages in beneficiation and extraction, **GGG** has positioned the project to be a key potential future supplier of critical rare earths. Similarly for uranium, the Kvanefjeld deposit is one of the largest deposits internationally, certainly at a grade approaching 300ppm, and has the potential to be one of the worlds' top ten producers.

As discussed in our earlier report (**RMR**, 19/4/2012), if geological continuity between the regional satellite deposits is confirmed, the ultimate resource size could exceed 5bt containing more than 50mt of rare earths and 3b lb of uranium or a deposit that is approaching the Olympic Dam deposit in terms of scale.

PRE-FEASIBILITY STUDY

On 4 May 2012 **GGG** announced the results of the Pre-Feasibility study. The study drew together reports and studies by various third party consultancies such as SRK, Coffey Mining, AMEEC Minproc, ANSTO, SGS, CSIRO and others.

Key outcomes from the study were:

- **Production Metrics**: An initial mine throughput rate of 7.2Mtpa with ROM running at 1.22% TREO and 341ppm U_3O_8 producing 4 main products (and minor zinc sulphide) including –
    - 4,200tpa heavy rare earth hydroxide;
    - 10,400tpa mixed rare earth carbonate;
    - 26,200tpa light rare earth carbonate; and
    - 2.6mlb pa U_3O_8.
- **Capex/Opex:** Capital costs of the plant and associated infrastructure was estimated at US$1.53 billion and operations would produce at a cost competitive unit cost of US$31/lb for uranium and US$8/kg for the rare earths putting the project in the lowest quartile with respect to rare earths;
- **Financial Returns & Payback**: With a mine life of 33 years (based on Indicated resources only and a approximate 1:1 strip ratio) and assuming a uranium price of US$70/lb for uranium and US$41.60/kg TREO, the project generates a pre-tax ungeared $NPV_{10\%}$ of US$4.6 billion, an IRR of 32% and a payback period of less than 4 years;
- **Resource Upside**: Further upside is possible by exploiting the Sorensen and Zone 3 deposits and probable additional resources to be added from elsewhere in the complex taking the mine life to in excess of 60 years.

The prefeasibility has demonstrated an NPV in excess of $4 billion based on a 33 year mine operation based on current Indicated resources. Mine life could ultimately be extended to in excess of 60 years.

While not directly reported in the Pre-Feasibility summary released to ASX, **RM Research** has calculated recoveries of around 48.3% for uranium and 46.5% for the rare earth products. We suspect that as the process flow sheet is further refined and piloting work completed there is room to improve on these recovery figures.

RM Research was impressed with the content and delivery of this study and the economic outcomes that flow from it. It is our view that the market has not yet fully absorbed the study outcomes or the potential economic leverage to shareholders.

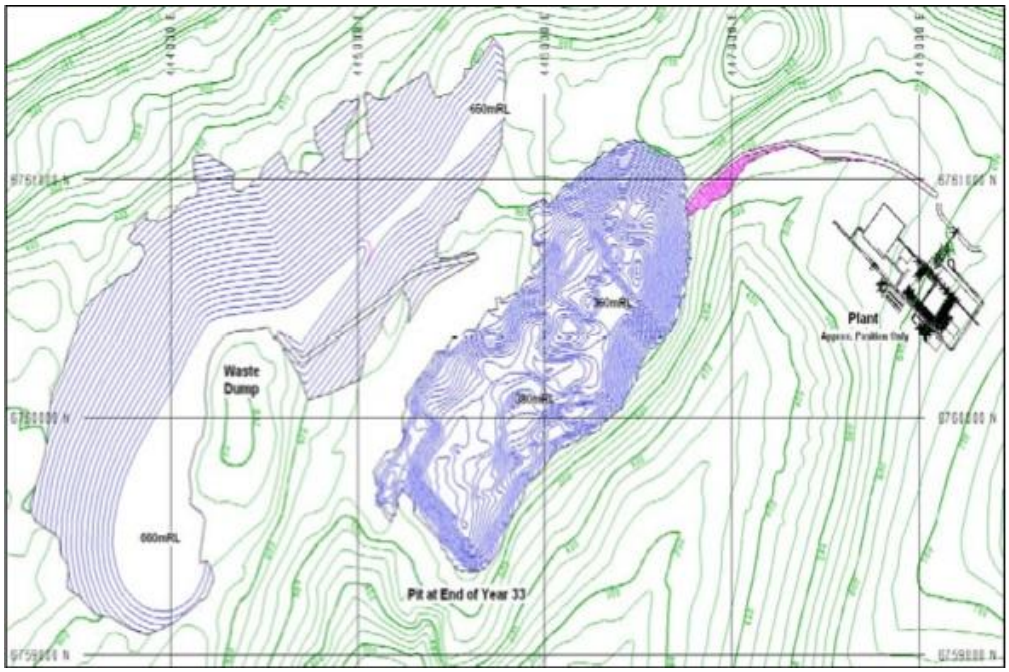


FIGURE 4: Kvanefjeld pit design after 33 year mine life (*source*: **Greenland Minerals and Energy** Prefeasibility report, May 2012).

In addition to the plant site itself, substantial infrastructure is planned including hydroelectric dam, additional fuel oil driven power station, port facilities, roads and accommodation village.

Two tailings facilities are also planned: one for the crushing-milling circuit near the pit site and a second tailings facility near the plant site itself.

