



**GREENLAND**  
MINERALS AND ENERGY LTD

## Raw Materials for a Clean and Efficient Energy Future



May, 2016

| [www.ggg.gl](http://www.ggg.gl)

# Important Notice

This presentation contains only a brief overview of Greenland Minerals and Energy Ltd (Greenland Minerals) and its respective activities and operations. The contents of this presentation may rely on various assumptions and subjective interpretations which are not possible to detail in this presentation and which have not been subject to any independent verification.

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## **JORC Code (2012) Competent Person Statement – Mineral Resources and Ore Reserves**

*The information in this report that relates to Mineral Resources is based on information compiled by Mr Robin Simpson, a Competent Person who is a Member of the Australian Institute of Geoscientists. Mr Simpson is employed by SRK Consulting (UK) Ltd ("SRK"), and was engaged by Greenland Minerals and Energy Ltd on the basis of SRK's normal professional daily rates. SRK has no beneficial interest in the outcome of the technical assessment being capable of affecting its independence. Mr Simpson has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Robin Simpson consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.*

*The information in the statement that relates to the Ore Reserves Estimate is based on work completed or accepted by Mr Damien Krebs of Greenland Minerals and Energy Ltd and Mr Scott McEwing of SRK Consulting (Australasia) Pty Ltd.*

*Damien Krebs is a Member of The Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the type of metallurgy and scale of project under consideration, and to the activity he is undertaking, to qualify as Competent Persons in terms of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 edition). The Competent Persons consent to the inclusion of such information in this report in the form and context in which it appears.*

*Scott McEwing is a Fellow and Chartered Professional of The Australasian Institute of Mining and Metallurgy and has sufficient experience that is relevant to the style of mineralisation and type of deposit under consideration, and to the activity he is undertaking, to qualify as Competent Persons in terms of The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code, 2012 edition). The Competent Persons consent to the inclusion of such information in this report in the form and context in which it appears.*

The mineral resource estimate for the Kvanefjeld Project was updated and released in a Company Announcement on February 12<sup>th</sup>, 2015. The ore reserves estimate was released in a Company Announcement on June 3<sup>rd</sup>, 2015. There have been no material changes to the mineral resource estimate, or ore reserves estimate since the release of these announcements.

# GMEL'S VISION



**To develop a stable, long-term source of materials essential for clean energy generation and energy efficient technologies**





# GREENLAND

MINERALS AND ENERGY LTD

Greenland has a globally-unique natural resource opportunity. One that has been designed as the basis of a new, stable supply network of materials essential to clean energy generation, and energy efficient use.

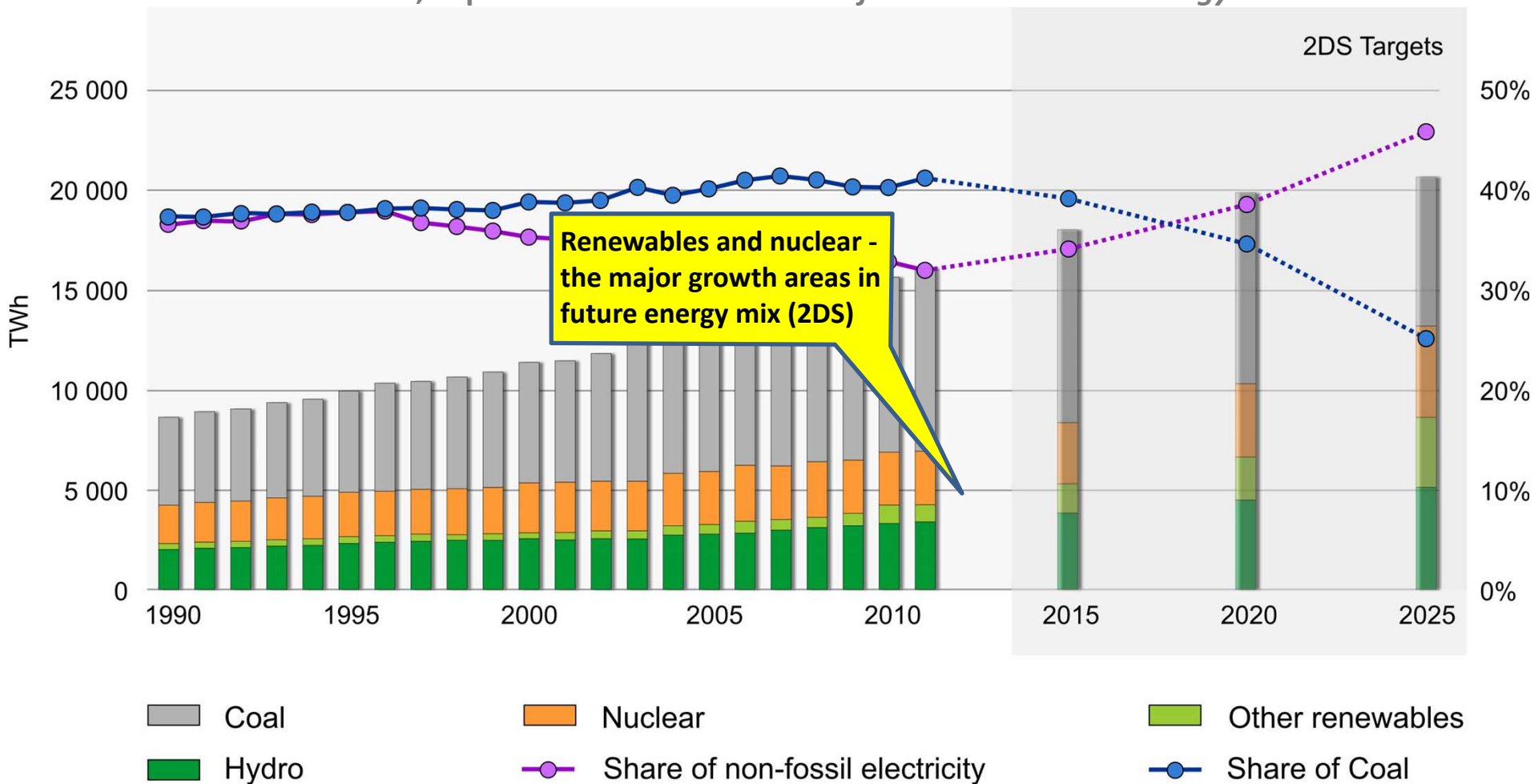
The strength of the opportunity is backed by:

- *A world leading **rare earth** and **uranium** resource,*
- *A location which offers year-round direct shipping access,*
- *Operations that can be powered by hydro-electricity,*
- *Unique minerals that offer simpler, advantageous processing*
- *Multiple products, diversified revenue streams, low operational costs*



