

# Greenland Minerals Ltd

## (GGG \$0.10) Speculative Buy - Initiation of Coverage

EUROZ

Analyst	Date	Price Target
Michael Emery	27 <sup>th</sup> November 2019	\$0.55/sh

### The world's largest undeveloped Rare Earths project.

#### Key points

- Greenland Minerals Ltd (ASX:GGG) is sitting on the largest undeveloped Rare Earths deposit globally, the Kvanefjeld Rare Earths Project in Greenland;
- The multi-element deposit has a JORC (2012) Resource of 1.01 billion tonnes at 1.1% Rare Earth Oxide (REO) and 266ppm of U3O8 for a total of 593Mlbs of contained uranium, the 5th largest total uranium resource globally;
- Recent optimisation work on a 2016 Feasibility Study demonstrates compelling economics with operating costs 3x lower and capital intensity 5x lower than ASX peers;
- REO production is 2x peer ave. at 32ktpa with by-products of 1Mltpa of uranium and 15ktpa of Zn concentrate over a 37 year mine life;
- Based on a REO basket price of US\$19.55/kg, we estimate annual EBITDA >US\$450m and calculate a post-tax NPV10 of US\$2,069m with an IRR of 77%, comparing favourably to current EV of US\$90m;
- Updated flow sheet has been optimised in conjunction with supportive shareholders Shenghe Resources, a fully integrated Chinese Rare Earths producer with extensive knowledge of Rare Earths processing;
- The orebody is non-refractory, unique to Rare Earths deposits meaning that metallurgy is excellent from simple leaching with REO-equivalent recoveries of 94% yielding a wide range of critical "magnet metals" Neodymium, Praseodymium, Terbium and Dysprosium elements;
- Rare Earths demand is growing given their use in permanent magnets for electric motors and wind turbines;
- China dominates downstream processing of Rare Earths, making it a critical mineral and of particular strategic importance globally;
- Greenland is developing into a mining friendly jurisdiction, with the government supportive of Rare Earth and uranium extraction;
- GGG has made significant inroads into obtaining a Mining License for Kvanefjeld which we expect delivered in CY20, allowing completion of BFS and FID shortly thereafter;
- Our Valuation of \$0.55/sh is based on a DCF incorporating recently published optimisation numbers and risk adjusts this by 60% to reflect uncertainty around Mining License and funding;
- We Initiate Coverage with a Speculative Buy recommendation and \$0.55/sh Price Target. As the largest undeveloped Rare Earths project globally with outstanding metrics, we see potential for Kvanefjeld to become the world's leading Rare Earths mine;

Greenland Minerals Ltd	Year End 31 Dec	
Share Price	0.10	A\$/sh
Price Target	0.55	A\$/sh
Valuation	0.55	A\$/sh

Shares on issue	1206 m, diluted *
Market Capitalisation	121 A\$m
Enterprise Value	116 A\$m
Debt	- A\$m
Cash	5 A\$m
Largest Shareholder	Shenghe Resources - 10.5%

Production F/Cast	2020f	2021f	2022f
Rare Earth Oxide Sales (kt)	-	32	32
Uranium Sales (Mlbs)	-	1	1
Opex (inc. by-prd credits) (US\$/t)	-	6.1	6.1

Assumptions	2020f	2021f	2022f
REO Basket Price (US\$/kg)	19.65	19.75	19.84
Uranium Price (US\$/lb)	60.00	60.00	60.00
AUD/USD	0.70	0.70	0.70

Key Financials	2020f	2021f	2022f
Revenue (A\$m)	-	903	907
EBITDA (A\$m)	-2	619	622
NPAT (A\$m)	-16	310	320
Cashflow (A\$m)	-2	453	455

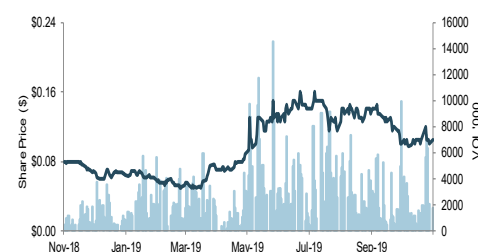
CFPS (Ac)	-0.2	37.6	37.8
P/CFPS (x)	-64.9	0.3	0.3

EPS (Ac)	-1.3	25.7	26.5
EPS growth (%)	NA	NA	0.0
PER (x)	NA	0.4	0.4

EV:EBITDA (x)	NA	0.5	-0.2
EV:EBIT (x)	NA	0.6	-0.2

ND:ND+Eq (%)	86%	60%	-992%
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#### Share Price Chart



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# Greenland Minerals Ltd

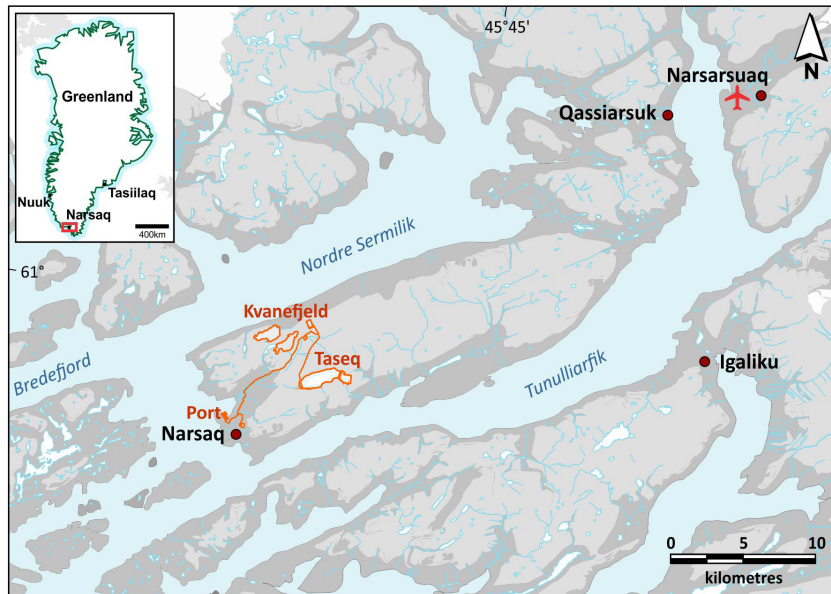
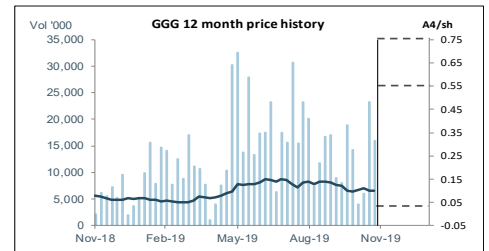
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## Key Variables

Val/ Sh		Rare Earth Oxide Basket Pricing (US\$/t)								
\$0.55		-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%
AUDUSD	15%	\$0.29	\$0.33	\$0.38	\$0.43	\$0.48	\$0.53	\$0.58	\$0.62	\$0.67
	10%	\$0.30	\$0.35	\$0.40	\$0.45	\$0.50	\$0.55	\$0.60	\$0.65	\$0.70
	5%	\$0.31	\$0.37	\$0.42	\$0.47	\$0.52	\$0.58	\$0.63	\$0.68	\$0.74
	0%	\$0.33	\$0.38	\$0.44	\$0.50	\$0.55	\$0.61	\$0.66	\$0.72	\$0.77
	-5%	\$0.35	\$0.40	\$0.46	\$0.52	\$0.58	\$0.64	\$0.70	\$0.76	\$0.81
	-10%	\$0.37	\$0.43	\$0.49	\$0.55	\$0.61	\$0.67	\$0.74	\$0.80	\$0.86
	-15%	\$0.39	\$0.45	\$0.52	\$0.58	\$0.65	\$0.71	\$0.78	\$0.84	\$0.91

## Our Share Price Sensitivity



## Our Market Sensitivity

Valuation - \$0.55/sh

Price Target - \$0.55/sh

### Bull Scenario - \$0.75/sh

GGG successfully develops Kvanefjeld and the operating performance meets expectations of Optimised FS. Basket price received exceeds FS numbers by 20%.