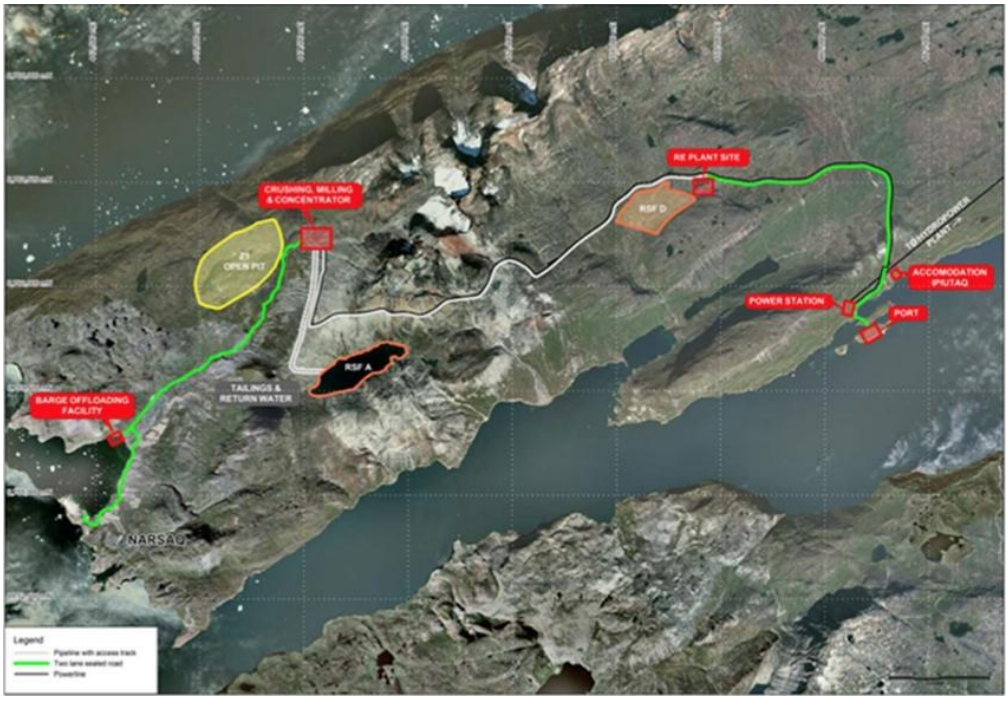


FIGURE 5: Aerial view of Kvanefjeld project infrastructure configuration indicating:

* the pit location (yellow)
* concentrator (near pit)
* plant site (top right)
* tailings storage (orange)
* port. (far right)

(*source*: **Greenland Minerals and Energy** Prefeasibility report, May 2012).

The proposed processing flow sheet has been greatly simplified and has much improved the project economics. It has been achieved by:

- Froth flotation to beneficiate the ore and thereby create a high grade mineral concentrate comprised or rare earths and uranium in 15% of the original ore mass;
- The mineral concentrate is then subject to atmospheric leaching using sulfuric acid (produced on site) to produce a high purity concentrate subject to a final solvent extraction step.

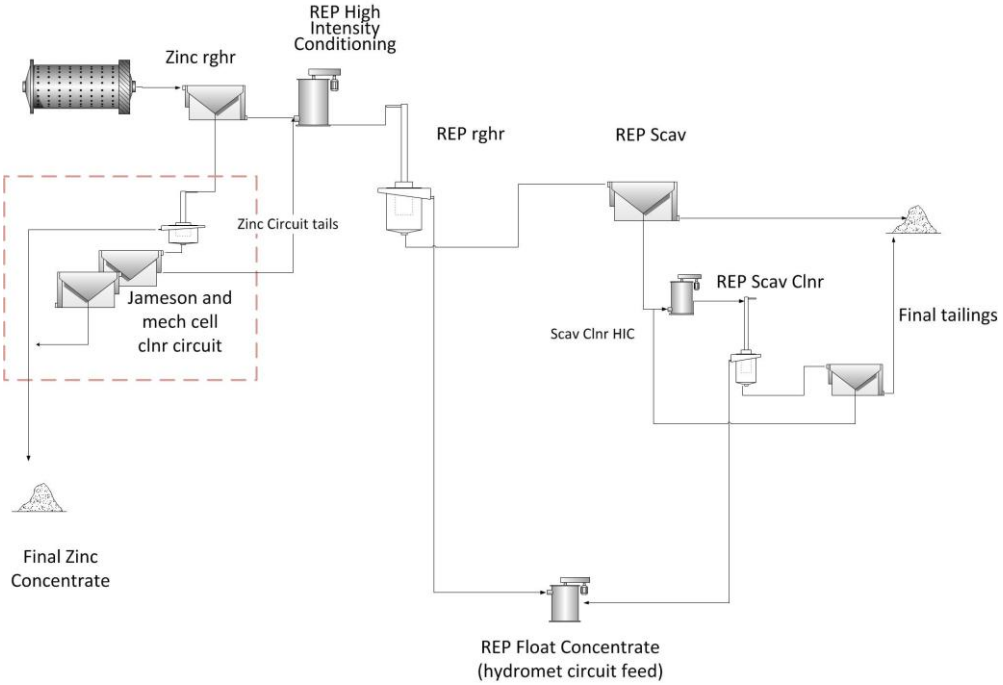


FIGURE 6: Kvanefjeld Project flotation circuit – this concentrates the rare earths and uranium before being transported to the main process plant. See new developments below for the current proposed full extraction circuit. (*source*: **Greenland Minerals and Energy** Prefeasibility report, May 2012).

It should be noted that the rare earth products drive the economics of Kvanefjeld. While uranium is important it constitutes only 15% of the revenue. The project will turn on the ability to produce a product to specification for a rare earth offtaker. In particular the ability for the project to generate the heavy rare earth hydroxide will be critical as this is the high value component of the revenue.

Process Flow Sheet Improvements

GGG continues to make great strides with its development plans and process flow sheet. In recent months several major updates have been provided that will have a potential impact on the way the project is marketed going forward:

- On 13 August 2012 **GGG** announced extensive laboratory scale testwork has confirmed that due to the unique mineralogy a froth flotation process can concentrate 82% of the rare earths in 8.5% of the original ore mass resulting in an approximate grade uplift of 10 times;
- On 5 September 2012 **GGG** announced that further process enhancements had been achieved in the atmospheric leach part of the flow sheet that has resulted in cleaner separation between rare earths and uranium resulting in simplification of the circuit, improved product recoveries and reduced costs.