# Greenland's Kvanefjeld: Leveraged to a Clean and Efficient Energy Future

UN declaration, September 2014 *"Coal has no future in the world energy mix"*



**Source:** International Energy Agency (IEA)

The 2°C scenario (2DS) describes an energy system with an emissions trajectory to limit warming to 2°C by 2050

# Increasing International Focus on Arctic Resources

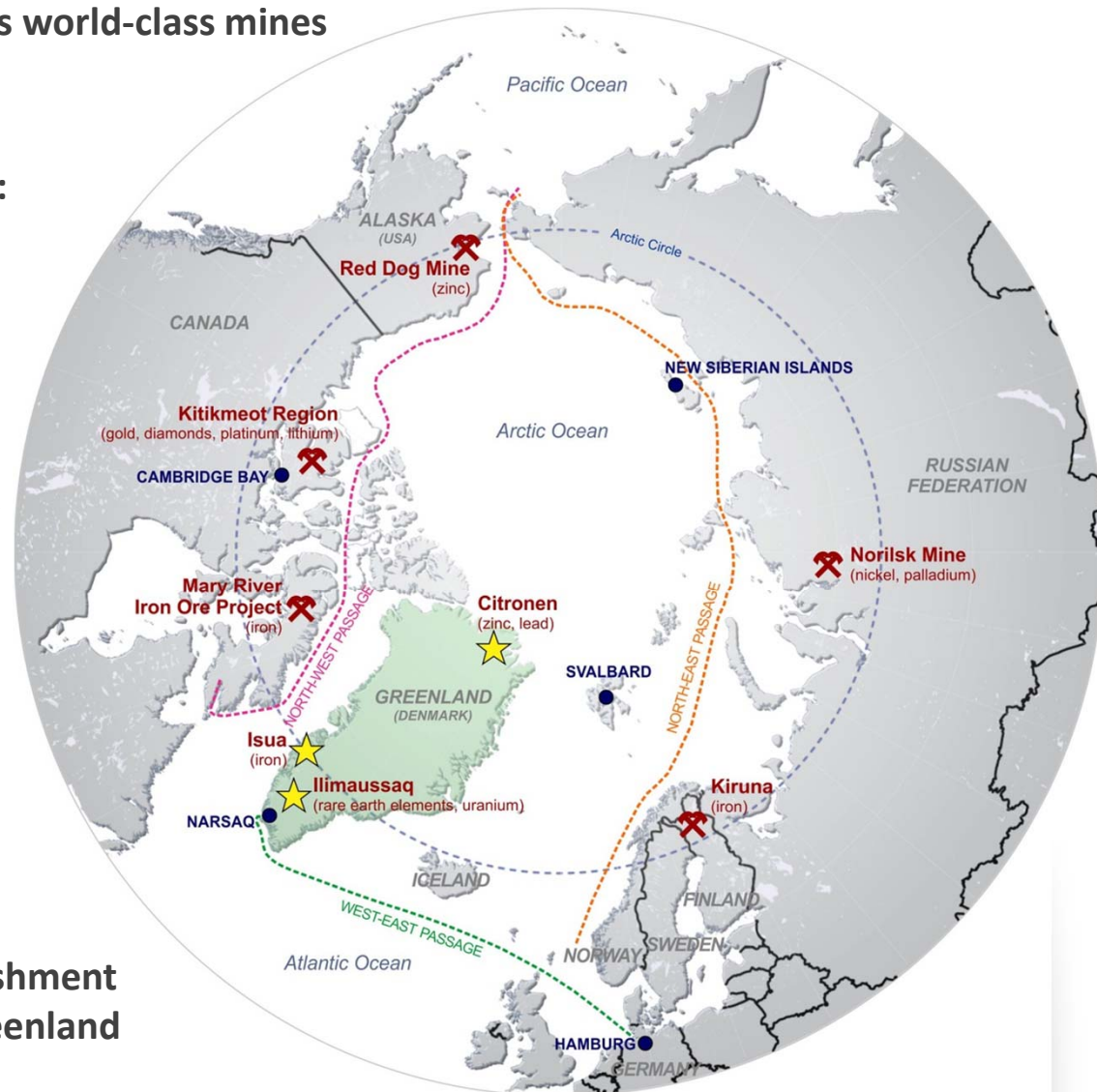
## Greenland – the gateway to the Arctic

The Arctic region is host to numerous world-class mines

Greenland is increasingly the centre point of Arctic resource focus due to:

- *Political stability with increasing independence*
- *Political push to move toward a natural resource-based economy*
- *Numerous mineral resource projects awaiting development*
- *Mining licenses being issued*
- *Opening of Arctic shipping lanes providing access to Asia-Pacific*

A growing number of countries are looking to participate in the establishment of a new generation of mines in Greenland



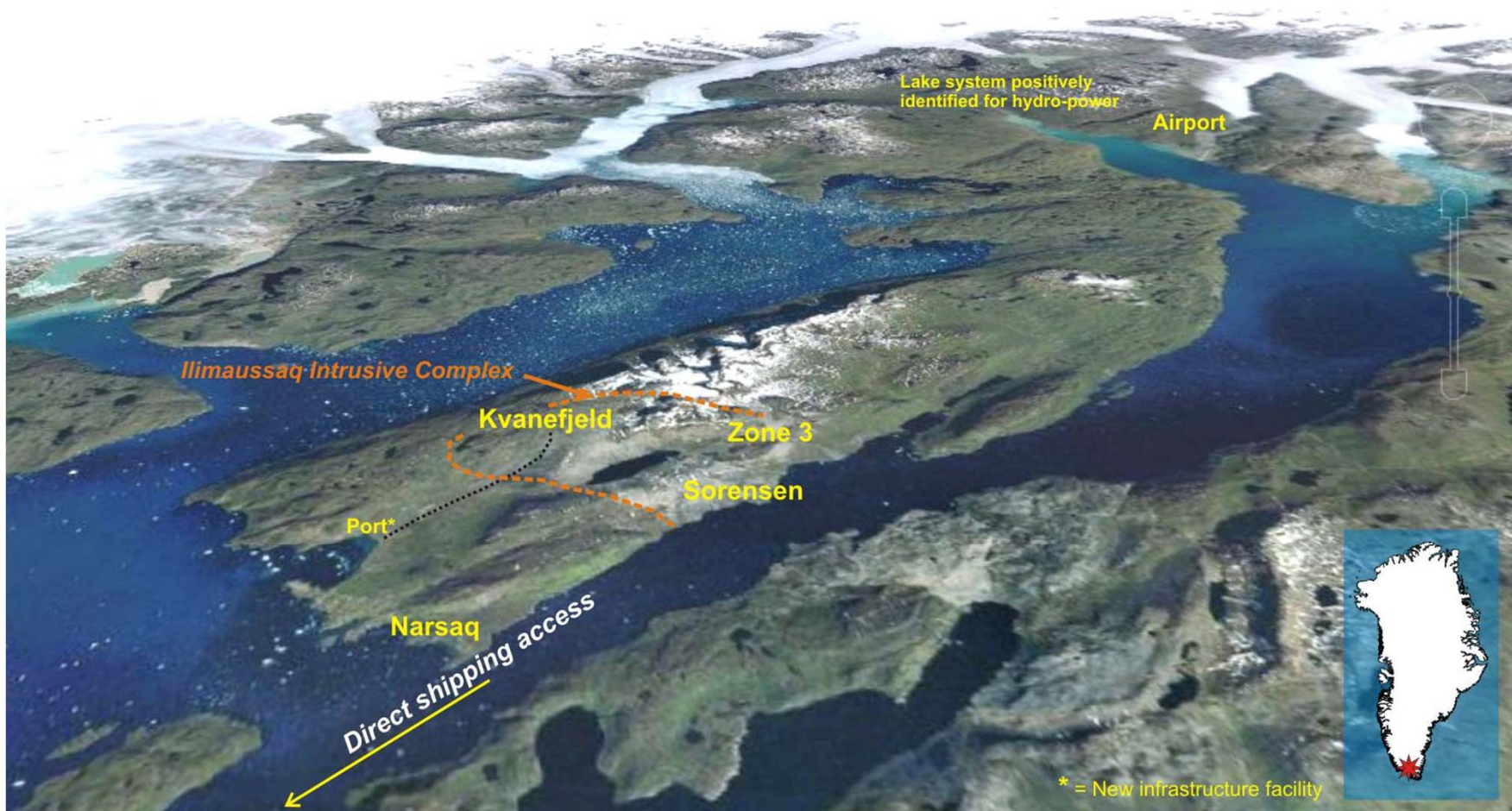
# Southern Greenland: A Readily Accessible Location