### Base Scenario - \$0.55/sh

GGG successfully develops Kvanefjeld in line with expectations of Optimised FS. Basket price received aligns with FS numbers.

### Bear Scenario - \$0.05/sh

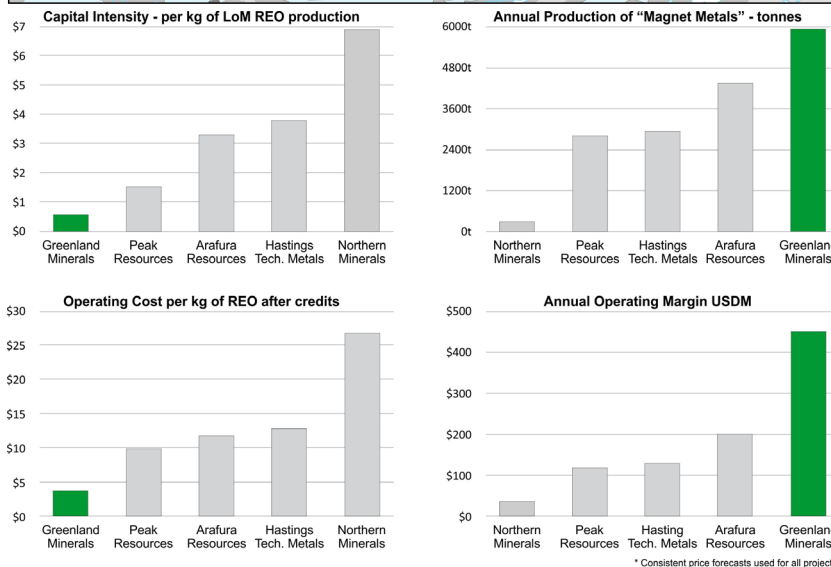
Kvanefjeld permitting delayed for foreseeable future and Shenghe walks away from project and sells GGG holdings.

## Company Summary

Greenland Minerals Ltd is an exploration and development company. The Company's primary focus is the development of the Kvanefjeld Rare Earths project in south west Greenland. At over 1 billion tonnes of Resource, it is the largest undeveloped Rare Earths project globally. By-products include uranium and zinc.

## Disclaimer

The projections and information above is based on the set assumptions outlined. Due care and attention has been used in the preparation of this information. However actual results may vary from forecasts and any variation may be materially positive or negative. Forecasts by their very nature, are subject to uncertainty and contingencies, many of which are outside the control of Euroz.



Euroz Forecast	2019	2020	2021	2022	2023
REO (US\$/kg)	\$20	\$20	\$20	\$20	\$20
AUDUSD	0.70	0.70	0.70	0.70	0.70

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Market Statistics				Year End 31 Dec			
<b>Share Price</b>	<b>\$0.10</b>	<b>A\$/sh</b>	<b>Directors</b>				
Fully Paid Ord	1191		Anthony Ho	NE Chair			
Performance Rights	15	m	John Mair	MD			
Options	4	m	Simon Cato	NE Dir			
<b>Total Dil. FPOrd</b>	<b>1,206</b>	<b>m</b>	Xiaolei Guo	NE Dir			
Market Capital'n (dil)	\$121	m	<b>Shareholders</b>				
Enterprise Value	\$116	m	Shenghe Resources	10.5%			
Cash	\$5	m	Peto Pty Ltd	2.4%			
Debt	\$-	m					
<b>Asset Valuation</b>				<b>A\$m</b>	<b>A\$/sh</b>		
Kvanefjeld (100% GGG)			1,182	0.56			
Cash			5	0.00			
Debt			-	-			
Corporate			(30)	(0.01)			
Unpaid Capital			-	-			
Assumed Dev. Fully Dil. Sol (m)			2,100				
<b>Total</b>			<b>1,157</b>	<b>0.55</b>			
<b>F/Cast Production</b>	<b>(A\$m)</b>	<b>2020f</b>	<b>2021f</b>	<b>2022f</b>	<b>2023f</b>		
<b>Kvanefjeld (100% GGG)</b>							
Rare Earth Oxide	kt	0	32.0	32.0	32.0		
Uranium	Mlbs	0	1.0	1.0	1.0		
<b>Opex (incl. by products)</b>	<b>US\$/kg</b>	<b>0</b>	<b>6.1</b>	<b>6.1</b>	<b>6.2</b>		
Assumptions							
REO Basket Price	US\$/kg	19.6	19.7	19.8	19.9		
Uranium U3O8 Spot	US\$/lb	60	60	60	60		
AUD/USD		0.70	0.70	0.70	0.70		
<b>Ratio Analysis (A\$m)</b>	<b>2020f</b>	<b>2021f</b>	<b>2022f</b>	<b>2023f</b>			
Cashflow	-2	453	455	458			
Cashflow per Sh	-0.2	37.6	37.8	38.0			
Cashflow Ratio (x)	-71.4	0.3	0.3	0.3			
Earnings	-16.1	310.3	319.7	328.5			
Earnings per Sh	-1.3	25.7	26.5	27.2			
EPS Growth (%)	NA	NA	3%	3%			
PE Ratio (x)	NA	0.4	0.4	0.4			
Enterprise Value	427.6	338.7	-113.9	-364.8			
EV : EBITDA	NA	0.5	-0.2	-0.6			
EV : EBIT	NA	0.6	-0.2	-0.7			
ND:ND+Eq (%)	86%	60%	-992%	-1866%			
EBIT Margin (%)	NA	69%	69%	69%			
RoE (%)	-34%	225%	118%	63%			
RoA (%)	-4%	53%	47%	37%			
Dividend (c/sh)	0.0	0.0	0.0	0.2			
Div Pay't Ratio	0%	0%	0%	1%			
Div Yield	0%	0%	0%	2%			
Div Franking	0.0	0.0	0.0	0.0			
<b>Profit and Loss (A\$m)</b>	<b>2020f</b>	<b>2021f</b>	<b>2022f</b>	<b>2023f</b>			
Revenue	-	903	907	912			
Cost of Sales	-	(280)	(281)	(282)			
Corporate	(2)	(4)	(4)	(4)			
Other	-	-	-	-			
<b>EBITDA</b>	<b>(2)</b>	<b>619</b>	<b>622</b>	<b>625</b>			
D&A	-	(71)	(71)	(71)			
<b>EBIT</b>	<b>(2)</b>	<b>547</b>	<b>550</b>	<b>554</b>			
Net Financing Costs	(14)	(71)	(64)	(58)			
<b>Profit Before Tax</b>	<b>(16)</b>	<b>476</b>	<b>486</b>	<b>496</b>			
Tax	-	(165)	(166)	(167)			
NPAT	(16)	310	320	328			
<b>Cash Flow (A\$m)</b>	<b>2020f</b>	<b>2021f</b>	<b>2022f</b>	<b>2023f</b>			
Receipts	-	903	907	912			
Payments	-	(280)	(281)	(282)			
Other	(2)	(170)	(171)	(172)			
<b>Operating CF</b>	<b>(2)</b>	<b>453</b>	<b>455</b>	<b>458</b>			
Capex	(357)	(364)	(43)	(43)			
Other	-	-	-	-			
<b>Investing CF</b>	<b>(357)</b>	<b>(364)</b>	<b>(43)</b>	<b>(43)</b>			
Equity	100	-	-	-			
Debt	300	100	-	-			
Other	-	-	-	(200)			
<b>Financing CF</b>	<b>400</b>	<b>100</b>	<b>-</b>	<b>(200)</b>			
<b>Cash Surplus(Deficit)</b>	<b>41</b>	<b>189</b>	<b>413</b>	<b>215</b>			
<b>Cash Close</b>	<b>5</b>	<b>194</b>	<b>606</b>	<b>821</b>			
<b>Balance Sheet (A\$m)</b>	<b>2020f</b>	<b>2021f</b>	<b>2022f</b>	<b>2023f</b>			
Cash & Equiv	5	194	606	821			
Other Current Assets	30	30	30	30			
Non-Current Assets	357	364	43	43			
<b>Total Assets</b>	<b>392</b>	<b>588</b>	<b>679</b>	<b>894</b>			
<b>Borrowings</b>	<b>300</b>	<b>400</b>	<b>360</b>	<b>324</b>			
Current Accounts Payable	30	30	30	30			
Other Liabilities	15	20	18	16			
<b>Total Liabilities</b>	<b>345</b>	<b>450</b>	<b>408</b>	<b>370</b>			
<b>Net Assets</b>	<b>47</b>	<b>138</b>	<b>271</b>	<b>524</b>			
<b>Reserves and Resources</b>	<b>Tonnes</b>	<b>REO Grade</b>	<b>REO cont</b>	<b>U3O8</b>	<b>U3O8 cont</b>		
	<b>Mt</b>	<b>ppm</b>	<b>Mt</b>	<b>ppm</b>	<b>Mlbs</b>		
<b>Kvanefjeld Resources</b>							
Measured	143	12,100	1.7	303	96		
Indicated	308	11,100	3.4	253	172		
Inferred	559	10,700	6.0	264	325		
<b>Total</b>	<b>1,010</b>	<b>11,000</b>	<b>11.1</b>	<b>266</b>	<b>592</b>		
<b>Kvanefjeld Reserves</b>							
Proven	43	14,700	0.6	352	33		
Probable	64	14,000	0.9	368	52		
<b>Total</b>	<b>107</b>	<b>14,300</b>	<b>1.5</b>	<b>362</b>	<b>85</b>		