Testwork has demonstrated significant advances in beneficiation

Interestingly **GGG** has indicated that the beneficiation process that generates a high-grade concentrate gives the Kvanefjeld Project optionality in regard to shipping the concentrate to a refinery outside of Greenland. Scoping level cost studies indicate that about 5% of the contained value of the product will cover the cost of transport making this a viable development option.

Having put the option of further process outside Greenland on the table **GGG** then demonstrate that they have significantly improved their own refining process flow sheet as compared to the May 2012 prefeasibility study including:

- Increased rare earth recovery by 27%;
- Increased uranium recovery by 4%;
- Reduced the capital costs to US$1.3 billion; and
- Reduced rare earth oxide unit costs to US$3/kg.

	May 12 PFS	August 12 Update	
Uranium Production (tpa U_3O_8)	1,185	1,230	+4%
Rare Earth Production (tpa REO)	40,780	51,900	+27%
Capex (US$m)	1,534	1,297	-15%
Unit Cost (US$/kg REO & uranium credit @ $70/lb)	$5.28	$3.07	-42%
Pre-tax NPV (US$ billion)	4.63	6.59	+43%
IRR	32%	43%	+34%

Based on PFS pricing assumptions and REO mixed rare earth intermediate product.

TABLE 2: JORC Resources at Kvanefjeld only (*source*: **Greenland Minerals & Energy ASX Release**, 5 September 2012).

Because the Kvanefjeld ore is non-refractory, it can be processed with relatively simple methods without resorting to expensive and risky high temperature and/or pressure methods required for the more usual refractory rare earth ores. With recent changes to the process flow sheet **GGG** plans:

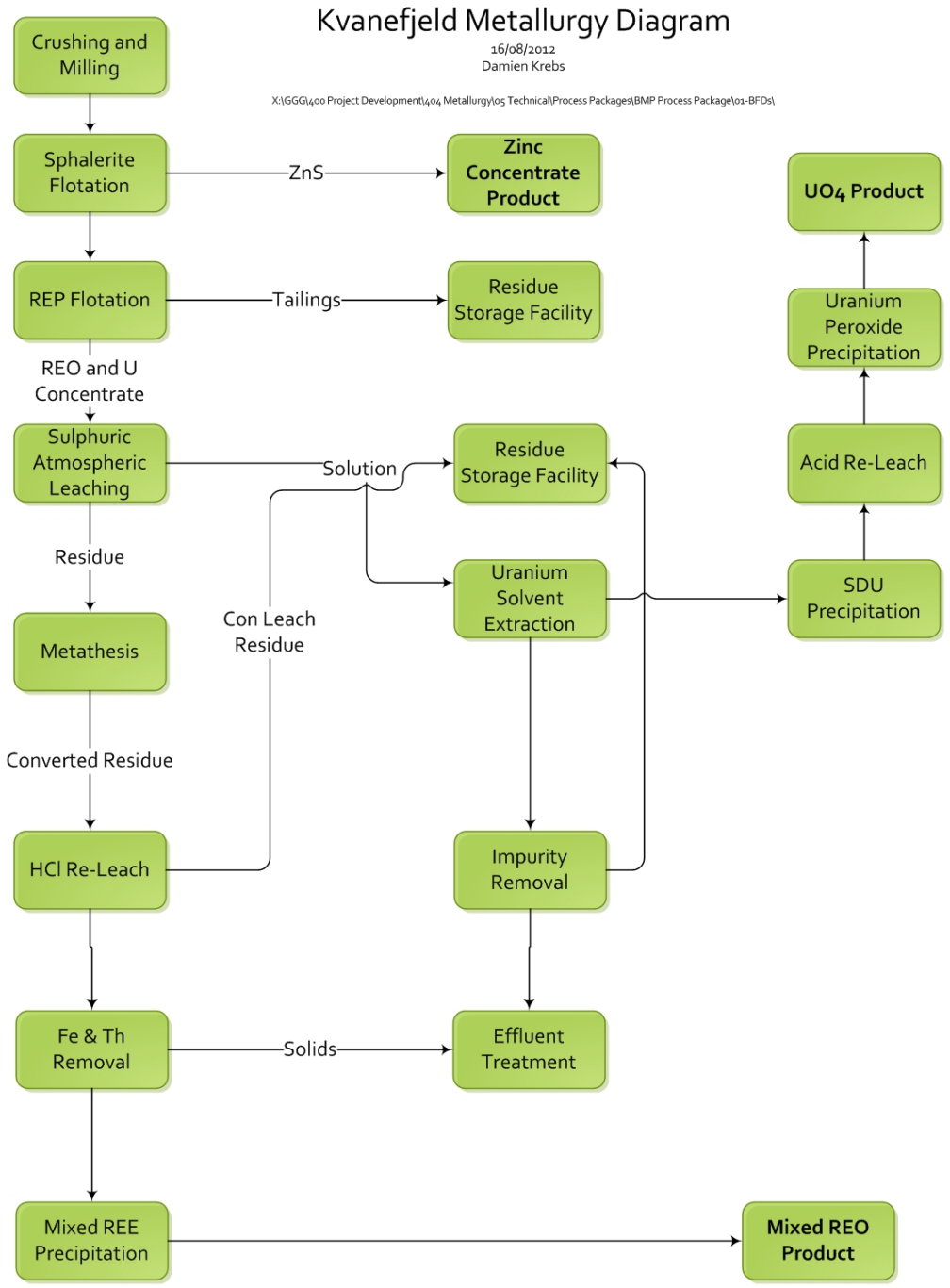
- to produce uranium oxide using solvent extraction; and
- to produce a mixed rare earth product precipitated from a chloride solution produced from a re-leach post the primary atmospheric leach.

High Temperature – high pressure methods are not required due to non-refractory nature of Kvanefjeld ore

Importantly **GGG** retains the option to either market the mixed rare earth product or further refine it to separate out the heavy more valuable fraction. This will depend to a large extent on marketing arrangements with third parties.

The key takeaway from this work however is that **GGG** continues to bring the cost of producing a kilo of rare earths to around the same level as the Chinese rare earth producers. With the uranium bi-product credit Kvanefjeld is now in the right part of the cost curve.