“ Year-round direct shipping access, airport nearby,  
” hydropower opportunities



# Project Area Hosts Vast Rare Earth and Uranium Resources

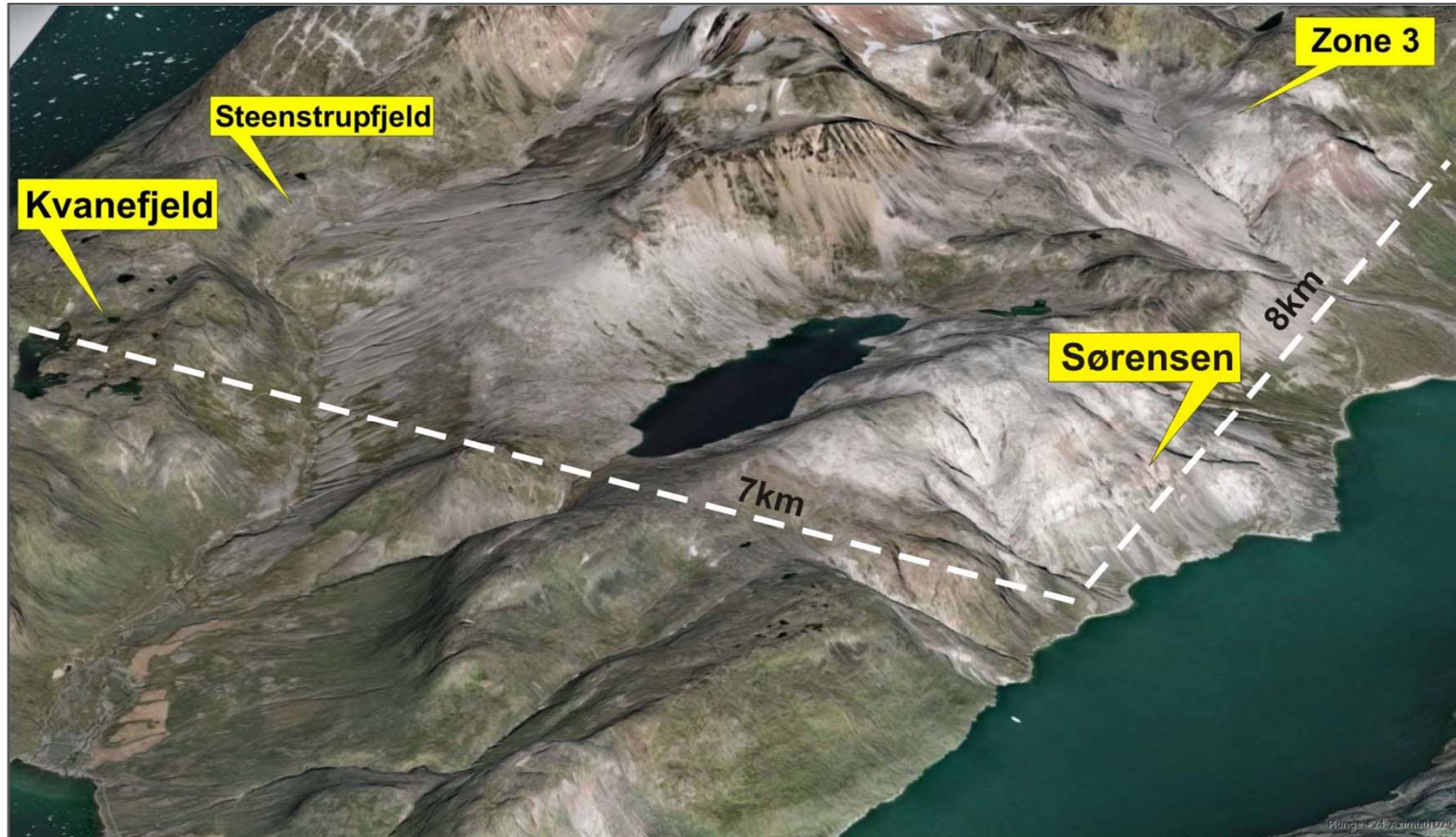


“ >1 billion tonnes defined (JORC 2012),  
” <15% of prospective area evaluated



# Mineral Resources – Multiple Deposits

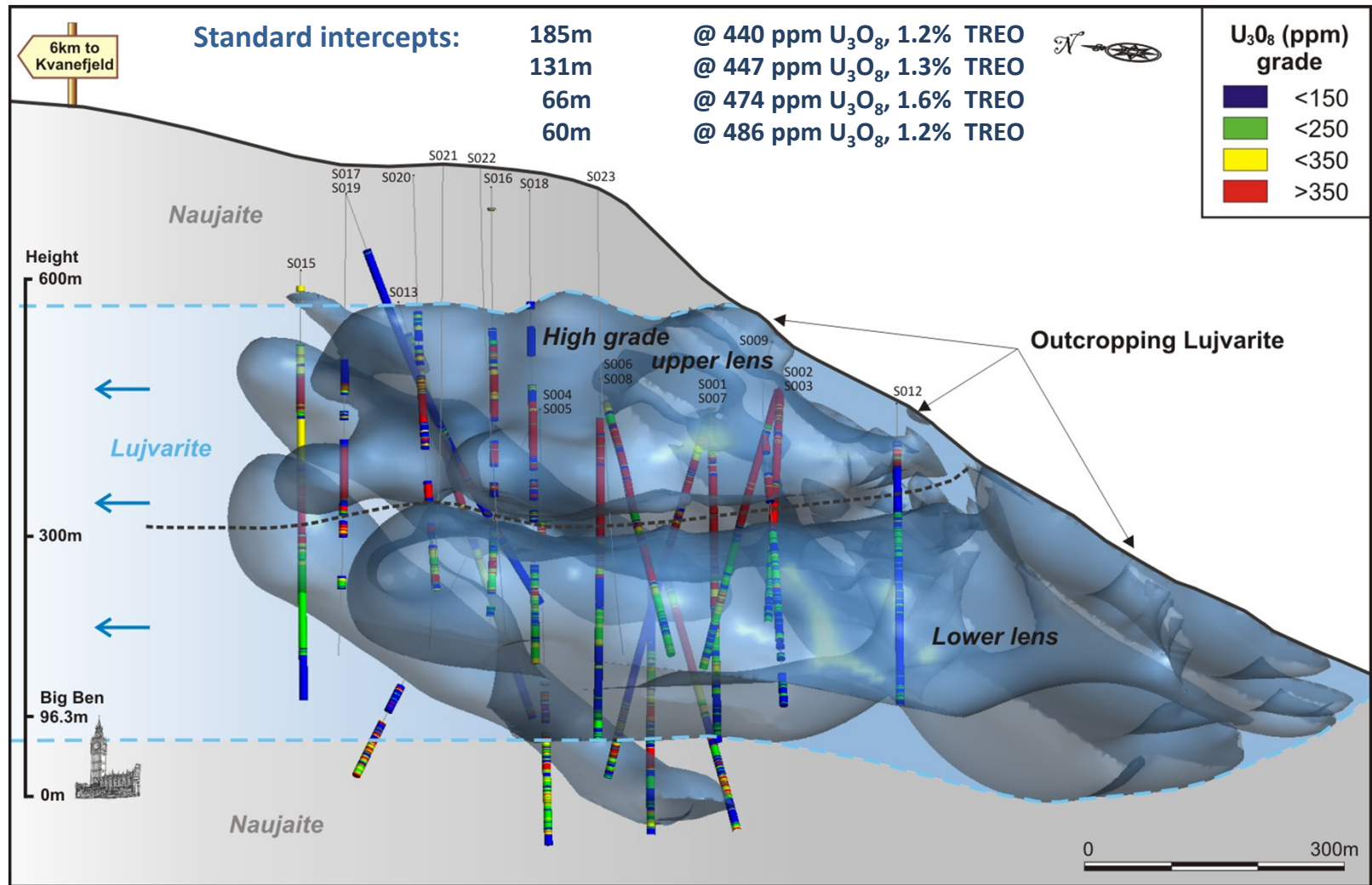
1.01B tones containing 593 Mlbs  $U_3O_8$ , 11.13 Mt TREO, 2.42 Mt zinc