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## (GGG \$0.10) Speculative Buy - Initiation of Coverage



### Background

The Kvanefjeld orebody was first discovered in the 1950s. More than 11km of diamond drilling and bulk metallurgical test work was performed during early exploration stages, however in 1983, the Danish government decided not to pursue the option of nuclear power and work at Kvanefjeld ceased.

**Kvanefield discovered in 1950's focusing on uranium.**

In May 2007, The Gold Company Ltd (ASX:GGG) acquired an interest in the Kvanefjeld Project by acquiring 100% of Chahood Capital Ltd for ~\$8.8m in cash and scrip, which was a party to a JV that held the exploration license over the area. The Gold Company Ltd changed its name to Greenland Minerals and Energy Ltd later that year to reflect the shift in focus.

**GGG acquired 61% stake in 2007 for \$8.8m scrip.**

Exploration was recommenced at Kvanefjeld in 2007, focussing on a multi-element search. Uranium exploration was banned in Greenland at the time, meaning uranium was became a by-product of the program. An initial JORC (2004) Resource was tabled in 2008 with an Inferred Resource of 90Mt of REO at 1.09% and 338Mt at 310ppm uranium.

**Maiden JORC Resource of 90Mt of REO at 1.09% and 338Mt at 310ppm**

A February 2010 PFS incorporated an expanded Resource of 457Mt at 1.07% REO and pointed to a large output of 44ktpa of REO and 8.6Mlbp of uranium over 23 years. Capex was high at US\$2.3bn, with a pre-tax NPV10 of US\$2.18bn and IRR of 24%.

**PFS pointed to NPV10 of US\$2.2b after US\$2.3b capex.**

In 2012, GGG acquired the remaining 39% stake in Kvanefjeld from JV partners Westrip Holdings and Rimbald Pty Ltd for A\$5m cash and ~A\$30m in GGG scrip. The structure of the final deal was favourable to GGG with the original deal requiring A\$39m in cash and ~A\$3m in scrip which would have stretched GGG's Balance Sheet at a time of weak prevailing market conditions.

**Remaining 39% stake purchased in 2012 for A\$35 cash and scrip.**

In 2013, the government of Greenland repealed its "zero-tolerance" uranium policy, allowing the exploitation of uranium and other radioactive elements. This effectively paves the way for permitting and ultimately the development of the Kvanefjeld Project due to the coincident uranium in the Rare Earths mineralisation.

**Government of Greenland repeals "zero-tolerance" uranium policy, allowing development of Kvanefield.**

A 2015 Feasibility Study was subsequently updated in 2016 pointing to a meaningful improvement in economics from resized operations. Capex was reduced by 62% to US\$832m delivering an after-tax NPV10 of US\$1.59bn and a 43% IRR. Increased Resources of 1.01 billion tonnes at 1.1% REO allow for an impressive 37-year mine life with output of 22ktpa of REO.

**2016 Feasibility Study improved economics with NPV10 of US\$1.6b after US\$832m capex.**

In 2016, the Kvanefjeld Project received strong third party validation when Shenghe Resource Holding Ltd (Shenghe) took a 12.5% stake in GGG at a Company level after a review of the best Rare Earths projects globally. Shenghe is a fully integrated Chinese Rare Earths producer with extensive experience in Rare Earths mining, processing and marketing, as well as solid capital strength. It is listed on the Shanghai Stock Exchange and has a Market Capitalisation of ~\$15 billion, providing the "big brother" support to progress Kvanefjeld. Ultimately we view offtake agreements as a likely outcome with JV potential to develop the Project.

**Rare Earths expert, Shenghe, took a 12.5% strategic stake in GGG in 2016.**

Through Greenland's in house expertise and Shenghe's experienced guidance, an optimised flowsheet has been developed, further improving Project economics. In July 2019 updated numbers pointed to a 40% decrease in capex to US\$505m and REO production costs <US\$4/kg (inclusive of by-product credits). Annual production is increased to 32ktpa of TREO, with 1Mlbp of uranium and 15ktpa of Zn concentrate as by-products over a 37-year mine life. With a more palatable capex more in-line with peers and the lowest operating costs, the Kvanefjeld Project truly is a standout Rare Earths development story globally. with the capability of delivering exceptional , as evidenced by.

**2019 optimisation lowers capex to US\$505m and operating costs to <US\$4/kg REO, lowest vs peers.**

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While we acknowledge that a funding requirement -6x larger than the current Market Capitalisation is always a challenge for any small company, the quality of the project and quick capital payback suggests Kvanefjeld could support a high level of debt. Other financing options include offtake finance, a royalty deal, traditional equity or farm-down of the Project. A JV deal with Shenghe is a possibility, however interest is also likely from European car manufacturers looking to secure an upstream supply of magnets as input materials for EVs.

Our initial Valuation of \$0.55/sh is based on the Updated Feasibility Study and optimised flowsheet estimates, with a basket price of REOs starting at US\$19.55/kg, a long-term uranium price of US\$60/lb and an AUD/USD exchange rate of 0.70. We heavily risk adjust our NPV10 (after capex and after tax) by 60% to reflect the uncertainties regarding final permitting, funding and project complexities.

We do however see significant upside to this once Kvanefjeld is developed. With annual EBITDA of >A\$600m, GGG could comfortably command a 3-4x EV/EBITDA implying a share price of >\$0.80/sh on a fully developed basis.

We Initiate Coverage with a Speculative Buy recommendation. Kvanefjeld is a genuine Tier 1 Rare Earths project with an incredible mine life and production potential, a simple processing flowsheet developed with industry leading experts and world class margins with the potential for multiples of GGG's current price.

Short to medium term catalysts include:

- Project permitting updates;
- Receipt of Mining License and completion of BFS;
- Potential offtake agreements;

## Valuation

**Valuation - \$0.55/sh**

**Price Target - \$0.55/sh**

Our Sum-of-the Parts (SOP) Valuation is outlined below:

ASSET VALUATION	A\$m	A\$/sh
Kvanefjeld (100% GGG)	1,182	0.56
Cash	5	0.00
Debt	-	-
Corporate	(30)	(0.01)
Unpaid Capital	-	-
Assumed Dev. Fully Dil. Sol (m)	2,100	
<b>Total</b>	<b>1,157</b>	<b>0.55</b>

Source: Euroz

Our Valuation of Kvanefjeld is based on the Updated Feasibility Study estimates, together with inputs from the optimised flowsheet studies recently completed. We risk adjust our after-tax NPV10 by 60% due to the uncertainty regarding final permitting, funding of the noteworthy capex and the complexity of the project.

Our REO basket price assumption starts at US\$19.55/kg in 2020 and grows nominally at 0.5%pa which we view as conservative compared to Rare Earths pricing forecasts from industry specialists. Our long-term uranium price is US\$60/lb and USD/AUD FX is \$0.70.