FIGURE 7: Revised and simplified process flow sheet producing a mixed rare earth product and uranium (*source*: **Greenland Minerals and Energy** ASX Release, 5 September 2012).



80% of revenue from Kvanefjeld is attributable to rare earths

It should be noted that the current process configuration emphasizes the production of rare earths and the level of uranium production has come down significantly – from more than 8mlb per year to under 3mlb per year. **RM Research** believes this is a prudent approach – treating the uranium as a bi-product credit and maximizing the value of rare earths. With 80% of the revenue from rare earths it is this market that will drive the project to production.

The net result of all these adjustments in process design and economic re-estimation is a pre-tax NPV of US$6.6 billion and an IRR of 43%, an increase of >20% from May PFS outcomes on both counts. With bottom quartile costs and a much more moderate capital cost, now below $1.3 billion, the project looks more bankable than it did perhaps a few years ago.

While various stages of the process flow sheet have been tested in isolation, it is understood that no fully integrated real-time testing of the whole process has taken place. This may become the next stage as part of the Bankable Feasibility Study and will put a lot of doubts to rest.

RARE EARTHS MARKET

RM Research is forecasting volatile but elevated REE pricing reflecting supply constraints and steadily growing industrial demand, especially for the manufacture of sophisticated portable computing devices, hybrid cars and the renewable energy expansion plans in Western countries. While prices have come off the highs of 2011, prices are still relatively high compared to the levels seen in 2009 and before. To illustrate see the variation in a basket of rare earths over the last few years (this example uses data from Mt Weld).

TABLE 3: FOB China prices in $/kg for basket of rare earths reflecting Mt Weld average composition (*source*: **Lynas Corp** Website, September 2012).

Rare Earth Oxide	Mt Weld Distributn	2009	2010	2011	Q1 2012	Q2 2012	9-Dec
Lanthanum Oxide	25.50%	4.88	22.4	104.1	42.31	24.64	19
Cerium Oxide	46.74%	3.88	21.6	102	37.92	24.79	19
Neodymium Oxide	18.50%	19.12	49.5	234.4	177.31	122.14	100
Praseodymium Oxide	5.32%	18.03	48	197.3	163.08	122.86	105
Samarium Oxide	2.27%	3.4	14.4	103.4	73.85	82.86	53
Dysprosium Oxide	0.12%	115.67	231.6	1449.8	1366.15	1085.71	920
Europium Oxide	0.44%	492.92	559.8	2842.9	3623.08	2412.86	2020
Terbium Oxide	0.07%	361.67	557.8	2334.2	2658.46	2074.29	1800
Av. Mt Weld Com		**10.32**	**31.35**	**147.96**	**92.2**	**63**	**50.87**

Price forecasts in this space are typical across a wide range. The table below is data supplied by **GGG** in its recent corporate presentation that illustrates the range possible. Note that the company appears to have taken a conservative view on its assumed pricing going forward.

TABLE 4: Rare earth price forecasts from various sources, including **GGG** view (*source*: **GGG** Corporate Presentation, September 2012).

	Company View	Roskill 2015	BCC 2016	Actual Aug-12 (FOB China)
La	$10.00	$28.00	$6.00	$19.00
Ce	$5.00	$13.00	$4.00	$20.00
Pr	$100.00	$100.00	$19.00	$105.00
Nd	$100.00	$100.00	$130.00	$102.00
Eu	$1,100.00	$1,100.00	$4,350.00	$2,020.00
Tb	$1,100.00	$1,100.00	$3,650.00	$2,000.00
Dy	$900.00	$900.00	$2,170.00	$950.00
Y	$50.00	$50.00	$275.00	$100.00

FIGURE 8: Bloomberg Index BNREMRS:IND for last 12 months (*source*: Bloomberg Website, September 2012).

As a proxy to rare earth market performance in recent times the Bloomberg rare earth index (containing all rare earth companies with a NI43-101 or JORC resource) indicates a downward trend continuing but with a recent improvement coming into September 2012.

URANIUM MARKET UPDATE

The uranium market has had a series of very interesting developments recently – some long term bullish and some short-term bearish indicators. Most market analysts believe there is a major shortfall in uranium production developing, especially from 2017 onwards. This has been exacerbated by recent uranium price performance that has seen uranium prices tail off in recent times.

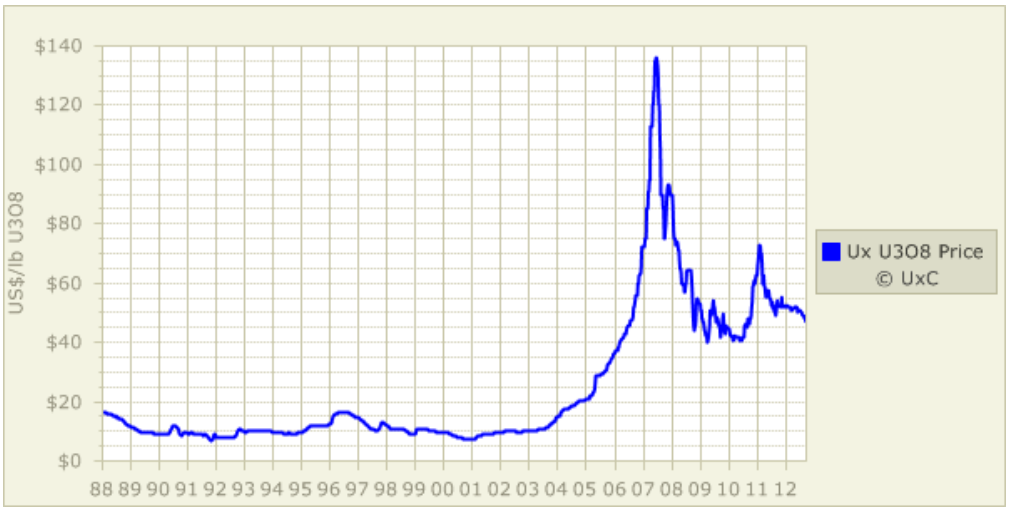


FIGURE 9: UxC spot uranium prices 1988-2012 (*source*: UxC).