37 Year Mine Reserves at Kvanefjeld Deposit - 2015

Classification (JORC)	Inventory (Mt)	REO (ppm)	$U_3O_8$ (ppm)	Zn (ppm)
Proven	43	14,700	352	2,700
Probable	64	14,000	368	2,500
<b>Total</b>	<b>108</b>	<b>14,300</b>	<b>362</b>	<b>2,600</b>

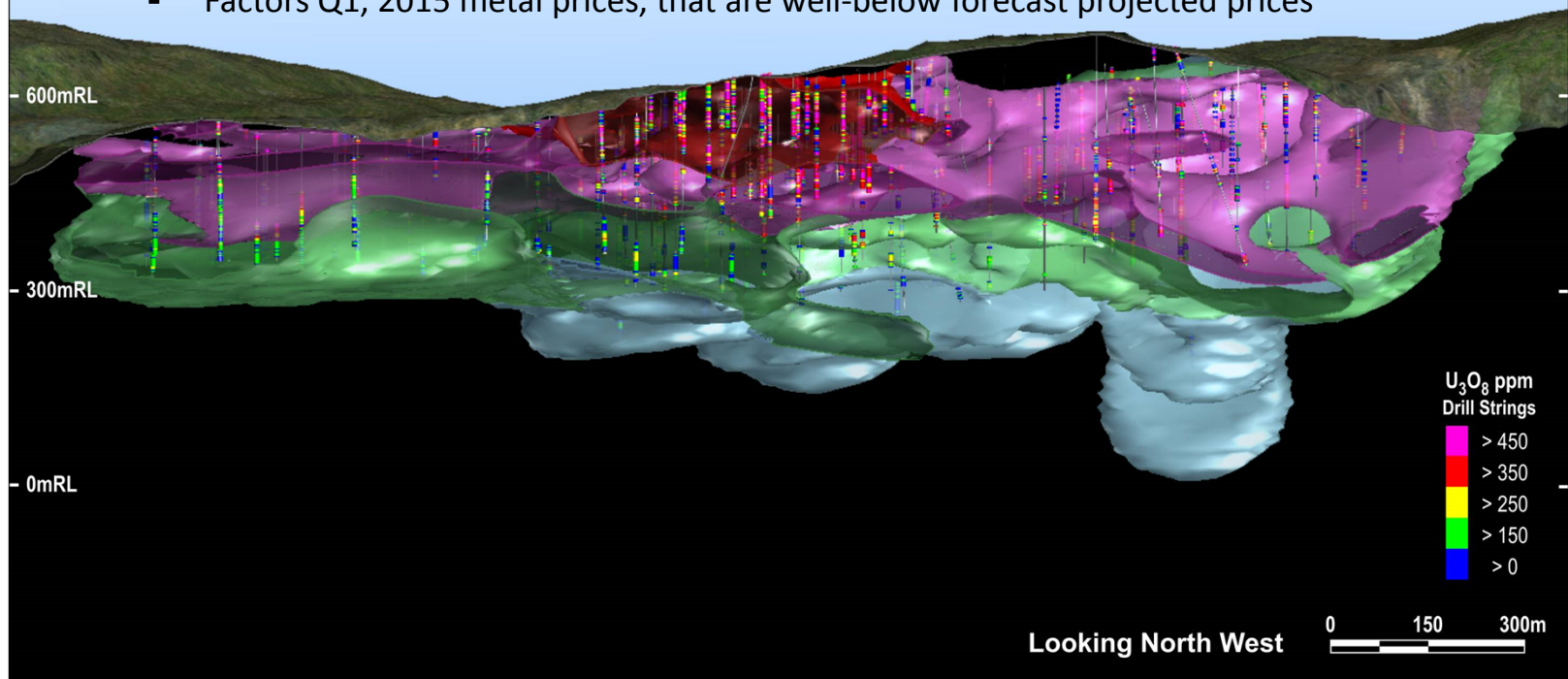
# Scale – Laterally Persistent Ore Seam



“ A cross section through the ore seam at Sørensen highlights  
 ” the scale and simplicity of a globally-unique ore system

