

***BUILDING THE FOUNDATIONS OF A WORLD-CLASS  
MINING PROJECT***



**GREENLAND**  
MINERALS AND ENERGY LTD

*“Specialty Metals for a Greener World”*

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## **JORC Compliance – Consent of Competent Persons**

Information in this presentation that relates to mineral resource estimation reflects information compiled by Mr Robert Spiers and Arnold van der Heyden. Resource estimation was undertaken by Mr Spiers who with Mr van der Heyden are full time employees of Hellman and Schofield Pty Ltd. Mr Spiers is a Member of the Australian Institute of Geoscientists (AIG) and Mr van der Heyden is a member of the Australian Institute of Mining and Metallurgy (AusIMM). Mr Spiers and Mr van der Heyden have sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which they are undertaking to qualify as Competent Persons as defined in the 2004 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Spiers and Mr van der Heyden consent to the reporting of this information in the form and context in which it appears.



# Presentation Overview

## ■ *The Timing:*

*Rare earth metals* and *uranium* now recognised as strategically important metals for the future

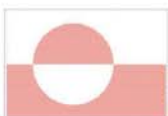
*Greenland* – an emerging minerals province

## ■ *The Project:*

Unearthing the *Ilimaussaq Ore Field*; building the foundations of a world-class rare earth and uranium mining project

## ■ *Current Status and Outlook:*

Pre-Feasibility Study updates





# GREENLAND

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- Acquired a license over the northern Ilimaussaq Complex located in south Greenland in mid-2007 in a JV agreement
- License contained historic uranium deposit, and area known to be highly prospective for specialty metals – particularly REEs
- Permitted to evaluate the potential for multi-element resources: Now recognized as one of the largest deposits of REEs globally, pre-feasibility studies indicate strong economics
- Greenland reviewing uranium policy; new amendment to exploration license terms creates evaluation framework for projects that contain uranium



## Market Details:

<b>ASX:</b>	<b>GGG</b>
<b>52 Week Range:</b>	<b>\$0.30 – 1.10 AUD</b>
<b>Shares:</b>	<b>266M</b>
<b>Options:</b>	<b>157M</b>
<b>Market Cap:</b>	<b>\$239 M AUD</b>
	<i>(undiluted)</i>
<b>Top 20 shareholders control 75%</b>	

*Consider first the world of tomorrow*

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*Global power consumption soaring*



*An increasingly electronic world*



*New technologies for energy efficiency*



*Growing concerns about our environment*

# Company Focus

## *Strategic Metals For Tomorrow*

### **Rare Earth Elements:**

- *Specialty metals with unique chemical and physical properties*
- *Essential in many new technologies and consumer products*
  - *Hybrid cars, wind turbines, laptops, ipods, flat screens, oil refining, catalytic converters, medical and military applications*
- *Strategically important to the global manufacturing base*
- *Imminent short supply as China reduces exports*

### **Uranium:**

- *World power crisis, climate change and the nuclear renaissance*
- *Crucial base load energy supply for the future – clean and efficient*



# Greenland

## An Emerging Mineral Province

### ***Politically stable democracy:***

- *Autonomous constituent country within Kingdom of Denmark*
- *Increasing independence with transition from [Home Rule](#) to [Self Rule](#)*
- *Pro-mining government – increased independence is dependant on establishing strong minerals and hydrocarbon industries*

### ***Extremely prospective:***

- *Diverse geology exposed around coastal fringe*
- *Underexplored, yet strong geological survey, quality service providers*
- *High potential for world-class ore bodies near surface*



# Greenland

## An Emerging Mineral Province

**Important political development in relation to radioactive elements**

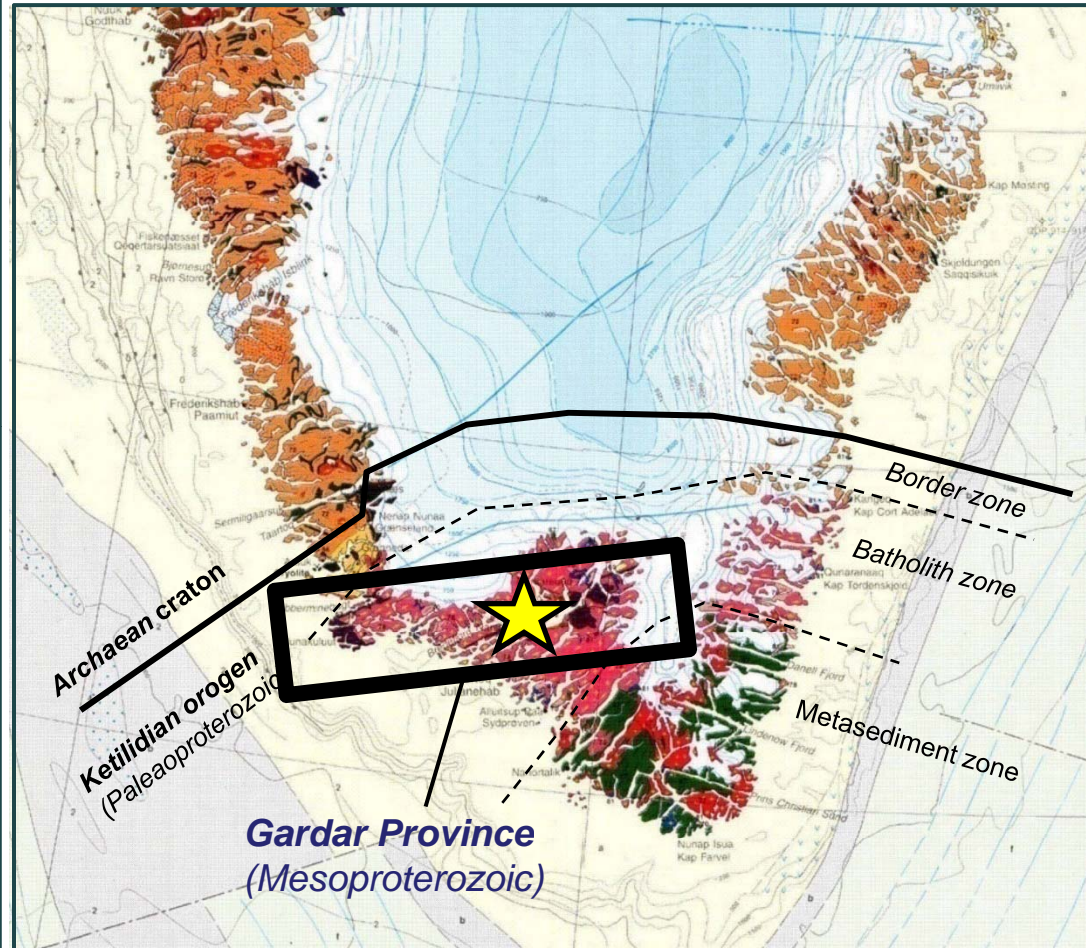
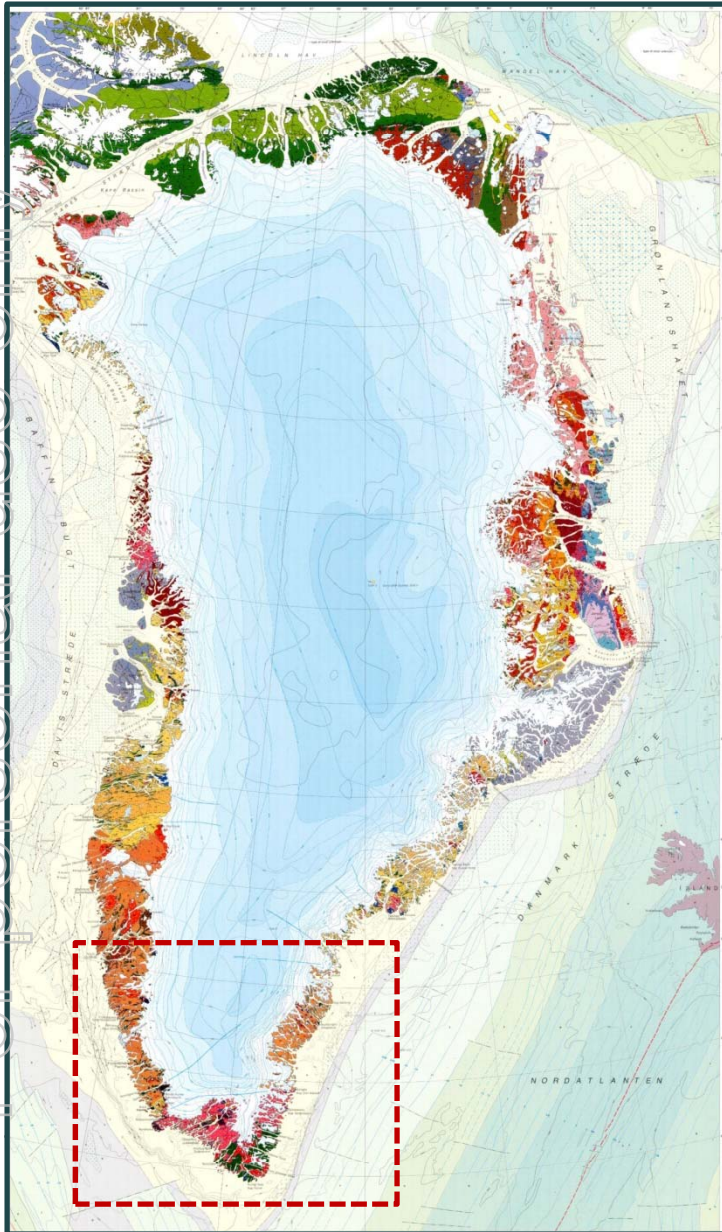
- *New amendment to the ‘Standard Terms for Exploration Licenses’*
- *The amendment allows for, upon government approval, the full evaluation and reporting on mineral projects that include uranium*
- *Provides a framework for projects that include radioactive materials to be fully evaluated through a definitive feasibility study*
- *Permitting is then based on study outcomes with an emphasis on environmental and social considerations*