**Capex hurdle is noteworthy but project quality allows plenty of financing options.**

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## ASX Rare Earth Development Peers

Below we table the relevant ASX-listed peer set of Rare Earth developers to highlight the standout size and scale of Kvanefjeld.

		Arafura Resources	Greenland Minerals	Hastings Resources	Peak Resources	Northern Minerals*	Peer Average
ASX Ticker		ARU	GGG	HAS	PEK	NTU	
Share Price (A\$/sh)	\$/sh	0.09	0.10	0.185	0.043	0.055	
Dil. Sol	m	1055	1206	837	1529	2682	
Market Cap (A\$m)	A\$m	92	121	155	66	148	
Net Cash (A\$m)	A\$m	25	10	14	20	-3	
EV (A\$m)	A\$m	67	111	141	46	151	
Resources (cont. REO)	Mt	1.5	11.1	0.23	1.1	0.06	
Reserves (cont. REO)	Mt	0.6	1.5	0.14	0.89	0.02	
Est. Prod'n	ktpa	13	32	8	9	3	16
Mine Life	Years	23	37	13	26	11	25
Capex	A\$m	1000	721	517	521	330	690
EBITDA est	A\$/yr	286	643	199	166	108	323
Op cost/kg REO (after credit)	A\$/kg	17	5	18	14	27	14
EV:Resource	A\$/t	46	10	602	42	2508	175
EV:Reserve	A\$/t	116	74	1020	51	6841	315
EV:EBITDA	x	3.7	1.3	3.3	3.4	4.4	2.9
Capital Intensity	A\$/kg	3.3	0.5	3.8	1.5	2.5	2.3
Location (Flag.)		NT	Greenland	WA	Tanzania	WA	
Product		NdPr	NdPrDy	NdPr	NdPr	Dy	
Status		DFS underway	Optimised FS	DFS	BFS	Pilot Plant	

^^ AUD = 0.70 USD

\*Northern Minerals pilot plant figures skews ave. and was removed from calcs.

Figure 1: ASX-listed Rare Earth developer peer set. Source: Euroz

From the above peer set, we note the following points:

- Northern Minerals Ltd (ASX:NTU) is the most advanced of these with an operating pilot plant, therefore trading at meaningfully higher multiples than other peers;
- The small scale of NTU's pilot plant significantly skews multiples that it trades on and was therefore omitted from averages;
- Conversely, the standout size and scale of Kvanefjeld is evident above with almost 50% more mine life than the next largest peer and a total REO output 2.5x higher than the peer average;
- Scale and longevity is arguably more important in Rare Earths than most other commodities due to the relative complexity of the flowsheet and the downstream processing. A long mine life allows partners to confidently invest in downstream processing capacity outside of China;
- While prima facie capex for Kvanefjeld appears high, relative to peers it is broadly in line on an absolute basis at A\$721m vs peer average of A\$690m;
- Importantly, GGG trades on a capital intensity multiple about 5x cheaper than the peer average, when looking at the capital cost per kg of REO produced over LOM;
- GGG's unique, non-refractory orebody lends itself to simple processing relative to peers, with significant by-product credits. This is evidenced by the operating costs being 3x lower than the peer average at US\$4/kg of REO (after credits);

**Sector leading scale and mine life important to downstream processing partners.**

**5x lower capital intensity vs peers**

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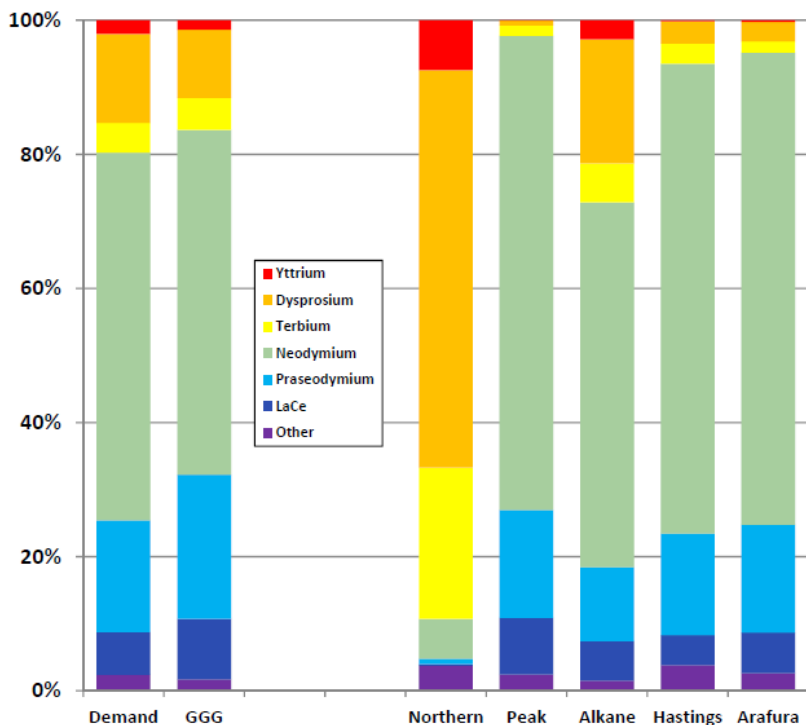


# Greenland Minerals Ltd

## (GGG \$0.10) Speculative Buy - Initiation of Coverage

- The Kvanefjeld orebody allows for a production profile of Rare Earth Elements that closely aligns to projected long term demand versus peers as evidenced below. This is important for downstream partnerships;

Unique, non-refractory orebody allows output aligned to customer demand at 3x lower cost than peer ave.



- Large production at lowest operating costs allows an impressive est. EBITDA of >A\$600m/year, with a peer-leading fully developed EV:EBITDA multiple of 1.3x, less than half of the peer average of 2.9x;
- While it can be argued that Greenland is not as favourable a mining jurisdiction as Australian-based peers, we believe that the market has unduly discounted the jurisdictional risk;
- One could argue that the relative international neutrality of Greenland vs Australia makes Kvanefjeld strategically appealing to both the East and the West, increasing the range of potential offtake partners for the vast output;
- The location of the Project has the added advantage over peers of being adjacent to deep water shipping routes which contributes to the low operating costs and makes it advantageous from a distance to European market standpoint;

Fully developed EV:EBITDA less than half of peers (GGG 1.3x vs peers 2.9x)

Location adjacent to deep water port contributes to lower cost and offers strategic advantage in proximity to customers

We view receipt of the Mining License for Kvanefjeld as being the key milestone that will lead to a re-rate of GGG toward peer average valuations. We expect this is likely in 2020.

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## Kvanefjeld Project (GGG 100%)

### Location

The Kvanefjeld Project is located near the southwest tip of Greenland, within the municipality of Kujalleq. The coastal town of Narsaq is the closest of several towns in the region, about 9km away. Narsaq has a deep-water port, currently used by local fisherman and for importing goods. Importantly, shipping access is year-round. Other towns of southern Greenland are serviced by air and ship, with an international airport at Narsarsuaq, located approximately 45 km to the east of Narsaq.

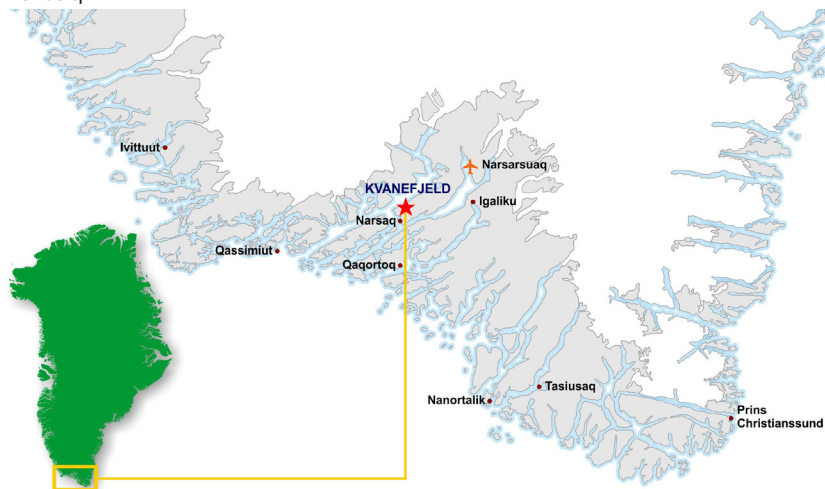


Figure 2: Kvanefjeld Project location. Source GGG

The climate in the Narsaq district is mild by Greenlandic standards, ranging between minus 6 degrees and 7 degrees Celsius throughout the year.