# Kvanefjeld Deposit – Starting Point

- Long section through the Kvanefjeld resource model
- 143 million tonnes defined in the ‘measured category’ – near surface – high grades
- Maiden Ore Reserve – 108 million tonnes – sufficient to underpin initial 37 year mine-life
  - Factors Q1, 2015 metal prices, that are well-below forecast projected prices



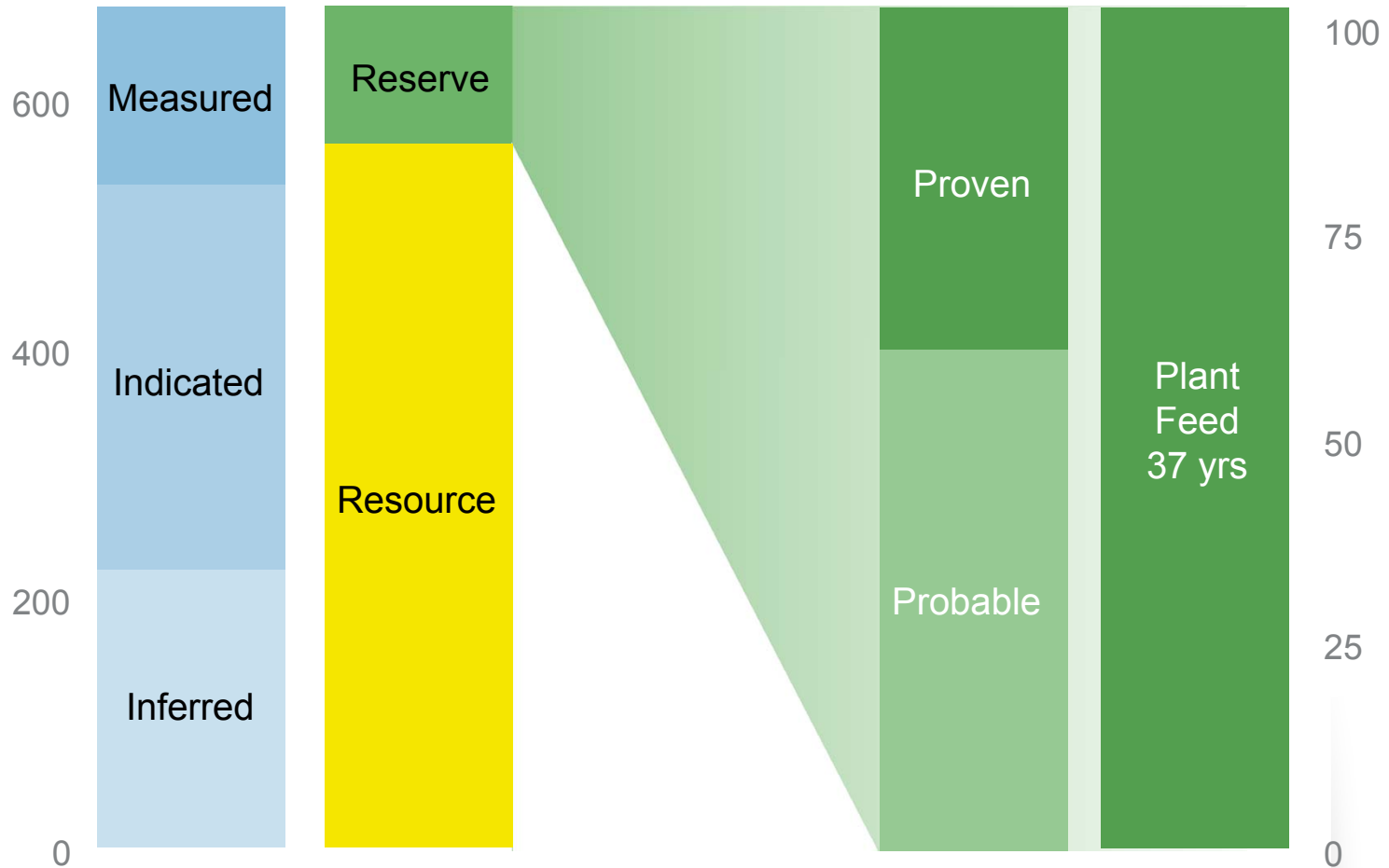


# Kvanefjeld Deposit – Reserves, Resources

Sufficient reserves to underpin initial 37 year mine-life