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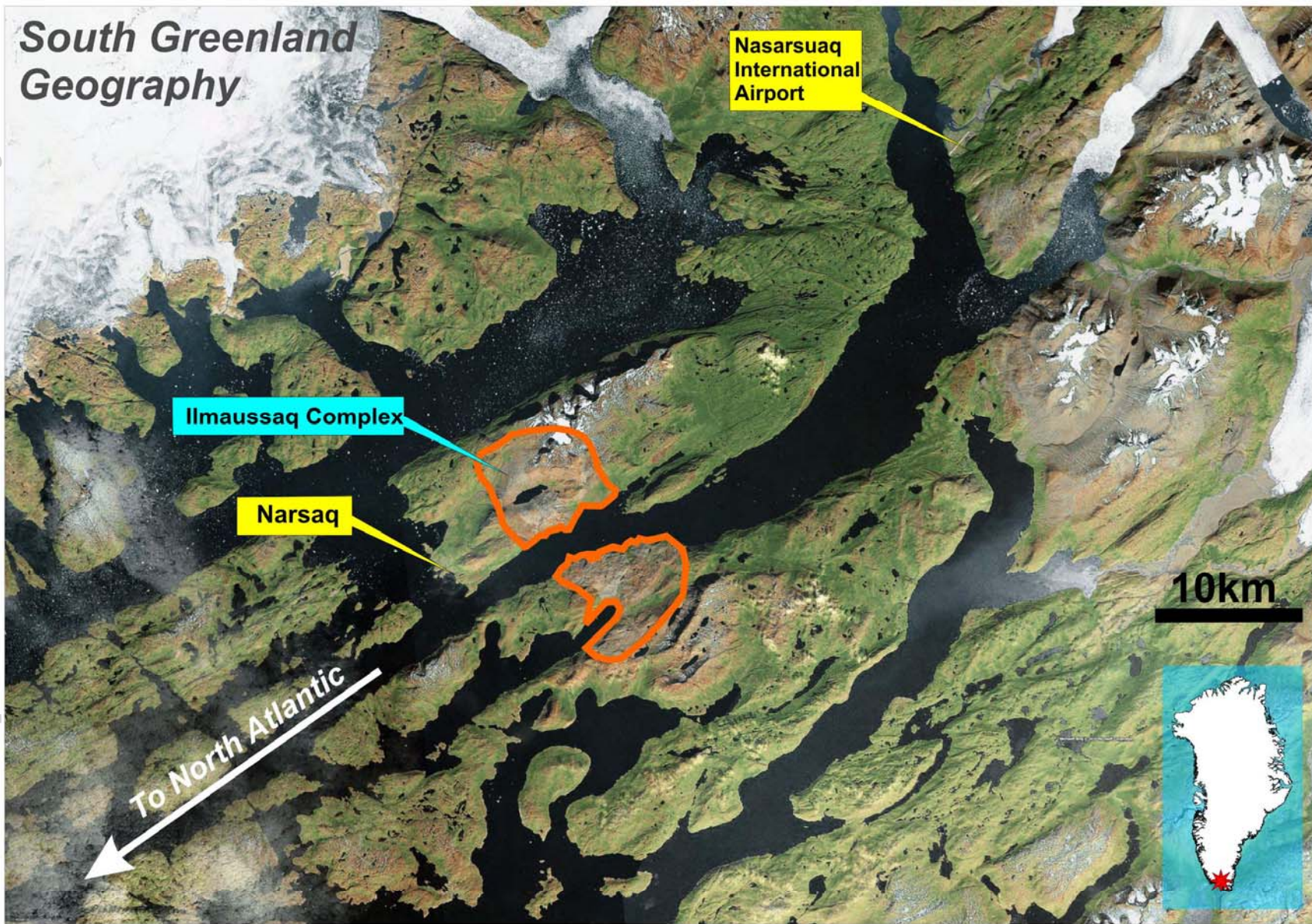