### The Unique Geology of the Ilimaussaq Complex

Sitting behind the town of Narsaq in southern Greenland is the Ilimaussaq alkaline complex, a unique geological setting. Economically, the most important rock unit forms an undulating, horizontal layer several hundred metres thick that is strongly enriched in rare earth elements, uranium, lithium, zirconium, zinc and fluorine. This rock called lujavrite, persists for over 50 square km, and forms the basis of the project.

Mineral resource estimates have been established at three locations within the project area; Kvanefjeld, Sørensen, and Zone 3. Each resource represents outcropping, or near-surface expressions, of the lujavrite seam. Resource estimates are JORC 2012 compliant and were prepared by SRK Consulting. To date, over a billion tonnes of mineral resources have been established. The Resource contains one of the largest inventories of Rare Earth elements and uranium globally (11.1 million tonnes of Rare Earth oxide, 593 million pounds U3O8).

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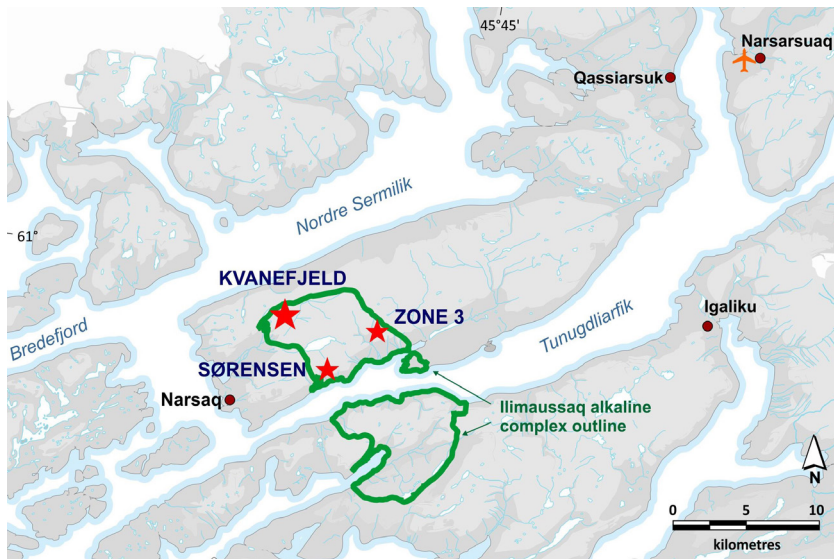


Figure 3: Ilimaussaq complex outline. Source GGG

The highest density of drill hole data is at the Kvanefjeld deposit, where part of the Resource is categorised as Measured. A Reserve estimate has also been established at Kvanefjeld. Mineral resources at Sørensen and Zone 3 are Inferred, but their geological similarity to Kvanefjeld suggests that further drilling will readily see resources shifted to higher confidence categories, and ultimately converted to Reserves as required.

Economic grades of Rare Earth, uranium and zinc mineralisation occur in the upper portions of the lujavrite seam and range from a few 10's of metres to well in excess of 250m in true thickness. In addition to Rare Earth, uranium and zinc, the mineralisation is also enriched in lithium, scandium and zirconium.

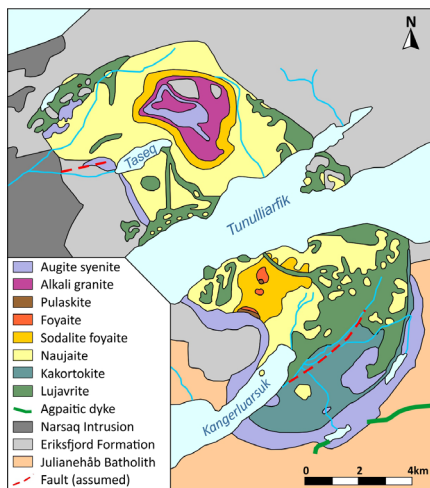


Figure 4: Ilimaussaq geology. Source GGG

Rare Earths, and to a slightly lesser extent uranium, are predominantly hosted in rare phospho-silicate minerals (steenstrupine), with much of the balance hosted in zirconium-silicate minerals (lovozerite group). Non-ore mineralogy is dominated by sodic silicate minerals such as arfvedsonite, albite, and feldspathoids. Zinc is hosted in sphalerite, which is disseminated through lujavrites, and is the only sulphide mineral consistently present.

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## Resource Estimate

The Ilimaussaq alkaline complex is a truly unique multi-element deposit with easy upgrade potential. The relative similarity of Inferred resources to the Measured section suggests that further work seamlessly upgrade the existing 1.01 billion tonnes of resources and can easily extend the already 37-year mine life.