**Tonnes [M]**  
Resources

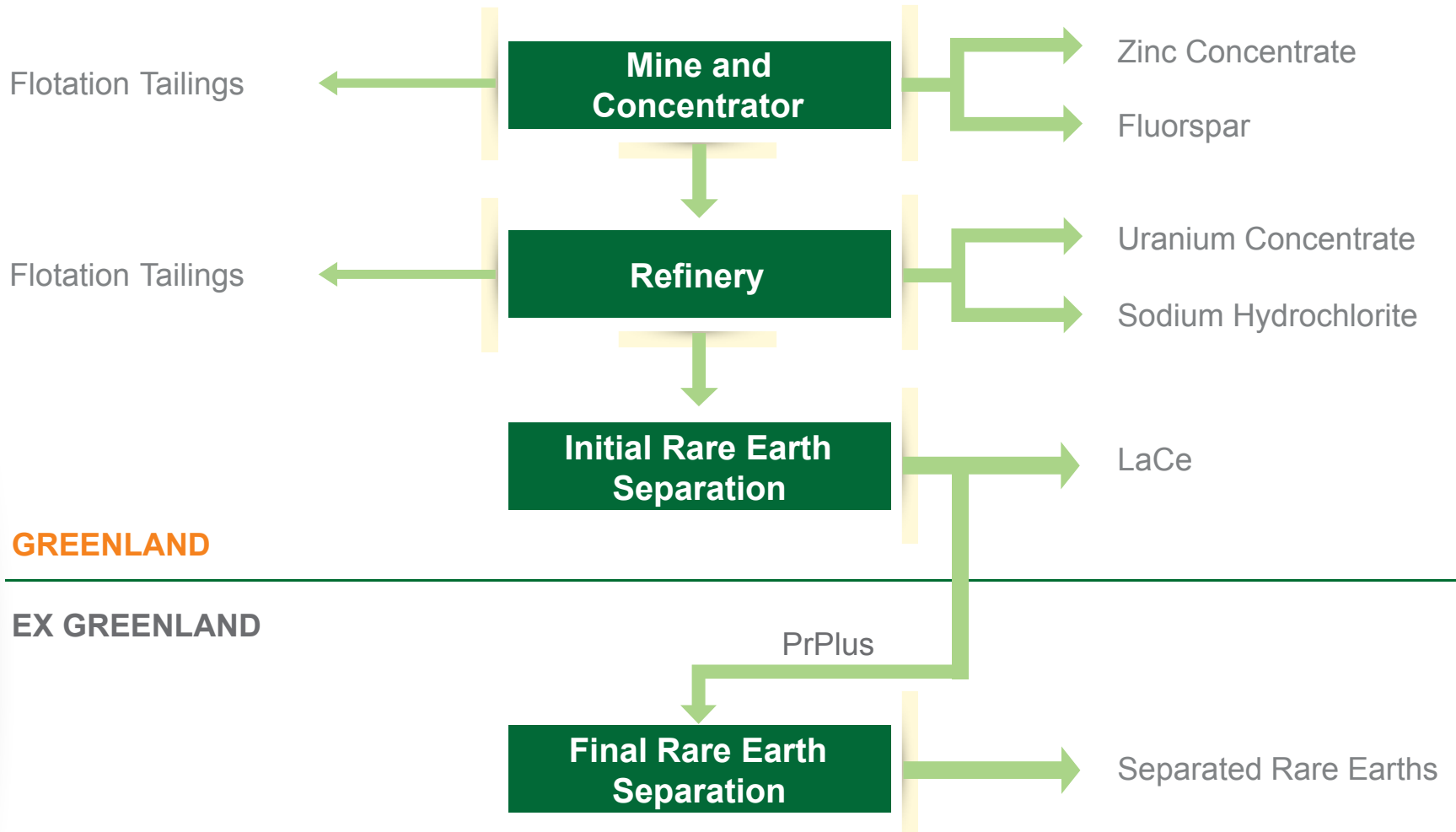
**Tonnes [M]**  
Reserves



# Extensive Feasibility Program

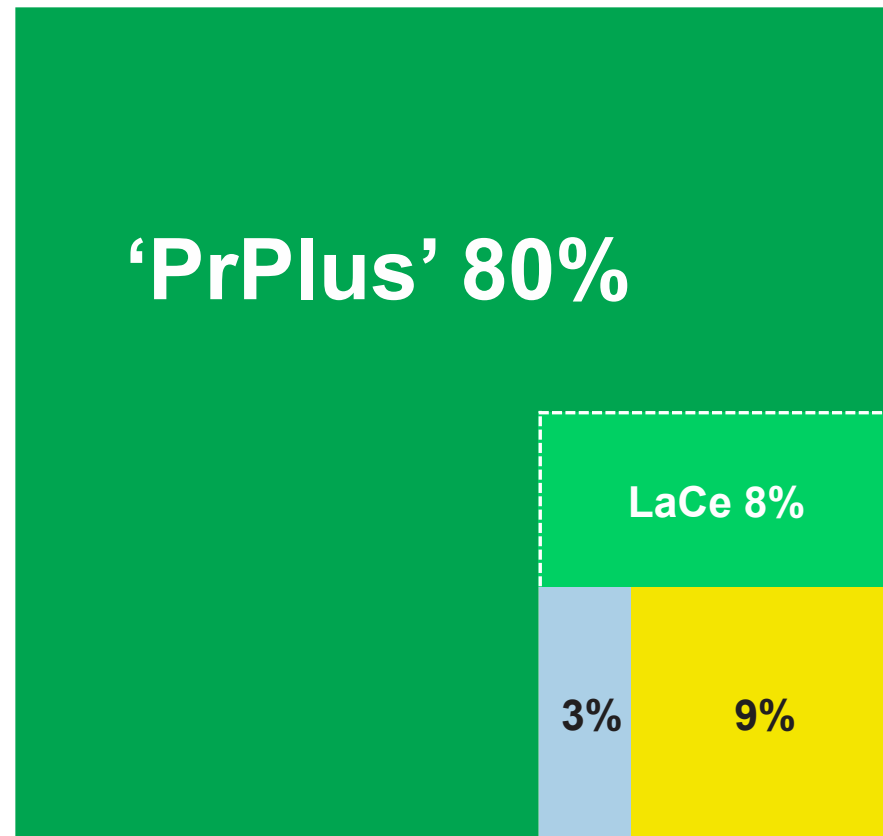
## Residues

## Products



**Pilot Plant Proven Metallurgy**

# Product Distribution by Value



See Company Announcement, April 6<sup>th</sup> 2016

 **Uranium**

[1Mlb's U<sub>3</sub>O<sub>8</sub>/year]

 **Rare Earth Products**

[PrPlus – 9,900 t/year]