# Greenland Geology



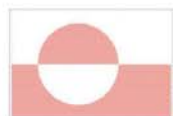
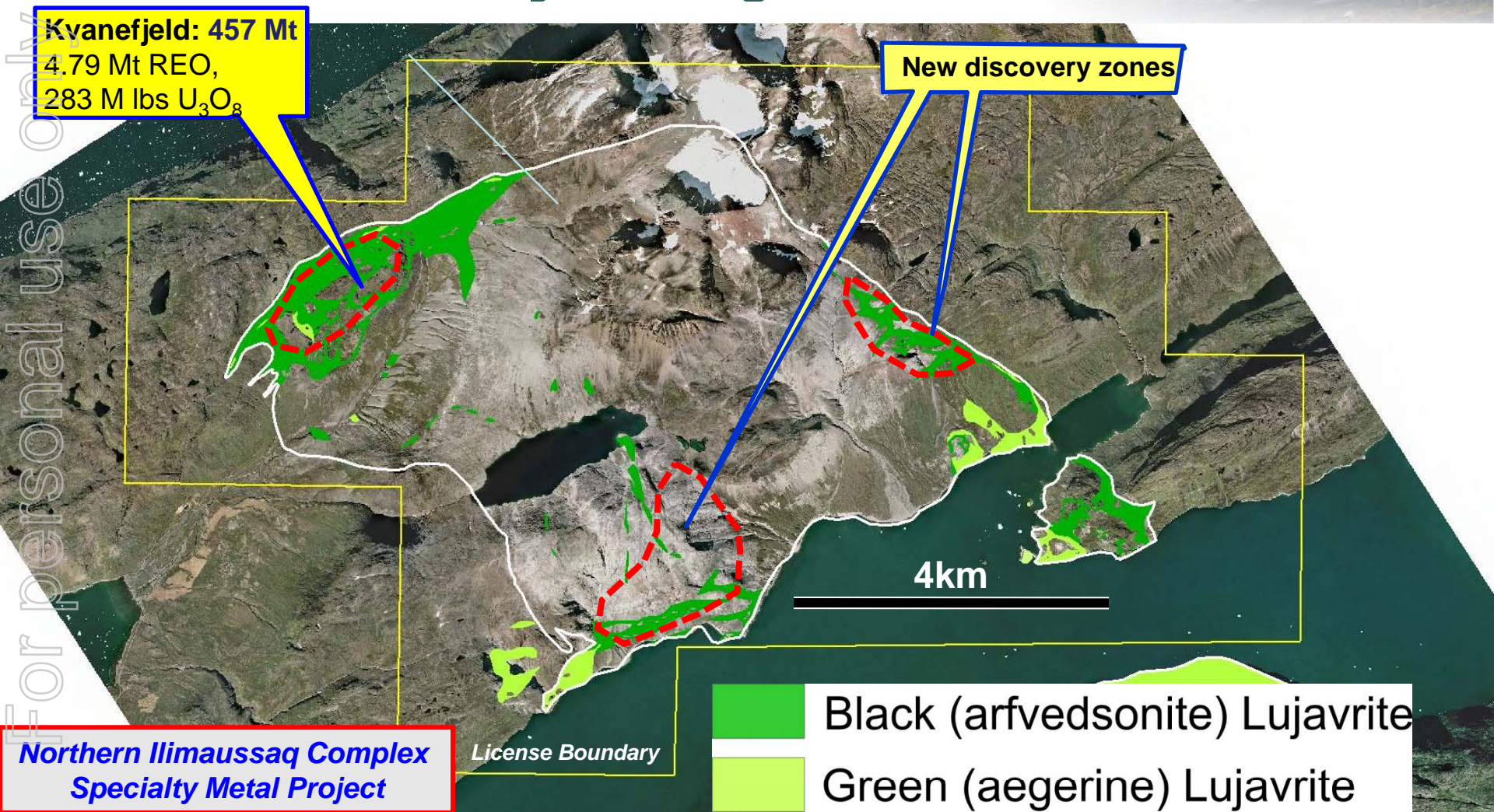
**Gardar Province** – Alkaline intrusions emplaced in a continental rift setting (e.g. **Ilimaussaq Complex**)