Multi-Element Resources Classification, Tonnage and Grade										Contained Metal				
Cut-off (U <sub>3</sub> O <sub>8</sub> ppm) <sup>1</sup>	Classification	M tonnes Mt	TREO <sup>2</sup> ppm	U <sub>3</sub> O <sub>8</sub> ppm	LREO ppm	HREO ppm	REO ppm	Y <sub>2</sub> O <sub>3</sub> ppm	Zn ppm	TREO Mt	HREO Mt	Y <sub>2</sub> O <sub>3</sub> Mt	U <sub>3</sub> O <sub>8</sub> M lbs	Zn Mt
<i>Kvanefjeld - February 2015</i>														
150	Measured	143	12,100	303	10,700	432	11,100	978	2,370	1.72	0.06	0.14	95	0.34
150	Indicated	308	11,100	253	9,800	411	10,200	899	2,290	3.42	0.13	0.28	172	0.71
150	Inferred	222	10,000	205	8,800	365	9,200	793	2,180	2.22	0.08	0.18	100	0.48
150	<b>Grand Total</b>	<b>673</b>	<b>10,900</b>	<b>248</b>	<b>9,600</b>	<b>400</b>	<b>10,000</b>	<b>881</b>	<b>2,270</b>	<b>7.34</b>	<b>0.27</b>	<b>0.59</b>	<b>368</b>	<b>1.53</b>
200	Measured	111	12,900	341	11,400	454	11,800	1,048	2,460	1.43	0.05	0.12	83	0.27
200	Indicated	172	12,300	318	10,900	416	11,300	970	2,510	2.11	0.07	0.17	120	0.43
200	Inferred	86	10,900	256	9,700	339	10,000	804	2,500	0.94	0.03	0.07	49	0.22
200	<b>Grand Total</b>	<b>368</b>	<b>12,100</b>	<b>310</b>	<b>10,700</b>	<b>409</b>	<b>11,200</b>	<b>955</b>	<b>2,490</b>	<b>4.46</b>	<b>0.15</b>	<b>0.35</b>	<b>252</b>	<b>0.92</b>
250	Measured	93	13,300	363	11,800	474	12,200	1,105	2,480	1.24	0.04	0.10	75	0.23
250	Indicated	134	12,800	345	11,300	437	11,700	1,027	2,520	1.72	0.06	0.14	102	0.34
250	Inferred	34	12,000	306	10,800	356	11,100	869	2,650	0.41	0.01	0.03	23	0.09
250	<b>Grand Total</b>	<b>261</b>	<b>12,900</b>	<b>346</b>	<b>11,400</b>	<b>440</b>	<b>11,800</b>	<b>1,034</b>	<b>2,520</b>	<b>3.37</b>	<b>0.11</b>	<b>0.27</b>	<b>199</b>	<b>0.66</b>
300	Measured	78	13,700	379	12,000	493	12,500	1,153	2,500	1.07	0.04	0.09	65	0.20
300	Indicated	100	13,300	368	11,700	465	12,200	1,095	2,540	1.34	0.05	0.11	82	0.26
300	Inferred	15	13,200	353	11,800	391	12,200	955	2,620	0.20	0.01	0.01	12	0.04
300	<b>Grand Total</b>	<b>194</b>	<b>13,400</b>	<b>371</b>	<b>11,900</b>	<b>471</b>	<b>12,300</b>	<b>1,107</b>	<b>2,530</b>	<b>2.60</b>	<b>0.09</b>	<b>0.21</b>	<b>159</b>	<b>0.49</b>
350	Measured	54	14,100	403	12,400	518	12,900	1,219	2,550	0.76	0.03	0.07	48	0.14
350	Indicated	63	13,900	394	12,200	505	12,700	1,191	2,580	0.87	0.03	0.07	54	0.16
350	Inferred	6	13,900	392	12,500	424	12,900	1,037	2,650	0.09	0.00	0.01	6	0.02
350	<b>Grand Total</b>	<b>122</b>	<b>14,000</b>	<b>398</b>	<b>12,300</b>	<b>506</b>	<b>12,800</b>	<b>1,195</b>	<b>2,570</b>	<b>1.71</b>	<b>0.06</b>	<b>0.15</b>	<b>107</b>	<b>0.31</b>
<i>Sørensen - March 2012</i>														
150	Inferred	242	11,000	304	9,700	398	10,100	895	2,602	2.67	0.10	0.22	162	0.63
200	Inferred	186	11,600	344	10,200	399	10,600	932	2,802	2.15	0.07	0.17	141	0.52
250	Inferred	148	11,800	375	10,500	407	10,900	961	2,932	1.75	0.06	0.14	123	0.43
300	Inferred	119	12,100	400	10,700	414	11,100	983	3,023	1.44	0.05	0.12	105	0.36
350	Inferred	92	12,400	422	11,000	422	11,400	1,004	3,080	1.14	0.04	0.09	85	0.28
<i>Zone 3 - May 2012</i>														
150	Inferred	95	11,600	300	10,200	396	10,600	971	2,768	1.11	0.04	0.09	63	0.26
200	Inferred	89	11,700	310	10,300	400	10,700	989	2,806	1.03	0.04	0.09	60	0.25
250	Inferred	71	11,900	330	10,500	410	10,900	1,026	2,902	0.84	0.03	0.07	51	0.20
300	Inferred	47	12,400	358	10,900	433	11,300	1,087	3,008	0.58	0.02	0.05	37	0.14
350	Inferred	24	13,000	392	11,400	471	11,900	1,184	3,043	0.31	0.01	0.03	21	0.07
<i>Project Total</i>														
150	Measured	143	12,100	303	10,700	432	11,100	978	2,370	1.72	0.06	0.14	95	0.34
150	Indicated	308	11,100	253	9,800	411	10,200	899	2,290	3.42	0.13	0.28	172	0.71
150	Inferred	559	10,700	264	9,400	384	9,800	867	2,463	6.00	0.22	0.49	326	1.38
150	<b>Grand Total</b>	<b>1010</b>	<b>11,000</b>	<b>266</b>	<b>9,700</b>	<b>399</b>	<b>10,100</b>	<b>893</b>	<b>2,397</b>	<b>11.14</b>	<b>0.40</b>	<b>0.90</b>	<b>593</b>	<b>2.42</b>

<sup>1</sup>There is greater coverage of assays for uranium than other elements owing to historic spectral assays. U<sub>3</sub>O<sub>8</sub> has therefore been used to define the cutoff grades to maximise the confidence in the resource calculations.

<sup>2</sup>Total Rare Earth Oxide (TREO) refers to the rare earth elements in the lanthanide series plus yttrium.

Note: Figures quoted may not sum due to rounding.

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## Greenland Minerals Ltd

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#### Updated Feasibility Study

GGG completed an updated Feasibility Study on Kvanefjeld in 2016 pointing to a robust project with a capex of US\$832m, delivering an after-tax NPV10 of US\$1.59bn with a 43% IRR. Resources of 1.01 billion tonnes at 1.1% REO provide a Reserve of 108Mt and allow for an impressive 37-year mine life with output of 22ktpa of total REO.

An Optimised Feasibility Study is ongoing, with initial updates pointing to further improved economics. 2019 updates have identified an additional 39% decrease in capex to US\$505m and REO production costs of <US\$4/kg (inclusive of by-product credits). Annual production is increased to 32ktpa of TREO, with 1Mlbpa of uranium and 6ktpa of Zn concentrate as by-products over a 37-year mine life. The basket price for the intermediate product is guided to US\$19.55/kg REO.

Cost Classification	US\$M
Direct Capital Costs	380
Indirect Costs for Construction	61
Contingency (Accuracy Provision)	64
<b>Total Investment Cost</b>	<b>505</b>

Figure 5: Optimised Kvanefjeld capex estimates. Source GGG

Of the total capital costs required to develop Kvanefjeld, a large proportion is for the concentrator and refinery plants. The breakdown of "Direct Capital Costs" is outlined below.

Direct Cost Area	US\$M
Mining Area	54.3
Concentrator Process Plant	142.4
Refinery Process Plant	62.7
Tailings Facilities	27.7
Infrastructure	46.3
Utilities	4.2
Miscellaneous	42.2

Figure 6: Optimised Kvanefjeld capex estimates. Source GGG

The key to the significant capex and opex reductions and the overall improvement in Project economics is the optimisation of the flowsheet. This has been completed in conjunction with supportive major shareholder Shenghe Resources Holding Co Ltd, a leading Rare Earths processing technology company globally.

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## Flowsheet

Typically, very high temperatures and pressures, as well as aggressive chemical approaches are required to extract rare earths from more common Rare Earth bearing minerals. However, the unique Kvanefjeld minerals readily liberate Rare Earths in a simple atmospheric acid leach. This is the key to significant cost savings.

A simple, two stage flowsheet is therefore the key that unlocks the value in the Kvanefjeld story.

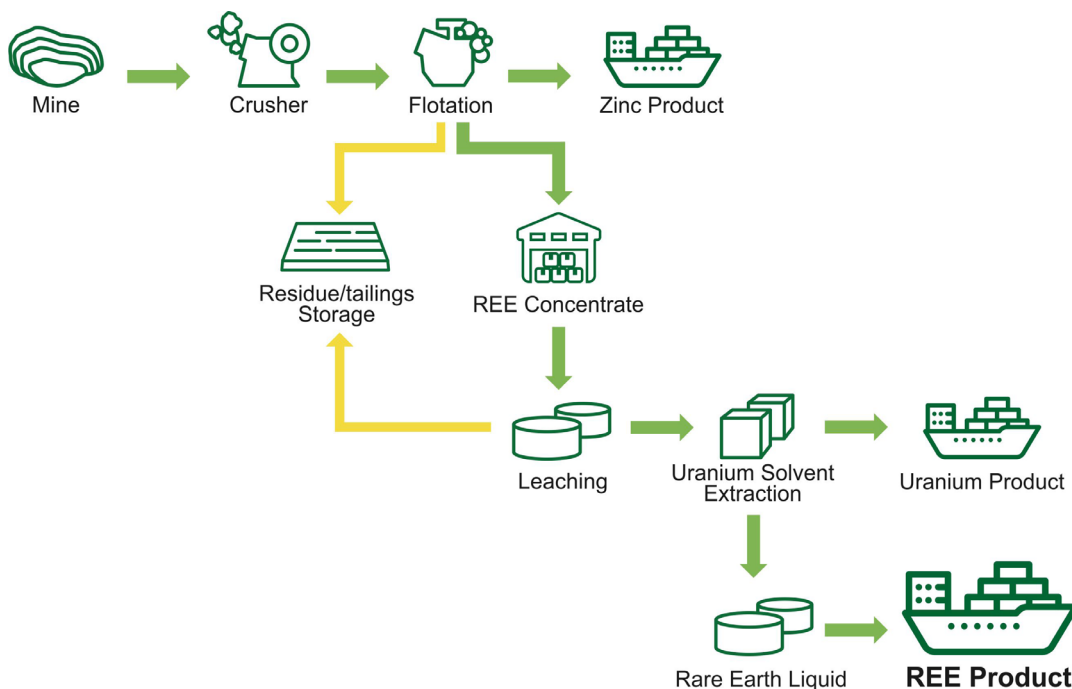


Figure 7: A simple flowsheet is the key to Kvanefjeld's value. Source: GGG

In the first stage, industry standard froth flotation concentrates the key Rare Earth bearing mineral steenstrupine. Zinc concentrate is also produced in this stage.