Significant uranium market developments in recent times include:

- **Japanese nuclear policy:** while initially announced as a phase out of nuclear by 2040 and making for very bearish headlines, recent back peddling by the Japanese government has seen the position become vaguer as the pressure from business and pro-nuclear prefectures becomes apparent. The restart of reactors should ramp up from mid-2013 onwards.
- **Olympic Dam Expansion Delay:** this is a very important development in the uranium space as in the long term ODEx was critical to meeting supply requirements from 2019-2020 onwards.
- **Paladin Completes US$200m forward sale agreement**: as if to reinforce the importance of the OD-Ex decision, an un-named utility completed a forward purchase agreement to secure 13.75mlb of uranium for US$200m to be settled at market related prices during a 2019-2024 delivery period.
- **The UAE completes a US$3 billion fuel supply contract with various parties**: settled with **AREVA**, **Uranium One**, **Rio Tinto**, **Converdyn**, **Urenco** and **Tenex**, the United Arab Emirates has bedded down its long term fuel supply arrangements for its new reactors. Saudi Arabia is also looking to start a major nuclear program.
- **Yeelirrie sold for US$430m: Cameco** purchased Yeelirrie from **BHP Billiton** at approximately US$3/lb. **Cameco** has been making a lot of project acquisitions in the current low price environment and is on the record as saying that a supply crunch is developing at the back end of the decade.

TABLE 5: Various analysts' uranium price projections (*source*: Raymond James July 2012, Ambrian Partners April 2012, Credit Suisse July 2012).

Analyst	2012	2013	2014	2015	2016	2017+
Raymond James	US$53	US$63	US$72	US$75	US$70	US$70
Ambrian Partners	US$55	US$57	US$60	US$65	US$75	US$75
Credit Suisse	US$53	US$59	US$65	US$70	US$65	US$65

RM Research believes the conditions are being set for a strong rebound in uranium prices in the mid-term. When the correction comes it will be quick as uranium prices tend to respond quickly to supply shortfalls and slowly to balanced market conditions. A long-term price of $70/lb remains reasonable, as the incentive price for new production is at least this level.

PEER COMPARISONS

GGG now has by far the largest rare earth resource outside China – it being more than double in size of its nearest rival. It also has a high proportion of valuable heavy rare earths placing it in the "quality" portion of the deposit universe.

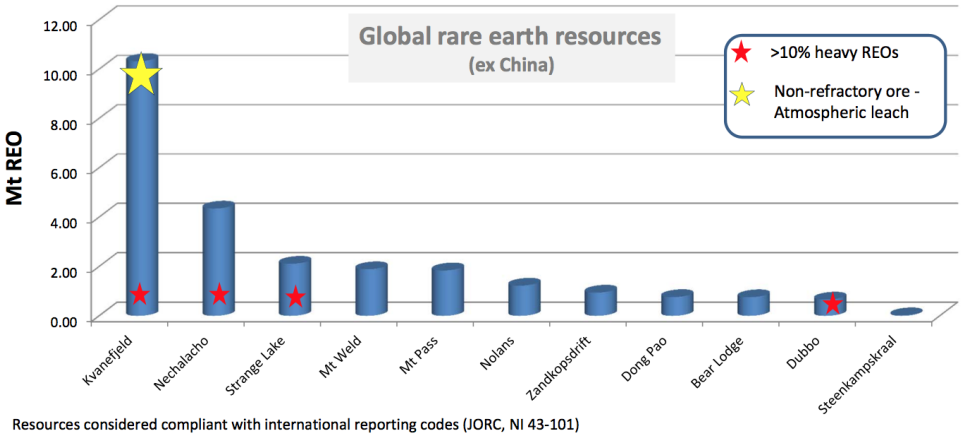


FIGURE 10: Global rare earth code compliant resources with Kvanefjeld being the largest outside China (*source*: **Greenland Minerals and Energy** Presentation, September 2012).

However this has not translated into an equivalent market capitalisation. When benchmarked against its peers **GGG** appears to be well undervalued on a market cap/t of REO basis. The benchmarks below hint at the sort of valuation uplift **GGG** can expect once it graduates into the more advanced group of aspiring rare earth producers.

Project	Owner	Market Cap (US$)	Resource (Mt REO)	Market Cap/t REO
Mt Weld	Lynas Corp	$1,200.00	1.80	$667.00
Mountain Pass	Molycorp	$1,100.00	1.80	$611.00
Dubbo Zirconia	Alkane Resources	$290.00	0.50	$580.00
Nolans	Arafura	$60.00	1.70	$100.00
Zandkopsdrift	Frontier	$70.00	0.94	$74.00
Nechalacho	Avalon Rare Metals	$200.00	4.35	$46.00
Strange Lake	Quest	$75.00	2.40	$31.00
Kvanefjeld	Greenland Minerals & Energy	$150.00	10.30	$15.00

TABLE 6: Market cap/t REO (*source*: Company reports and **Greenland Minerals & Energy** Corporate Presentation September 2012).