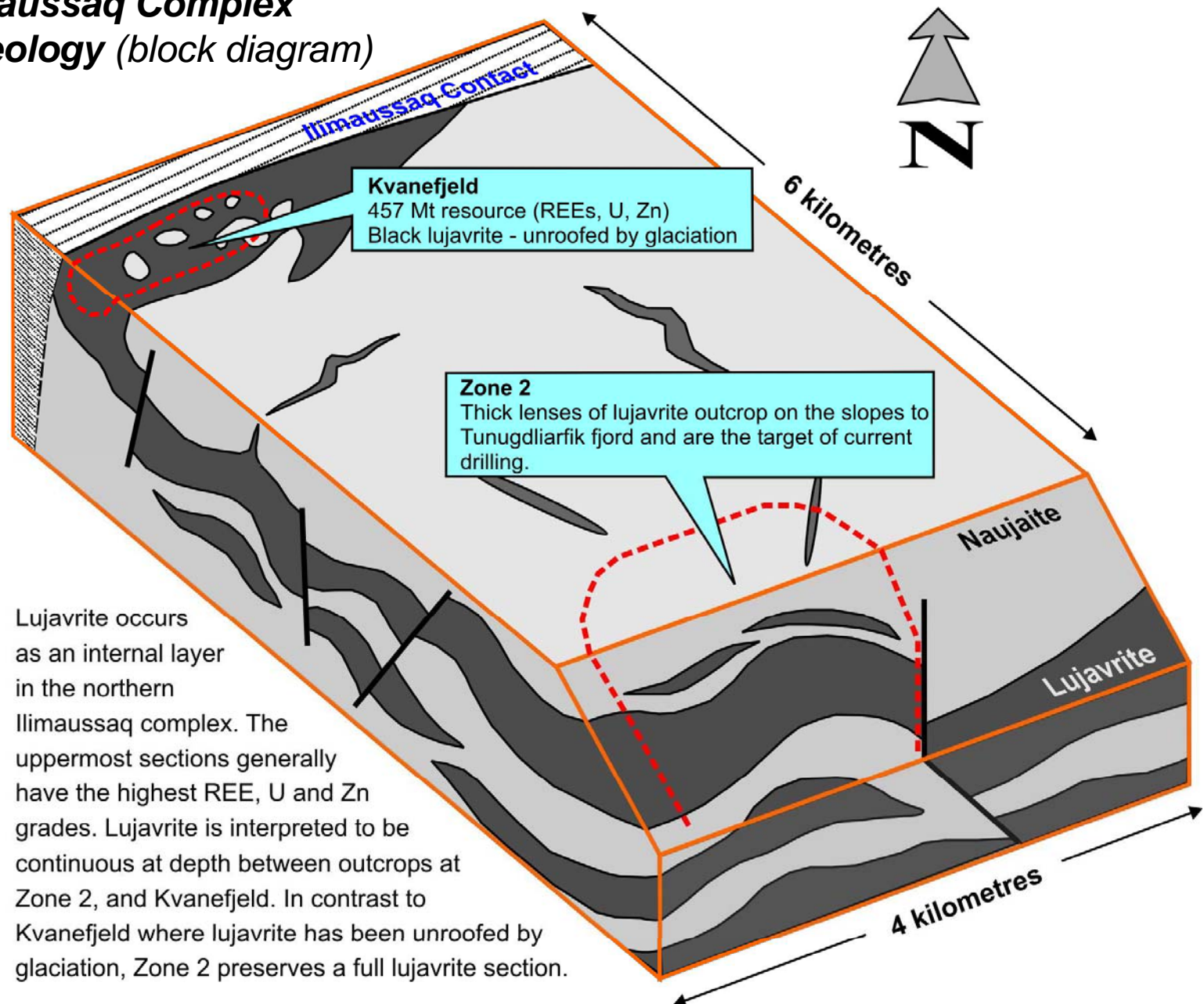
# Northern Ilimaussaq Complex

## Key Geological Units



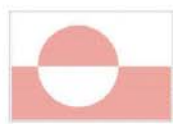
# Northern Ilimaussaq Complex

## Schematic geology (block diagram)



Lujavrite occurs as an internal layer in the northern Ilimaussaq complex. The uppermost sections generally have the highest REE, U and Zn grades. Lujavrite is interpreted to be continuous at depth between outcrops at Zone 2, and Kvanefjeld. In contrast to Kvanefjeld where lujavrite has been unroofed by glaciation, Zone 2 preserves a full lujavrite section.

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# Kvanefjeld - Resources

At U <sub>3</sub> O <sub>8</sub> % cutoff grades <sup>1</sup>	Tonnes (million)	U <sub>3</sub> O <sub>8</sub> %	U <sub>3</sub> O <sub>8</sub> lb/t	TREO% <sup>2</sup>	Zn%	Resource category
0.015	365	0.028	0.62	1.06	0.22	Indicated
	92	0.027	0.59	1.12	0.22	Inferred
	<b>457</b>	<b>0.028</b>	<b>0.62</b>	<b>1.07</b>	<b>0.22</b>	<b>TOTAL</b>
0.020	276	0.032	0.70	1.13	0.23	Indicated
	63	0.031	0.69	1.21	0.24	Inferred
	<b>339</b>	<b>0.032</b>	<b>0.70</b>	<b>1.14</b>	<b>0.23</b>	<b>TOTAL</b>
0.025	207	0.035	0.77	1.20	0.23	Indicated
	43	0.036	0.78	1.31	0.25	Inferred
	<b>250</b>	<b>0.035</b>	<b>0.77</b>	<b>1.22</b>	<b>0.24</b>	<b>TOTAL</b>

1) Uranium cut-off grades used owing to greater assay coverage; 2) TREO = rare earth elements plus yttrium

**457 Mt Resource containing:**

**4.9 Mt TREO @ 1.07%,**

**0.99 Mt Zn @ 0.22% Zn**

**282 Mlbs U<sub>3</sub>O<sub>8</sub> @ 280 ppm U<sub>3</sub>O<sub>8</sub>**

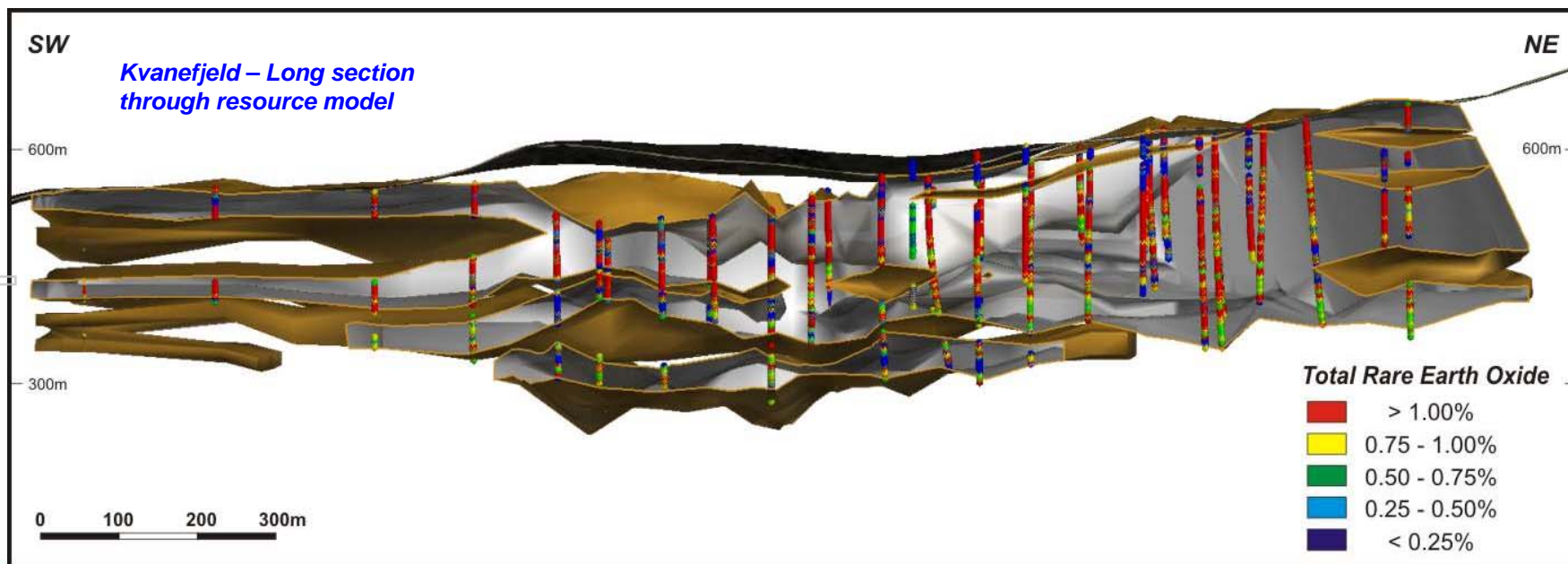
**JORC – Compliant, 79% Indicated, 21% Inferred**



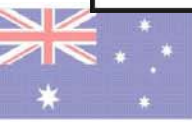
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# Kvanefjeld – Resource Details