 **By Products**

Zinc

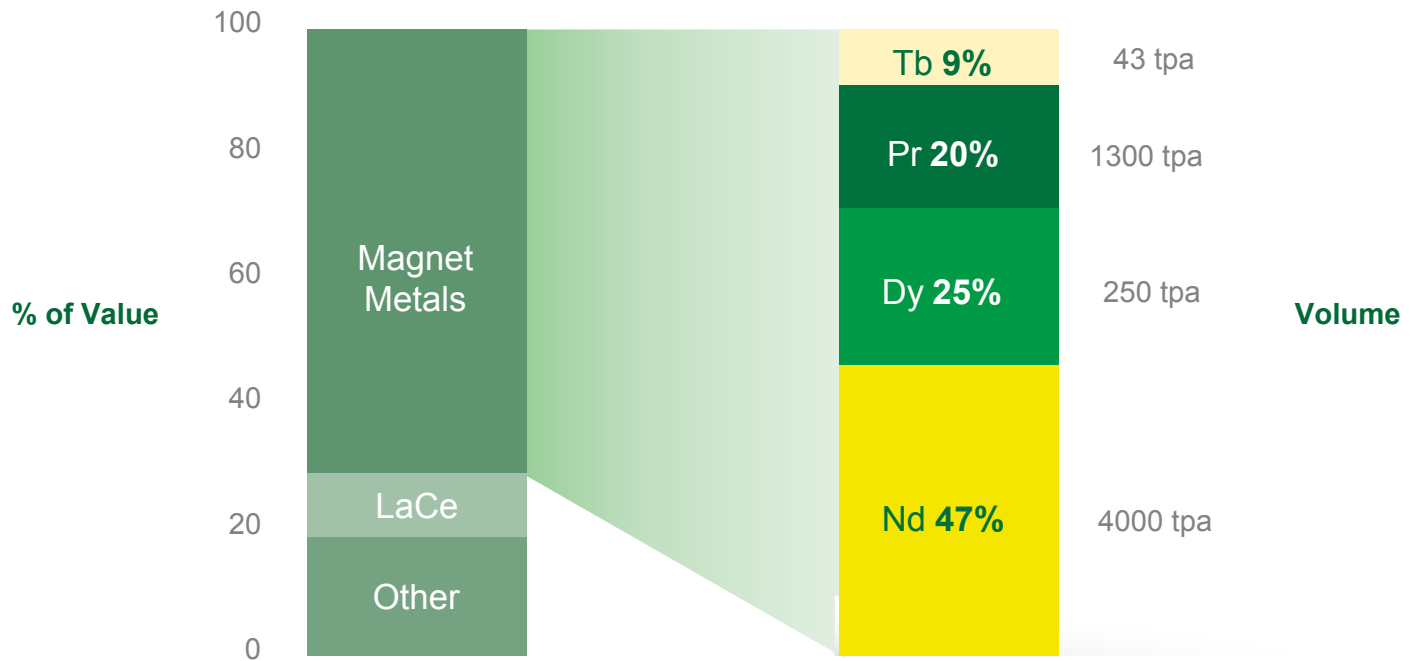
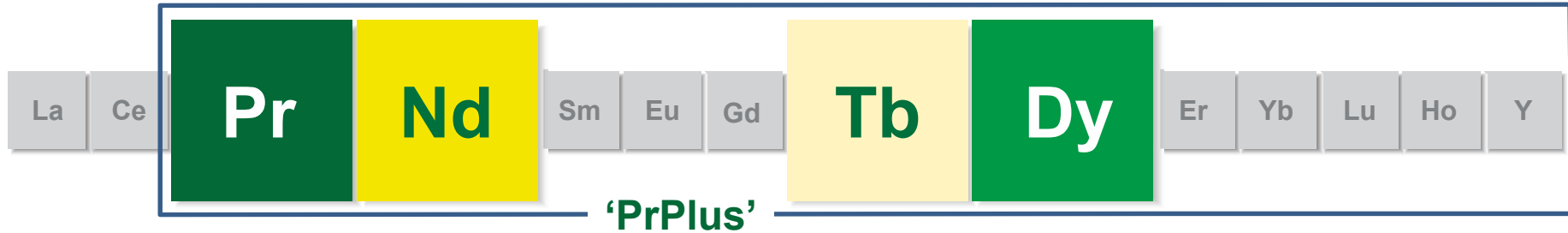
Fluorspar

NaClO

“ ‘PrPlus’ is rare earth product containing key magnet metals **Pr, Nd, Dy, Tb**, along with other heavy rare earth elements ”



# Magnet Metals Are At The Heart of Kvanefjeld



[See Company Announcements, May 25<sup>th</sup>, 2015, and April 6<sup>th</sup>, 2016]

# Magnets – A Vital Growth Area



**Magnetism:**  
*'the interface between electricity and motion'*



- Rare earth metals make the worlds strongest permanent magnets
- Key to clean energy generation and efficient energy use
- Ongoing electrification of transport systems and push to increased energy efficiency driving *major* demand growth



# Rare Earth Permanent Magnets – Growth Area

## Growth Drivers

Efficiency

Miniaturisation

Urbanisation

Globalisation

Portability

Ageing Populations

Climate Change

Technological Change

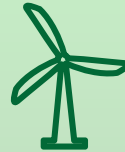
Clean Technology



## Growth Sectors



Transportation



Renewable Energy



Consumer Electronics



Medical Technology

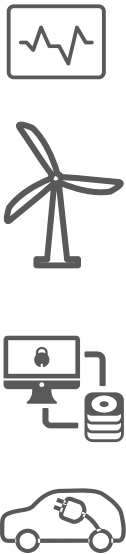
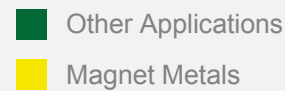
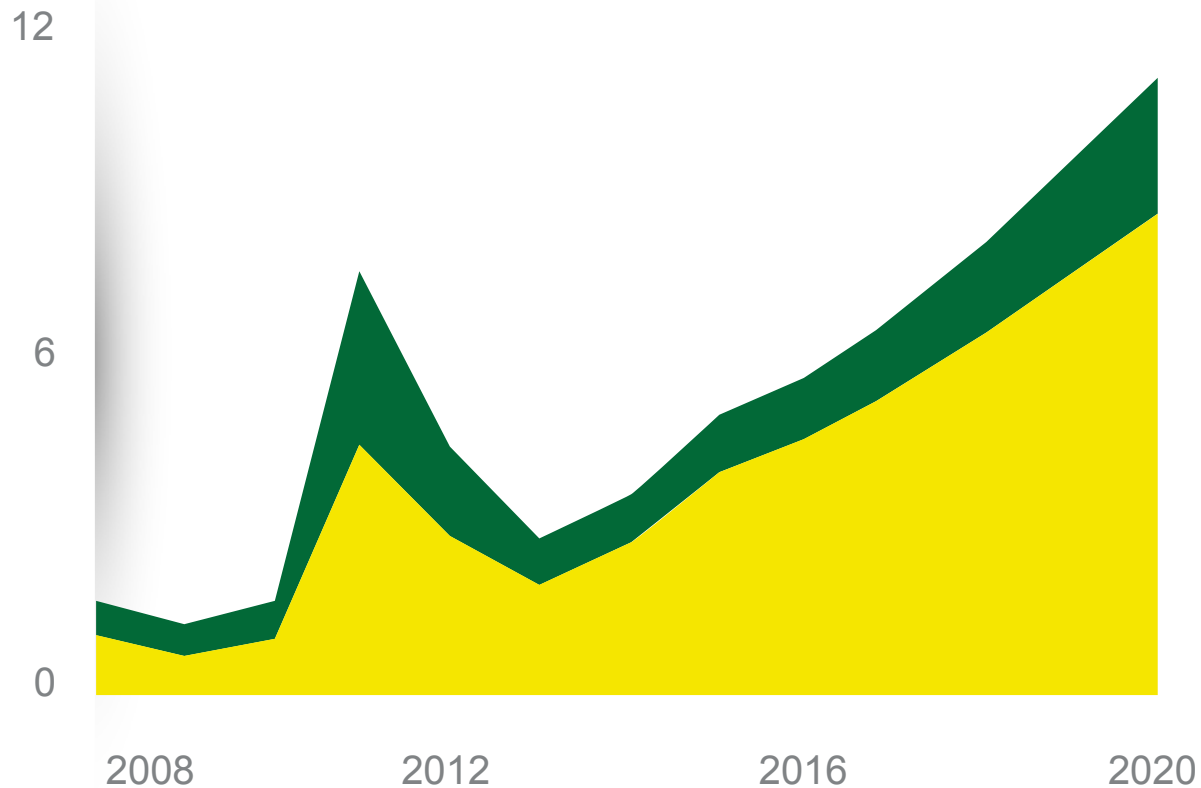