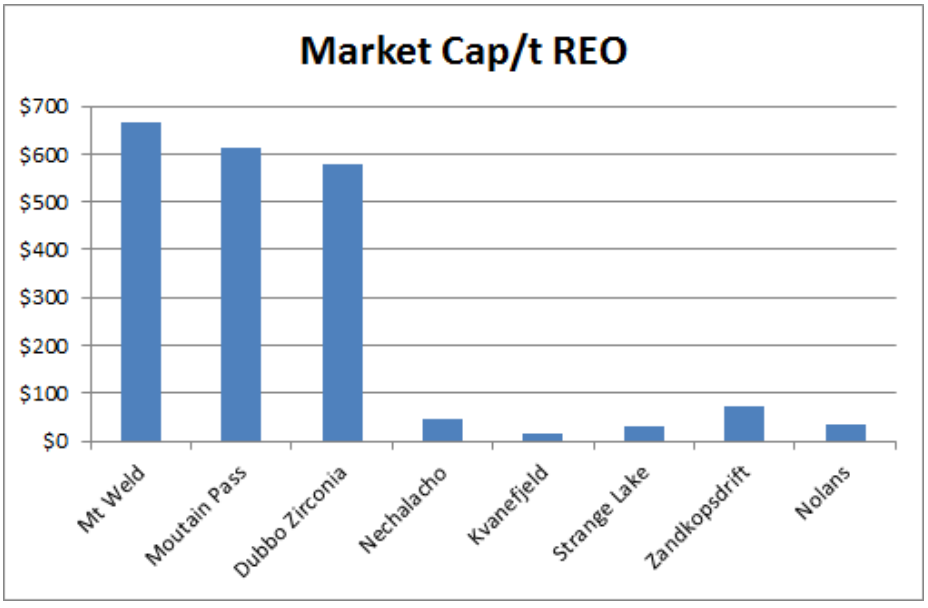


FIGURE 11: market cap/t REO multiples for GGG peer group (*source*: **RM Research** internal modelling and **Greenland Minerals & Energy** Corporate Presentation September 2012).

Looking at uranium benchmarks, **GGG** has an Enterprise Value per pound of U_3O_8 (ignoring the value of REE and using the global resource base of 575mlb) of ~**A$0.25/lb**. In the uranium space the following broad metrics apply (Table 6):

TABLE 6: EV/lb U_3O_8 averaged by development stage (*source*: Versant Partners Report 23 August 2012).

Stage	# of companies	43-101/JORC EV/lb U_3O_8
Producer	6	$4.45
Developer	4	$3.62
Feasibility	9	$0.44
Pre-feasibility	8	$0.85
Exploration	30	$0.62
All Categories	**57**	**$1.09**

Compared against any of these categories **GGG** EV/lb U_3O_8 of A$0.25lb is well below its peers. On the most fundamental basis one would expect the company to trade at least at the "feasibility" average of $0.44/lb or a market cap closer to $250m. In due course once developer status is achieved billion dollar market caps should be very achievable on this metric alone.

ESTIMATE OF VALUE

RM Research has completed its own internally modelling of the Kvanefjeld project. Key assumptions used in the modelling include:

FIGURE 12: financial modelling parameter and assumptions (*source*: **RM Research** internal modelling).

Assumptions		
Uranium Price	US$/lb	70.00
Heavy Rare Earth Hydroxide	US$/kg	82.20
Mixed Rare Earth Carbonate	US$/kg	26.10
Light Rare Earth Carbonate	US$/kg	15.60
AUD:USD FX Rate	US$	1.00
Tax Rate in Greenland	%	32.00%
Carried Forward Tax losses	US$m	40.00
Royalty Rate	%	0.00%
Discount Rate	%	10.00%

Key Project Parameters		
Plant Capacity	Mtpa	7.2
Capital Cost	US$m	1297
Opex	US$m pa	349
U3O8 Grade	ppm	364
U3O8 Recovery	%	46.9%
Uranium Prod.	t u3o8 pa	1230
TREO Grade	%	1.27%
TREO Recovery	%	56.8%
TREO Prod.	t TREO pa	51900

The headline numbers generated by internal modelling include a pre-tax NPV approaching $6.5 billion and an IRR of 129%.

TABLE 7: financial modelling outcomes on the base case (*source*: **RM Research** internal modelling).

Financial Metrics		
Pre-Tax NPV	US$m	$6,482
Pre Tax IRR	%	129%
After Tax NPV	US$m	$4,235
After Tax IRR	%	112%
Payback Period	Years	3.00

These results were flexed for the usual key parameters: Capex, Opex, commodity prices and throughput rates. A "multivariant" scenario captured all downside scenarios at the same time.

The results of the downside flex were as shown below, the most significant being commodity prices on a single flex basis and although the multivariant knocks $2 billion off the total NPV the residual NPV is still in excess of $4 billion.

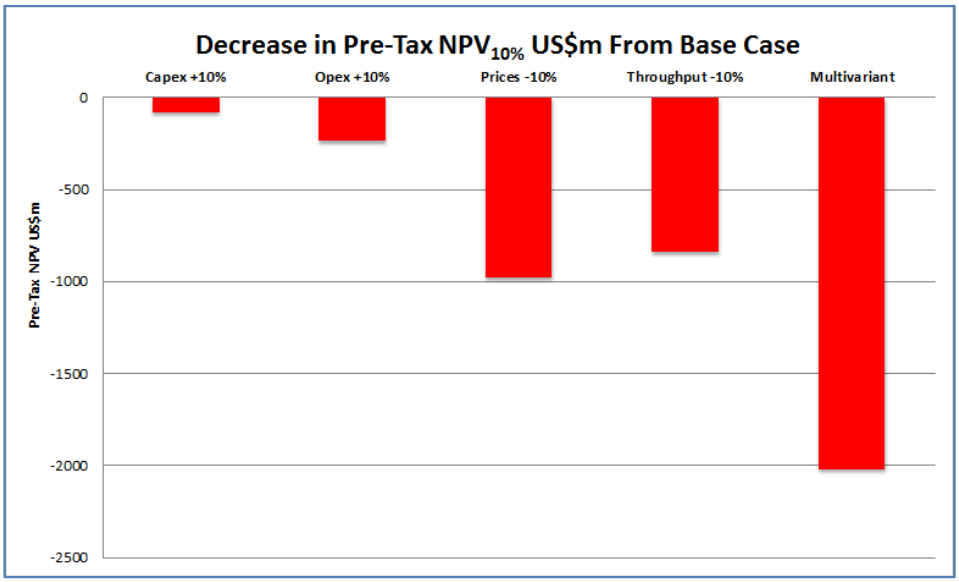


FIGURE 13: downside scenario impacts on pre tax NPV (*source*: **RM Research** internal modelling, September 2012).