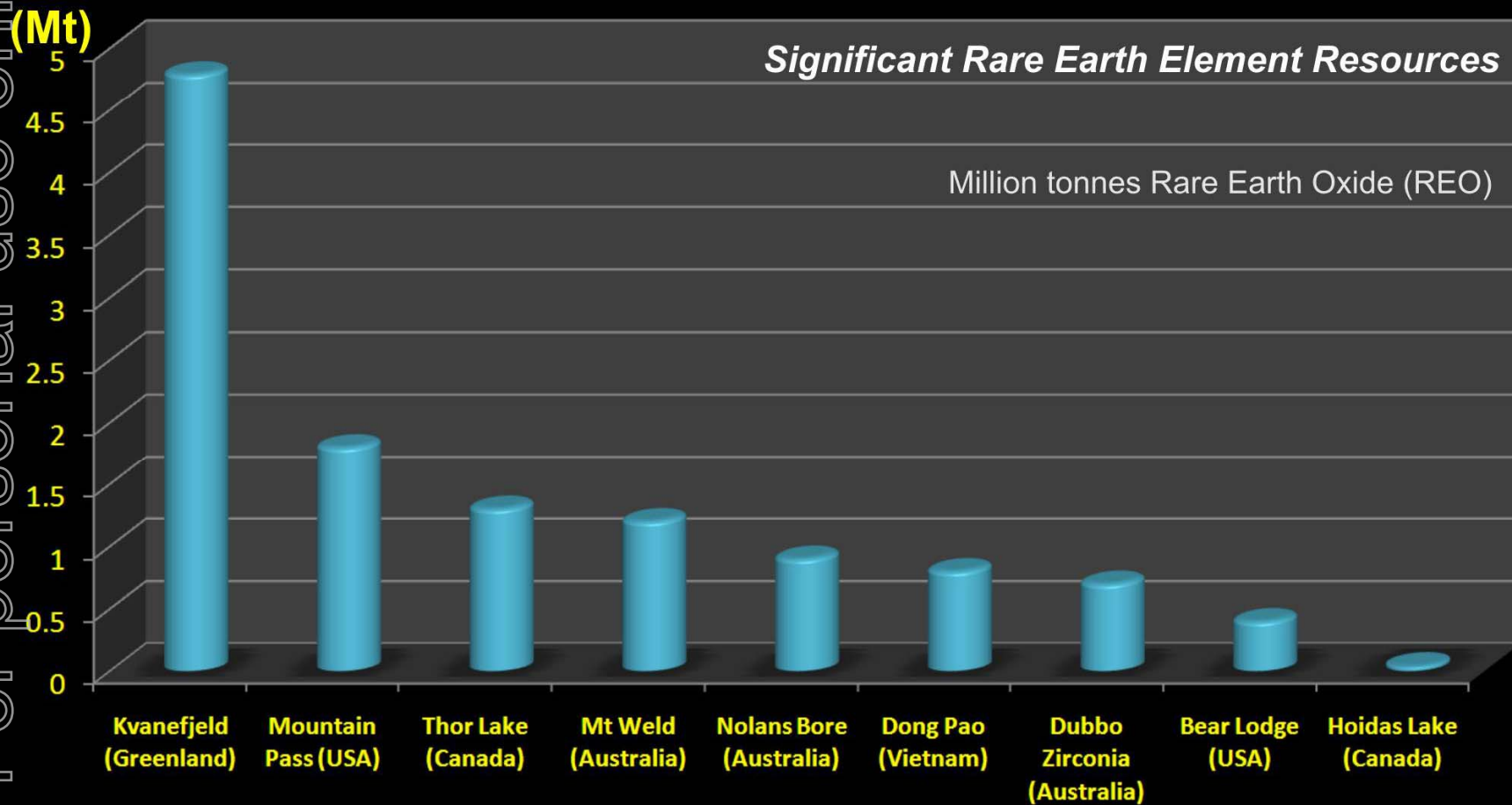
- 457 Mt resource, mostly outcropping and within 300m of ground surface
- Low strip ratio
- Highest grades are in the near-surface environment:
  - Grades range from  $\geq 350$  ppm  $U_3O_8$ , 1.3% REO near surface, to 200 ppm  $U_3O_8$  and 1% REO below 250 m depth
- Resource is located 7 km from tidewater, with deep water fjords running directly out to North Atlantic Ocean, potential for hydropower, international airport 40 km away



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Source – IMCOA, Company websites



## **'Zone 2'** – *A New Multi-Element Discovery on the Northern Ilimaussaq*



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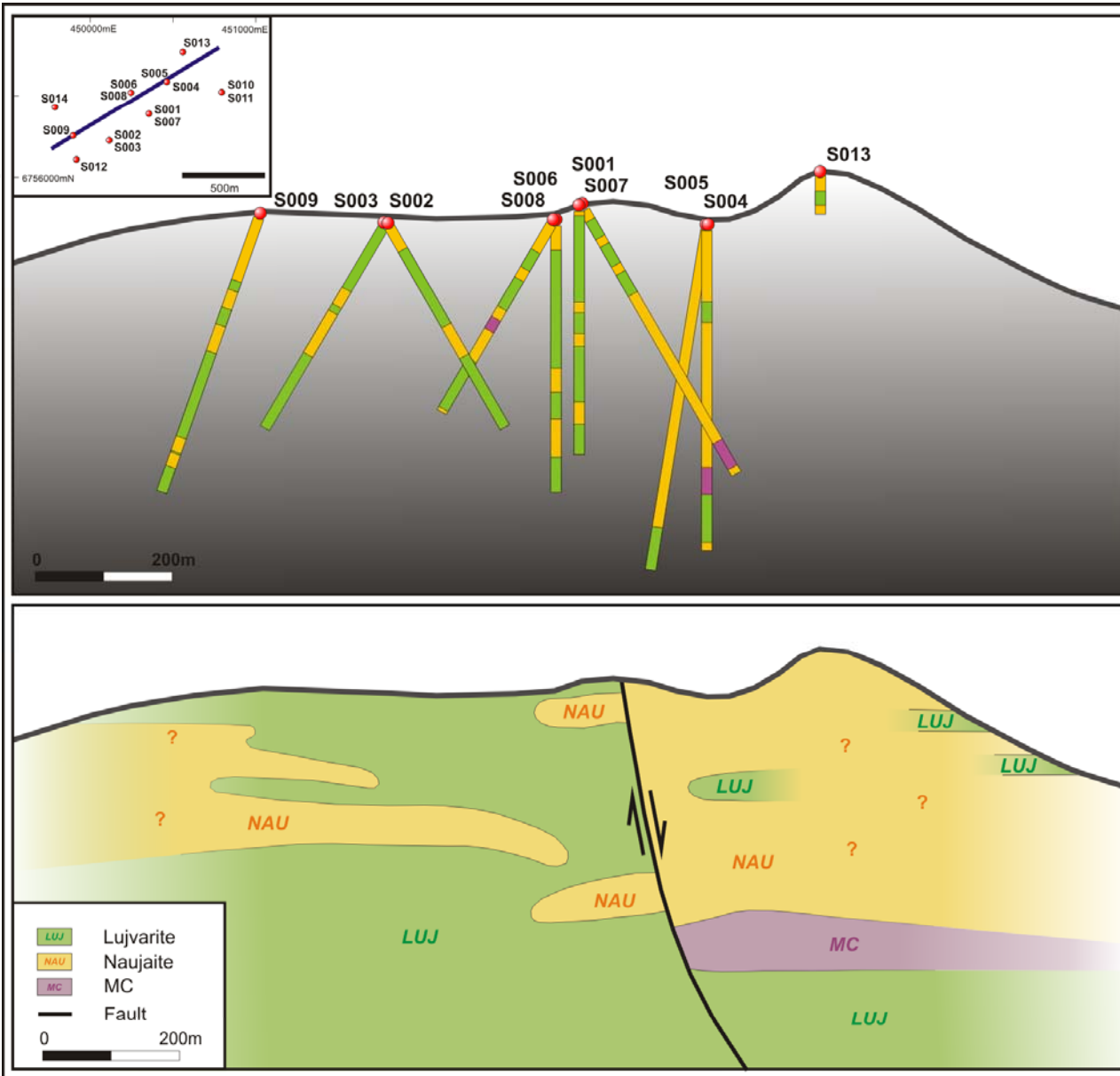
**Black Iujavrite**

Black Iujavrite outcrops extensively in the slopes that run to Tungdliarfik Fjord. The slope is approximately 700m from the ridge crest to sea level.