In the second stage, hydrometallurgical leaching of the steenstrupine concentrate, followed by solvent extraction, produces intermediate Rare Earth products and uranium oxide as a by-product.

Both stages have been extensively piloted, and the flowsheet is currently undergoing further optimisation under guidance from Shenghe. Optimisation test work has been extremely successful to date, and will result in simplifications and substantial improvements in efficiency and cost-structure.

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### Licensing a Risk

We view permitting and receipt of a Mining Licence as a key risk to GGG and believe this is a major reason for its discount relative to peers. In 2018/2019, significant progress was made toward obtaining relevant permits for Kvanefjeld, with 2020 shaping up as an exciting year on this front.

In June 2019, the Company lodged an application for an exploitation (mining) license with the Government of Greenland. In accordance with requirements set out by the Government, the following supporting documents were included with the Application:

- An environmental impact assessment (EIA)
- A social impact assessment (SIA)
- A navigational safety investigation study (NSS)

Collectively, these documents comprise a mining license application and the Company has received confirmation from the Mineral License and Safety Authority that the application has been received.

In March 2019, the municipal authority in southern Greenland, Kommune Kujalleq, and the Kujalleq Business Council signed a Memorandum of Understanding with the company to negotiate a participation agreement to cover community involvement in the development of the Kvanefjeld project. After a period of public consultation, a White Paper will be produced which will collate feedback received during this consultation period. Following the White Paper and final update of the Project's impact assessment and post this step, we expect the relevant permits to be granted. We anticipate that a Mining License could be received as early as 2020.

### Other Risks

**Market Risk** – General market risk.

**Commodity Price** – GGG is a resource exploration and development company. Market valuation is inextricably linked to prevailing resource sector macro and to the relevant commodity price.

**Sovereign Risk** – GGG's assets are in Greenland which is relatively unsophisticated from a mining industry standpoint. Although recent government moves have been pro-mining, there is still a risk with further permitting delays as policy evolves along with the Project. Greenland weather also poses a risk to construction timelines and to mining operations.

**Permitting Risk** – As described above and in the permitting discussion earlier, this is a key risk to the development of Kvanefjeld. Progress has been steady, however there is a risk that the process is longer than anticipated or that licencing is not granted at all.

**Financing Risk** – GGG is an exploration and development company requiring ongoing study capital. Given a lack of recurring operating cashflow, a debt funded business model is entirely inappropriate at this point in the Company's evolution. Consequently, equity capital will be required to complete planned development studies. There is also a significant capital hurdle that is required to develop the Project which poses Balance Sheet and Capital Structure risk.

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#### Rare Earths Market

Rare Earths are a group of 17 elements, comprising the 15 lanthanides and the elements Scandium (Sc) and Yttrium (Y). The 15 lanthanides are further classified into light (atomic number 57 to 64) and heavy (atomic number 65 to 71) Rare Earth Elements. Cerium, Praseodymium, Neodymium, and Europium are the majorly known light Rare Earth elements while Dysprosium and Terbium are more popular in the heavy Rare Earths category.

Curtin-IMCOA estimates that in 2020 there is a demand deficit for total Rare Earth Oxides globally with 201.5kts of demand vs 225kts of supply. This deficit is predicted to reverse shortly with the consumption of Rare Earths expected to grow at a CAGR of 6% until 2030. This is driven by rising demand of Rare Earths in emerging clean technologies such as wind turbines, Electric Vehicles (EVs), energy-effective lighting, and rechargeable batteries.

Rare Earth	Demand		Supply/Production	
	Tonnes	Share in Total Demand	Tonnes	Share in Total Production
Cerium (Ce)	72,175	36%	76,950	34.20%
Lanthanum (La)	49,425	25%	60,750	27%
Neodymium (Nd)	46,100	23%	42,975	19.10%
Praseodymium (Pr)	15,175	8%	13,725	6.10%
Yttrium (Y)	9,675	5%	13,275	5.90%
Gadolinium (Gd)	3,675	2%	5,400	2.40%
Dysprosium (Dy)	1,850	1%	3,150	1.40%
Samarium (Sm)	1,600	1%	4,725	2.10%
Erbium (Er)	900	0%	900	0.40%
Terbium (Tb)	400	0%	675	0.30%
Europium (Eu)	250	0%	675	0.30%
Ho-Tm-Yb-Lu	275	0%	1,800	0.80%
<b>Total</b>	<b>201,500</b>	<b>99.80%</b>	<b>225,000</b>	<b>100%</b>

Figure 8: Estimated 2020 Rare Earths market. Source: Curtin-IMCOA

Critical Rare Earths (Neodymium and Praseodymium) are the key for GGG as these are currently in a supply deficit, expected to exacerbate with a lack of quality projects able to efficiently separate these minerals.

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### Magnets are Key

Current Rare Earth magnet manufacturing accounts for about 27% and 73% of global Rare Earths consumption in volume and value terms, respectively. The most important Rare Earths for permanent magnets used in EVs and wind turbine generators are Neodymium (Nd), Praseodymium (Pr) and Dysprosium (Dy).

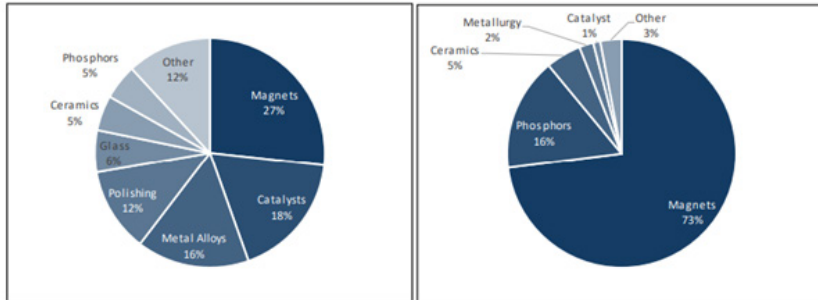


Figure 9: Demand breakdown of Rare Earths by volume (left) and value (right). Source: IMCOA

Importantly, this demand is expected to grow significantly as the shift toward EVs intensifies, as highlighted below.

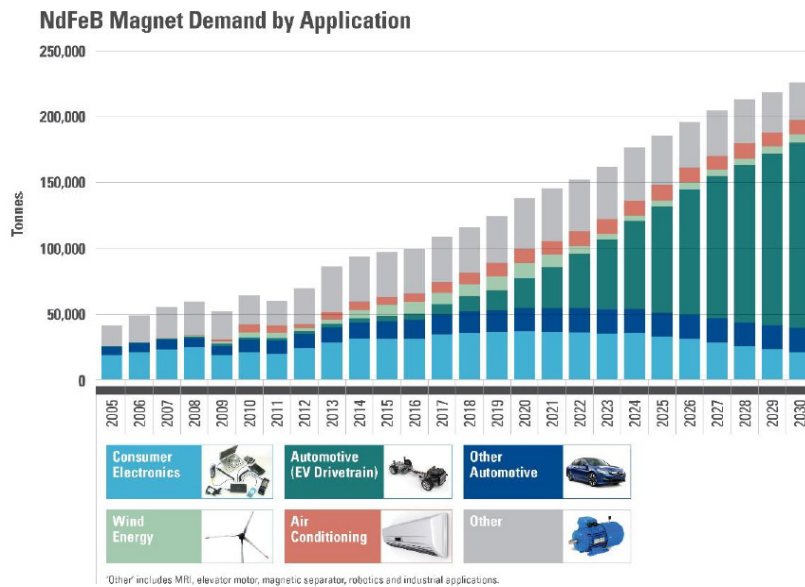


Figure 10: Growing magnet demand. Source: ARU

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#### Growing EVs Increasing Demand

Global EV sales were around 1.6m units in 2018, expected to increase at a CAGR of 25% to 3.9m units by 2022. This growth is largely driven by support and commitments from governments and the automotive industry for increased deployment of EV's.