Also modelled was the impact of expanding the project with Zone 3 and Sorensen deposits in due course. Some expansion on plant throughput was assumed and similar resource upgrade and recovery assumptions were made to Kvanefjeld. In this scenario the fully expanded project has an NPV approaching $10 billion!

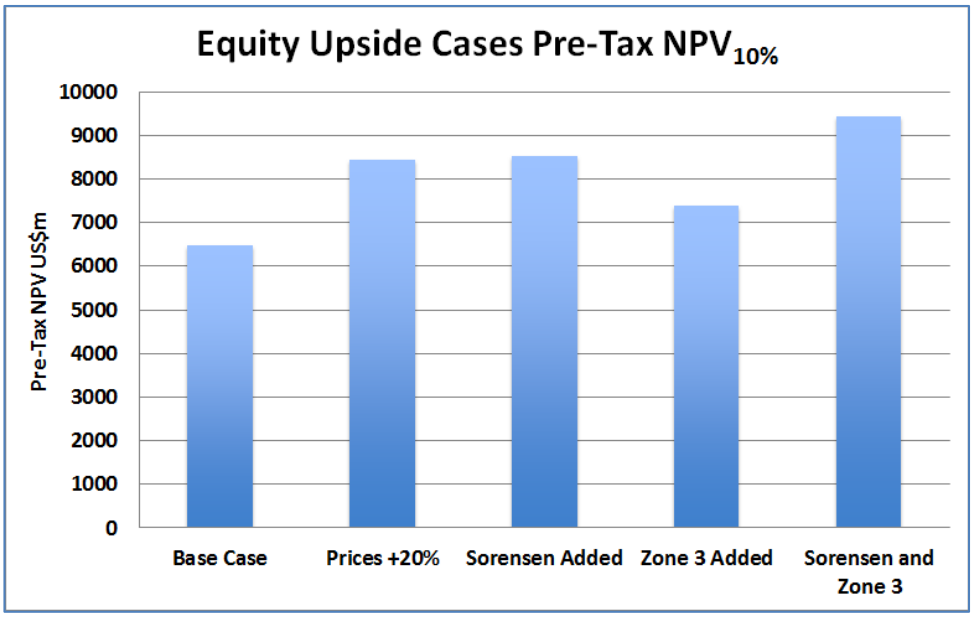


FIGURE 14: upside scenario impacts on pre tax NPV (*source*: **RM Research** internal modelling).

RM Research also reviewed the value per share on a fully diluted after tax basis assuming a 50% gearing in one scenario and a cornerstone JV investor holding 30% of the project along with 50% debt in the second scenario. In the first scenario the valuation (fully diluted) was $1.72 while in the second scenario returned $6.76/share. This analysis illustrates the return leverage to shareholders should the JV investor pay a reasonable premium or resource multiple to acquire its interest in the project. The greatest upside is provided by commodity prices with a 20% increase lifting the valuation (fully diluted) to $2.26 and $8.87 respectively.

RM Research can see two distinct valuation phases:

- **Near Term**: **GGG** should begin to trade towards its peers on an underlying multiple basis. Based on uranium this is around $250 million or > $0.50/share.
- **Medium Term**: The company should trade towards a percentage of NPV as near term production horizons become more visible, in which case valuations approaching 3-4 billion should be possible, or in excess of 10x multiple to the current share price.

CORPORATE

- On 6 August 2012, **GGG** announced a re-negotiated agreement between **GGG**, Westrip and Rimbal to enable the JV to be consolidated into the Company. **GGG** is to pay A$5 million in cash (previously $39 million) and issue an additional 67 million shares (previously 7.825 million shares and 5 million options @ $1.50 exercise price).
- This represents an excellent deal for **GGG** as they move to 100% of the Kvanefjeld Project. They pick up 39% of their primary asset for an issuance of 15.3% of additonal equity. The cash componnet of $5 million is also a much more acheiveable number, reducing execution risk considerably.
- Settlement is due within 5 business days of a meeting of shareholders approving the terms of the acquisition (currently scheduled for 8 October 2012).

RISK ANALYSIS

- **POLITICAL RISK**: Steady progress is the way to describe progress on the political front. Backtracking by the Greenland Government is always possible but considered unlikely by **RM Research**.
- **PROJECT OWNERSHIP:** Significant progress has been made on this front but until it is executed and completed the Westrip/Rimbal legal uncertainties will return to the project. The main risk here is the inability to secure the cash (although this requirement has been greatly reduced) to complete the settlement.
- **URANIUM OUTLOOK**: Since the last **GGG** report it would be fair to say that uranium prices and short-term outlook has deteriorated. While mitigated to a certain extent by the relatively lower proportion of revenue from uranium (~15% of total revenue), the current term uranium price estimate of $70/lb may need revision downward. At this stage **RM Research** is retaining its mid-long term bullish outlook for uranium due to significant supply constraints building in the industry against a solid demand increase through to the next decade.

We maintain a mid to long term bullish position with regard to the uranium price

- **METALLURGY/PROCESS RISK**: While **GGG** have made great strides on this front, large projected NPV's will draw attention to the risk of project delivery on a technical front. Can the beneficiation and other process benefits be delivered in a fully integrated real-time process flow sheet? **RM Research** suspects pilot plant testwork on a relatively large scale may be required to put doubts to bed – especially to secure the debt finance.
- **FINANCE RISK**: With resource critical mass, significant NPV results from development scenarios to PFS level, **GGG** is moving into DFS stage with financing to follow. The Capex quantum necessitates either a large debt component, JV partner or possibly both. These can be difficult to secure on a one-of-a-kind asset in indifferent equity markets.
- **MARKET RISK:** While equity markets may not be quite as low as they were a few months ago, brokers are still not doing cartwheels of joy either. Little equity capital is being raised at the moment (except perhaps for the glamour discovery stories) and this continues to put pressure on emerging resource companies. **RM Research** medium term view is that the risk premium has been eroded for many smaller resource companies and we see near term upside.