# Pseudo-section across new discovery zone 6 km south of Kvanefjeld



## Zone 2

Initial drilling highlights a thick section of black lujavrite. Medium-coarses (MC) lujavrite has been intersected at depth.

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# Kvanefjeld: Pre-Feasibility Study

- **Priority:** demonstrate that REEs and uranium can be extracted economically from what is a “new ore type”
- **Interim Report** released early 2009, outlining a viable base case mining scenario to produce a rare earth concentrate and uranium oxide product
  - *Report integrates the outcomes of historical Danish studies and those conducted by GMEL, and presents a viable process flow sheet*
- Resource development and integrated mineralogical and beneficiation studies continue
- Prefeasibility final report scheduled for Q2 2011



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# Interim Report: Key Outcomes

- Processing rate of **10.8 Mtpa**
- Forecast nominal production of **43,729 t of REO, and 3,895 t U<sub>3</sub>O<sub>8</sub> pa**
- Life of mine throughput: 239 Mt @ 1.01% TREO and 314ppm U<sub>3</sub>O<sub>8</sub>
- 23 year mine life

Break-even price @ 10% discount: **U<sub>3</sub>O<sub>8</sub> – US\$37.47/lb, REO – US\$5.75/kg**

Unit Costs: **U<sub>3</sub>O<sub>8</sub> – US\$29.60/lb, REO – US\$3.36/kg**

Capital Costs - **US\$ 2.31 billion\***

**Inclusive of:** mine infrastructure, new port and power generation facilities, roads, accommodation village, and processing and refining capacity for RE carbonate and uranium oxide production at throughput of 10.8 Mtpa,

\*Includes **US\$380m** contingency (20% of cost), and 30% increase on labour costs



# Interim Report: Financial Evaluation

## Market Analyses:

- REO product price range US\$7.5 – 18.50/kg (IMCOA, BCC)
- Uranium price range US\$70 – 90/lb (WNA)
- *Base case assumptions: REO - US\$13/kg, U<sub>3</sub>O<sub>8</sub> - US\$80/lb (2015)*

**NPV** – @ 10% discount, pre-tax **US\$ 2.18 billion\***

**IRR** – **24%**, payback period just over 5 years, inclusive of 2 years of construction \*

*\*based on 34% recovery of REO and 84% for uranium*

Cumulative operating surplus of **US\$8.93 billion**, generating an annual operating surplus of **US\$615 M pa** for the first five years of production

**Over life-of-mine, uranium revenues exceed total production costs effectively making REO production costs negative.**



# Current Focus

## ➤ **Process Development** - *aiming for efficiency*

- mineralogical and beneficiation studies continue and could result in significant flowsheet enhancements

## ➤ **Resources** – *expand and define higher grade zones*

- New resource estimate scheduled for Q1 2011
- Initial results from new discovery zones expect Q1 2011

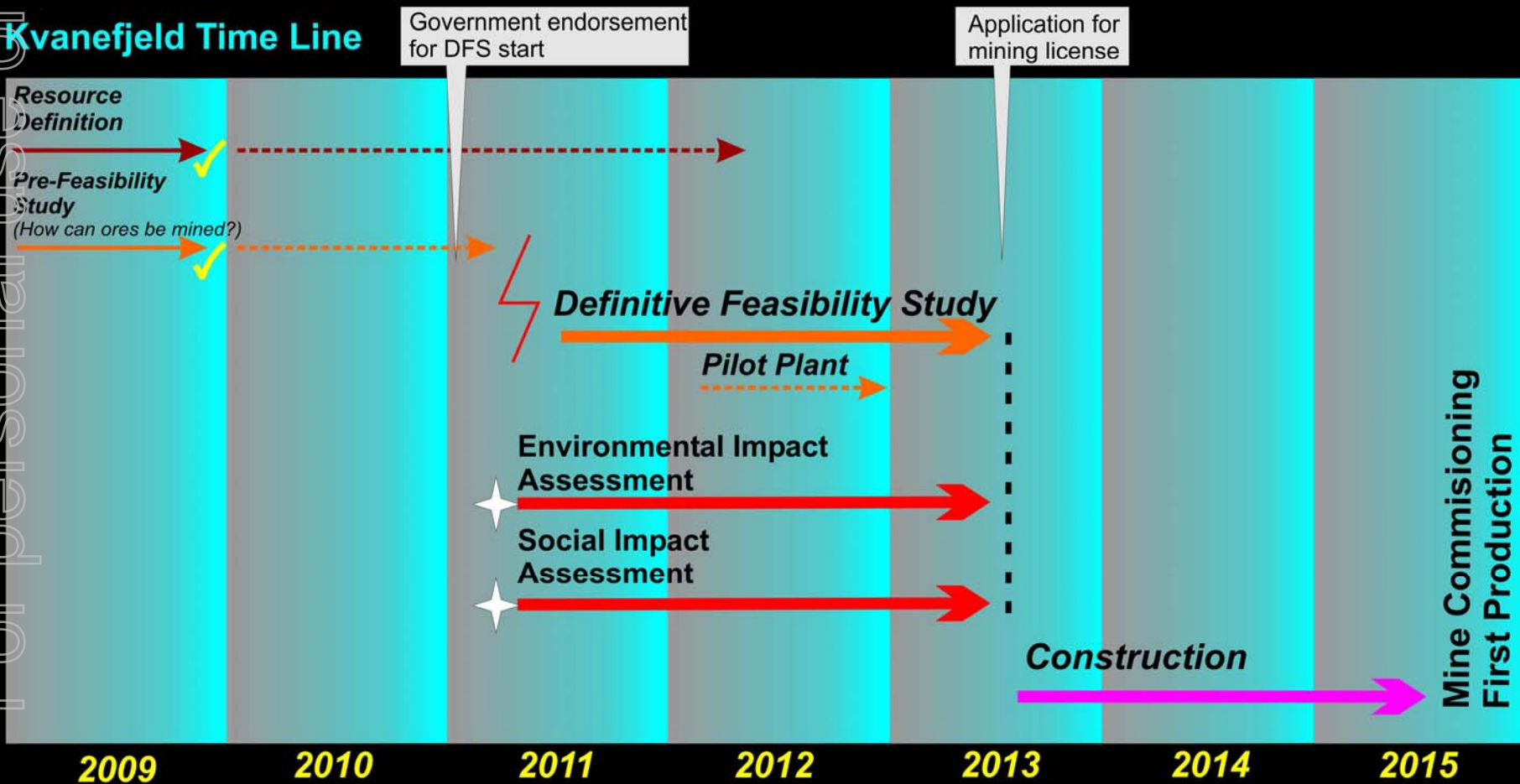
## ➤ **Feasibility Studies** – *ramping up in 2011*