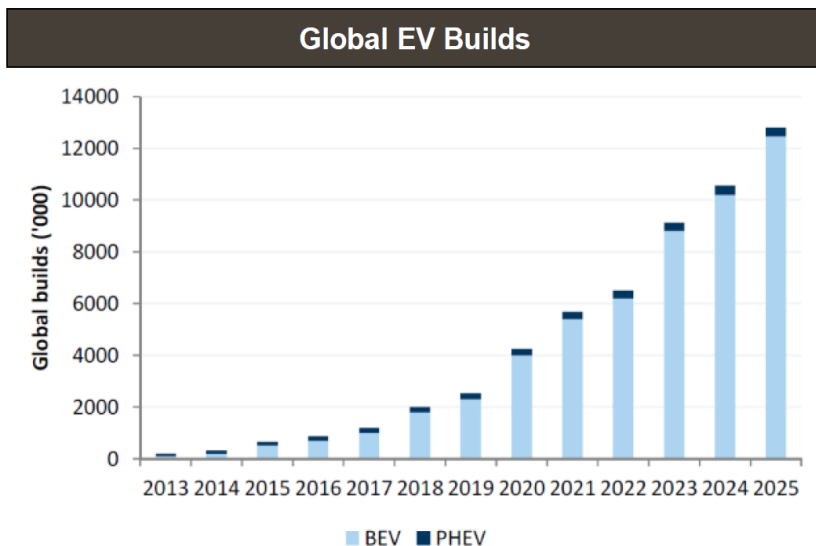


Figure 11: EV growth is expected to intensify. Source: PLS

Battery Electric Vehicles (BEVs) make up 66% of the global EV market and are growing faster than those of plug-in hybrid vehicles (PHEV), which accounted for the remaining 34% of the market in 2017. The share of BEVs has increased from 60% in 2015 to 66% in 2017.

#### China Dominates Rare Earths

In 2019, China is forecast to account for 77% of global Rare Earth production, with six state owned enterprises accounting for the majority of supply. Despite its dominance of the global industry, China's production of mined Rare Earths has been impacted in recent years by the introduction of environmental legislation and industry consolidation. Environmental legislation has led to many operations, predominantly in southern Chinese provinces, suspending production. As a result, Chinese processors have looked to alternative sources of Rare Earth raw materials, creating opportunities for producers both in the Chinese domestic market and in the rest-of-world.

Rare Earth production at operations outside of China is limited to a small number of locations in 2019, though there are multiple projects under development in Australia, Canada, the USA and Africa with the potential to supply rare earth concentrates to the market. The production of refined rare earth production outside China is even scarcer than the supply of mined raw materials and has been identified as a supply chain risk by some consumers. China is expected to remain the major supplier of REE products to the global market.

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### Management

#### Mr Anthony (Tony) Ho - Non- Executive Chairman

Mr Tony Ho is an experienced company director having held executive directorships and chief financial officer roles with a number of ASX listed companies. Tony was executive director of Arthur Yates & Co Limited, retiring from that position in April 2002. His corporate, general management and governance experience includes being chief financial officer/finance director of M.S. McLeod Holdings Limited, Galore Group Limited, the Edward H O'Brien group of companies.

Tony is currently the chairman of ASX listed Bioxyne Limited (ASX: BXN), Credit intelligence Limited (ASX:CI1) and NSX listed Truscreen Limited (NZX:TRU) He was previously chairman of Esperance Minerals Limited and a non-executive director of Apollo Minerals Limited and Hastings Technology Metals Limited.

Tony was the past non-executive chairman of St. George Community Housing Limited (November 2002 to December 2009) where he successfully grew the NGO to be one of New South Wales leading community housing companies Prior to joining commerce, Tony was a partner of Cox Johnston & Co, Chartered Accountants, which has since merged with Ernst & Young.

Tony holds a Bachelor of Commerce degree from the University of New South Wales and is a member of the Institute of Chartered Accountants in Australia and New Zealand and a fellow of the Australian Institute of Company Directors, Institute of Chartered Secretaries and Administrators, and Governance Institute of Australia.

#### Mr John Mair - Managing Director

John Mair is a minerals industry professional with international experience across technical, corporate and managerial roles. John holds a PhD in economic geology from the University of Western Australia, and was a post-doctoral research fellow at Mineral Deposit Research Unit, UBC, Vancouver, working in close association with the US Geological Survey.

John has been a director of GML since 2011 and Managing Director from September 2014. John has played a key role in the Company's successful political interface with the Greenland and Danish governments and stakeholder groups, as well as driving a number of significant funding initiatives, and the technical direction of the Company's activities in Greenland.

John presents on the Company's behalf in commercial, technical, and political forums internationally. He is a Member of the Australian Institute for Mining and Metallurgy (AusIMM) and the Society for Economic Geologists (SEG).

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## Greenland Minerals Ltd

### (GGG \$0.10) Speculative Buy - Initiation of Coverage

#### Mr Simon Cato – Non-Executive Director

Mr Simon Cato has over 30 years' experience in the capital markets in broking, regulatory roles and as director of listed companies.

He was initially employed by the ASX in Sydney and then in Perth. From 1991 until 2006 Simon was an executive director and/or responsible executive of three stockbroking firms. During that time Simon was involved in the formation of a number of companies, including writing prospectuses and managing the listing process and has been through the process of IPO listing in the dual role of broker and director.

Since 2006 he has been an executive and non-executive director of a number of public companies with a range of different business activities and was a founding director of Greenland Minerals Limited.

Currently Simon holds a number of non-executive director roles with listed companies in Australia.

#### Mr Xiaolei Guo – Non-Executive Director

Mr Xiaolei Guo completed a Bachelor of Arts, major in law at China University of Political Science and Law and was admitted to the Bar in China. He was previously a judge assistant in Tianjin Hexi District People's Court in July 2004, then joined King & Wood Mallesons in September 2007, working in the securities department specialising in providing securities and investment services to clients. He was extensively involved in IPOs, M&A bond issues bankruptcy and other corporate matters.

In early 2014, he joined Shenghe Resources Holding Co., Ltd as General Manger Assistant and Manager of the investments and development department. In this role, Mr Guo focused on the acquisition of rare earth projects and played a key role in selecting and evaluating project and participated in the negotiation and legal aspects of acquisitions.

Xiaolei is Le Shan Shenghe Rare Earth Company Limited's nominee to the Company's board.

### Director Shareholdings

Directors	Shares (m)	Perf Rights/Options
Tony Ho	3.5	0.0
John Mair	8.4	6.0
Simon Cato	6.4	0.0
Xiaolei Guo	0.0	0.0

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## Greenland Minerals Ltd

## (GGG \$0.10) Speculative Buy - Initiation of Coverage

## Top 18 Shareholders

Name of Shareholder	Shares (m)	% Held
1 Shenghe Resources Holding Co., Ltd	125.0	10.50
2 Peto Pty Ltd	28.0	2.35
3 Simon Millington	13.4	1.12
4 Mirae Asset Global Investments Co., Ltd	12.4	1.04
5 Dolefin SA	10.0	0.84
6 John Mair	8.4	0.70
7 Nero Resource Fund Pty Ltd	6.7	0.56
8 James Richardson	6.6	0.55
9 Simon Cato	6.4	0.54
10 Jiahuang Zhang	6.2	0.52
11 Harvey Stern	5.4	0.46
12 Vereinigte Sparkasse Eschenbach, Asset Management Arm	4.0	0.34
13 Anthony Ho	3.8	0.32
14 Adonis Kiritsopoulos	2.5	0.21
15 Jennifer Ford	2.5	0.21
16 Dimensional Fund Advisors L.P.	2.0	0.17
17 Miles Guy	1.6	0.13
18 Ahead International Portfolio Management AG	0.7	0.06
<b>TOTAL</b>	<b>245.4</b>	<b>20.6</b>

Source: GGG

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