In summary, most risks remain as flagged in the previous report but attention will now turn to deliverability of the high NPV outcomes – both in a technical but increasingly financial sense. The principal risk for **GGG** remains the fact it is a relatively low market capital company holding a world class asset requiring significant capital expenditure to develop.

DIRECTORS AND MANAGEMENT

Michael Hutchinson, B.Sc. **CHAIRMAN**

Michael previously served as director of the LME

Mr Michael Hutchinson has had a distinguished career in resources and commodity trading, having served as Director of the London Metal Exchange, the world's largest market in options and futures contracts on base and other metals. Michael has also served as Chairman of **RBS Sempra Metals Limited**, and **Wogen PLC**; a trader of off-exchange metals that sources metals worldwide for industrial end users. In addition, Mr Hutchinson previously served as a director of **MG PLC**.

Roderick McIllree, B.Sc., Grad Dip. (Min Econ) MAusIMM **MANAGING DIRECTOR**

*Rod has been with **Greenland Minerals and Energy** since inception in 2007 and has been the main driver of the Company*

Mr Roderick McIllree graduated from Curtin University of Technology in 1996 with a Bachelor of Science degree (Mineral Exploration and Mining Geology) and then commenced working in Western Australia's goldfields for companies including **Placer Dome** and **Wiluna Gold**. Roderick gained international experience in Chile, before returning to Australia's gold sector. After completing a graduate diploma in Mineral Economics, Roderick worked as an analyst and advisor for broking houses active in Australian and international capital markets.

Roderick was the founding Managing Director of 'The Gold Company' (now **Greenland Minerals and Energy**), and was instrumental in the Company's push into Greenland and the acquisition to Kvanefjeld project in 2007.

Dr John Mair, PhD **EXEC DIRECTOR – BUSINESS DEVELOPMENT**

John brings valuable technical expertise to bear on what is a unique geological context with challenging metallurgy.

Dr John Mair completed a Bachelor of Science with Honours, majoring in geology, at the University of Western Australia. He commenced working in gold exploration and mining in Western Australia's goldfields. He completed a PhD in 2004 and returned to the minerals industry working in exploration for porphyry Cu-Au deposits in New South Wales, and gold deposits in China. In mid-2005, John took the position of Post-Doctoral Research Fellow at the University of British Columbia, with a focus on the metallogeny of southwest Alaska.

At completion of the project in 2006, John returned to the minerals industry as a project co-coordinator for Vancouver-based exploration group **Geoinformatics Exploration Inc**., who in alliance with Kennecott, were exploring for Cu-Mo-Au deposits in western North America from Mexico to Alaska. In mid-2008 John returned to Australia to join **Greenland Minerals and Energy Limited** as General Manager.

Simon Cato, B.A., MSDIA **EXEC DIRECTOR**

Simon has over 20 years capital markets experience

Mr Simon Cato has had over 20 years capital markets experience in both broking and regulatory roles. He has been employed by ASX in Sydney and in Perth in the company's department that oversees the activities of listed companies. Over the last 12 years, he has been an executive director of two stockbroking firms. As a broker he has also been involved in the underwriting of a number of initial public offerings.

Mr Cato is also a director of **Transactions Solutions International Limited**, **Advanced Share Registry Limited**, **Queste Communications Limited** and **Convergent Minerals Limited**.

Jeremy Whybrow, B.Sc, Grad Dip. (Min Econ), MAusIMM **EXPLORATION DIRECTOR**

Jeremy has global mineral exploration experience

Mr Jeremy Whybrow and has had over 15 years' experience in the minerals industry both domestically and internationally. Jeremy has worked for companies such as **Sons of Gwalia Ltd**, **PacMin Ltd**, **Teck Australia Ltd**, **Mount Edon Gold Mines Ltd** and **Croesus Mining NL**. His experience has been mainly in the operational environment and includes significant exposure to exploration and mining operations, project evaluation and feasibility studies.

Jeremy also has extensive international exploration experience having worked in China, Africa and the Philippines as well as numerous localities in Australia. Jeremy is also an executive director of **Convergent Minerals Ltd**.

Tony Ho, B.Com., CA, FAICD, FCIS **NON-EXEC DIRECTOR**

Mr Tony Ho is an experienced company director having held executive director and chief financial officer roles with a number of publicly listed companies. Mr Ho is currently a non-executive director of **Dolomatrix International Limited**. He is also non-executive director and chairman of the **Audit Committee of Apollo Minerals Limited**, **Metal Bank Limited**, **Hastings Rare Metals Limited** and **Mariposa Health Limited**.

Tony has acted as executive director and CFO for a number of public companies

CONCLUSION

RM Research is pleased to see the expectations of the last report largely fulfilled and project momentum maintained. The JORC Resource continues to expand, further positive steps in the process flow sheet have developed and the DFS and associated social and environmental studies appear to remain on track.

While the equity markets have continued to disappoint and the junior end of the market has continued to drift lower as a result, **GGG** appear to be getting well positioned for the turnaround. **RM Research** expects investors to return to risk in the market in due course and when they do **GGG** will be ready to go.

While the equity markets have not helped, the company is still making very good progress and is well leveraged to the turn around in sentiment once investors inevitably return to risk.

We look to see further developments on the project finance front and the introduction of a strategic partner to leverage full value. Concluding the deal with Westrip to go to 100% of the project will help. Once **GGG** raises its next round of equity it will be in a good position to move forward. **Speculative Buy**.

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Our recommendation ranking system is as follows:

Buy	Companies with 'Buy' recommendations have been cash flow positive for some time and have a moderate to low risk profile. We expect these to outperform the broader market.
Speculative Buy	We forecast strong earnings growth or value creation that may achieve a return well above that of the broader market. These companies also carry a higher than normal level of risk.
Hold	A sound well managed company that may achieve market performance or less, perhaps due to an overvalued share price, broader sector issues, or internal challenges.
Sell	Risk is high and upside low or very difficult to determine. We expect a strong underperformance relative to the market and see better opportunities elsewhere.

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