- Final prefeasibility report scheduled to Q2 2011
- Definitive feasibility study to commence mid-2011



# Looking Forward

## Kvanefjeld Time Line



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**Site visit to Kvanefjeld project area, September 2<sup>nd</sup>, 2009**

The Honorable Mr Ove Karl Berthelsen (Minister for Commerce and Raw Materials); Dr John Mair (Greenland Minerals); Mr Simeon Simenson (Mayor of South Greenland); Mr Jørn Skov Neilson (Director of Bureau of Minerals and Petroleum)

# Community Open Day, August 2010, Narsaq

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# SUMMARY

## ***Aiming to develop one of the worlds largest REE and uranium resources***

- *World class JORC-compliant multi-element resource with enormous upside*
- *Initial pre-feasibility study outcomes indicate potential for Kvanefjeld to become an **economically robust, large-scale producer of RE concentrate and uranium oxide***
  - *Potential to supply **>20% of global REE demand** as of 2015/16 at low production costs owing to diversified production profile*
- ***New amendments** to exploration license terms to create a framework for the evaluation and permitting of projects that include uranium, strong stakeholder and community support*
- ***Well positioned for strong growth as Kvanefjeld advances toward development***





View over the broader geography of the Kvanefjeld multi-element project. The distance from Narsaq to Narsarsuaq airport is approximately 45km.



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*Supplementary Information*

# Greenland Minerals and Energy Ltd

- *Mineral exploration and development company*
- *Listed on the Australian Securities Exchange (ASX:GGG)*
- *Head office – Perth, Australia*
- *Operations base – Narsaq, Greenland*

## *Key Personnel*

### **Michael Hutchinson – *Executive Chairman***

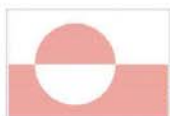
- Former Chairman and longstanding Director of the London Metals Exchange (LME)

### **Roderick McIlree - *Managing Director***

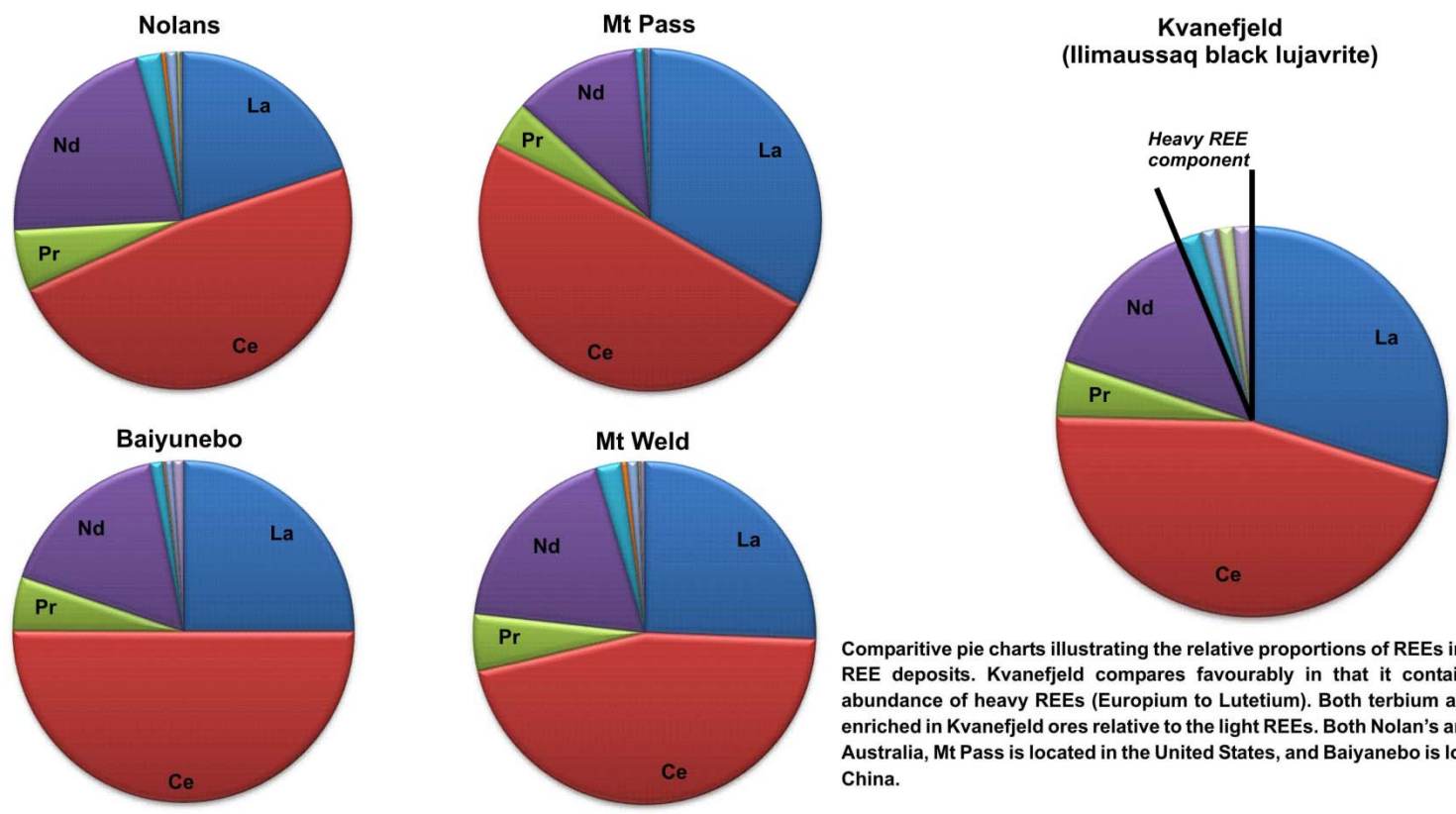
- Geologist, resource analyst, corporate experience in international capital markets

### **Lars-Emil Johansen *Chairman of Greenlandic subsidiary***

- Prime Minister of Greenland 1991-1997



# Relative Abundance of Individual Rare Earth Elements in Select Deposits

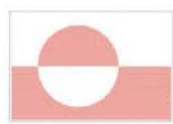


Comparative pie charts illustrating the relative proportions of REEs in a number of significant REE deposits. Kvanefjeld compares favourably in that it contains the highest relative abundance of heavy REEs (Europium to Lutetium). Both terbium and dysprosium are both enriched in Kvanefjeld ores relative to the light REEs. Both Nolan's and Mt Weld are located in Australia, Mt Pass is located in the United States, and Baiyanebo is located in Inner Mongolia, China.

## Kvanefjeld multi-element ore: Rare earth constituents plus yttrium by percent

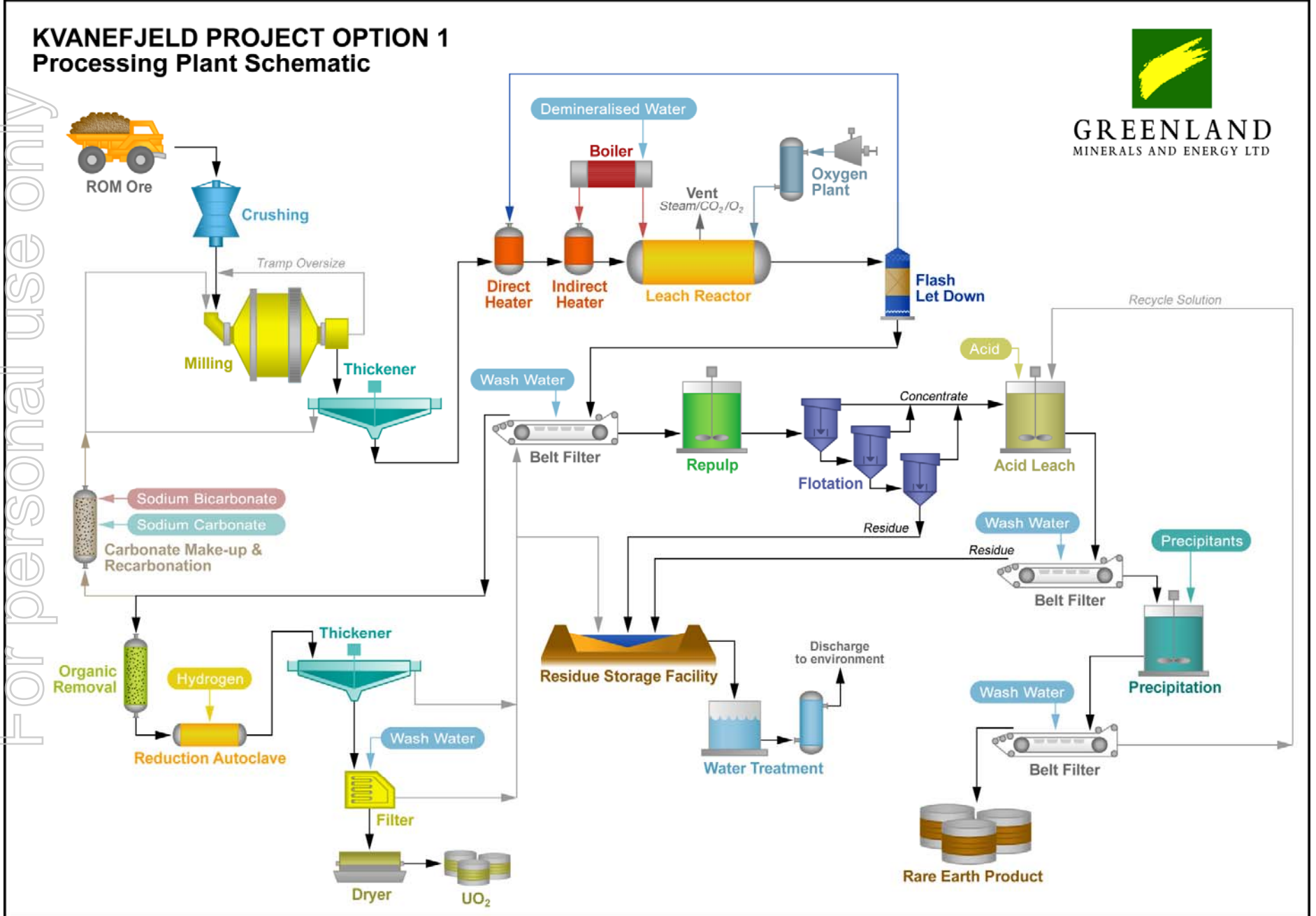
La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Y
27.5	42.0	4.2	12.9	1.6	0.1	1.1	0.2	1.1	0.2	0.6	0.1	0.5	7.7

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# Process flow sheet – base case scenario:

1- alkaline pressure leach uranium extraction; 2 - concentrate REE minerals; 3 - extract REEs with dilute HCl wash



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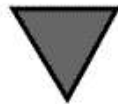
# Process Flowsheet - Explained

Milled ore



**Alkaline Pressure Leach**

*Carbonate leach - extracts uranium, converts thorium and fluorine to stable, insoluble compounds, increases REE solubility in subsequent dilute HCl wash*



Filter  
Liquid / solid separation

Liquid

Solid

Uranium recovery  
by hydrogen  
reduction

Beneficiation by froth  
flotation

Flotation tailings

Dilute acid leach on mineral  
concentrate (ambient P-T)

Precipitate

Wash

**REE Product**

*Beneficiation test work is ongoing. There is potential to beneficiate ore prior to alkaline leach circuit, however, the advantages and disadvantages are still being assessed.*

# Greenland Minerals and Energy Ltd

## *Capital Structure*

<b>Total ordinary shares:</b>	<b>266,454,502</b>
Quoted options exercisable \$0.20:	121,921,161
Unquoted options exercisable \$0.10:	750,000
Unquoted options exercisable \$0.20:	20,800,000
Unquoted options exercisable \$0.50:	5,750,000
Unquoted options exercisable \$1.00:	6,250,000
Unquoted options exercisable \$1.50:	1,888,840

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# Project Ownership Structure

**GREENLAND  
MINERALS AND ENERGY LTD**

*(Australian based company  
listed on ASX)*

**61%**

**WESTRIP HOLDINGS  
LIMITED**

*(UK based private  
company)*

**39%**

**GREENLAND  
MINERALS AND ENERGY A/S**

**EXPLORATION LICENSE  
2005/28 OVER NORTHERN  
ILIMAUSSAQ COMPLEX**

*Greenland Minerals and Energy Ltd can move to 100% ownership of the Greenlandic subsidiary Greenland Minerals and Energy A/S through two option agreements that do not expire. For \$10 million AUD in cash or shares (elected by Westrip), Greenland Minerals and Energy Ltd can move to 90% ownership, and with an additional payment of \$50 million in cash or shares can move to 100%.*

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*Greenland Minerals and Energy Ltd is aware of and respects the Greenlandic government stance on uranium exploration and development in Greenland – which is currently a zero tolerance approach to the exploration and exploitation of uranium. However, a new amendment has now been introduced to the exploration license terms that creates a framework for the evaluation and permitting of projects that include uranium.*

*The company is currently advancing the Kvanefjeld Project, recognised as the world's largest undeveloped JORC compliant resource of rare earth oxides (REO), in a multi-element deposit that is inclusive of uranium and zinc.*

*Greenland Minerals will continue to advance this world class project in a manner that is in accord with both Greenlandic Government and local community expectations, and looks forward to being part of the community discussion on the social and economic benefits associated with the development of the Kvanefjeld Project.*