## Magnets

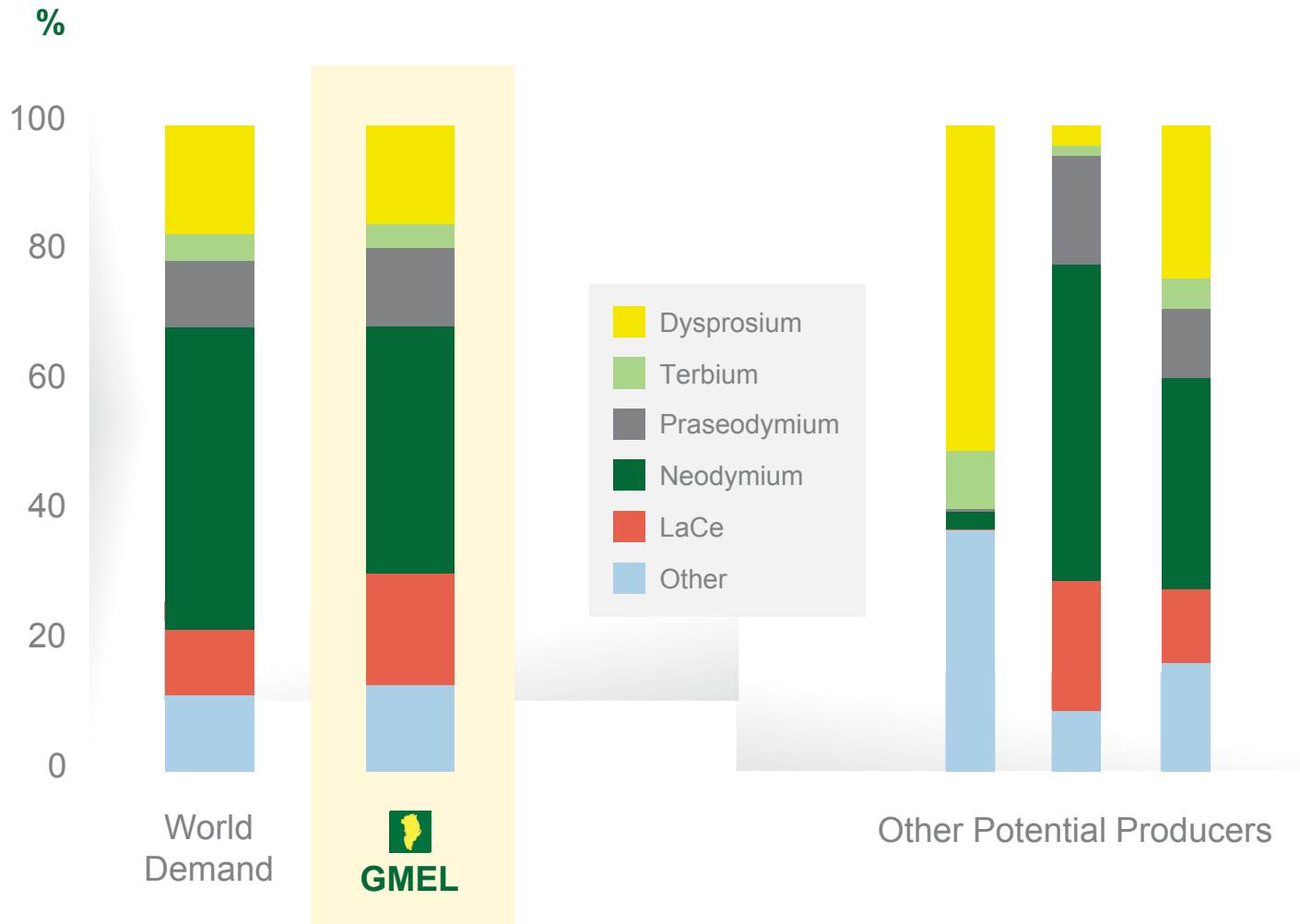


# Demand for Rare Earth Magnet Material

US\$ Billion

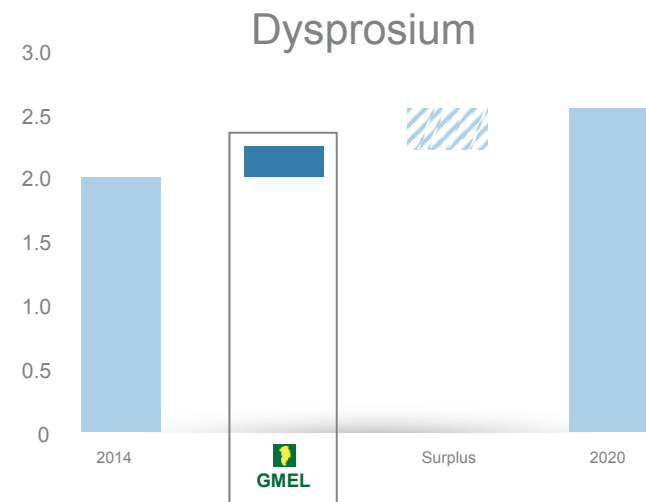
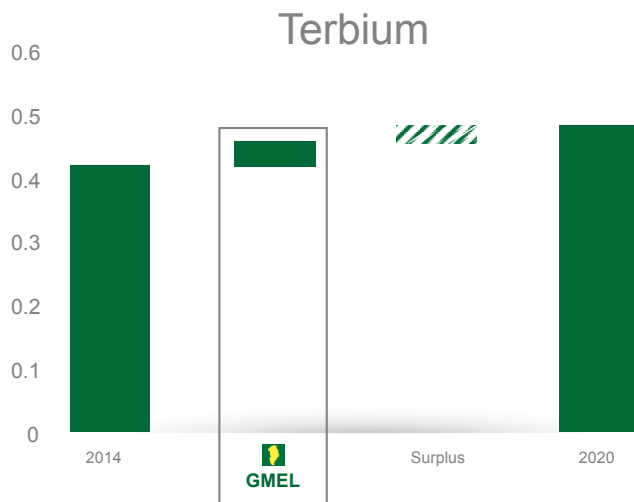
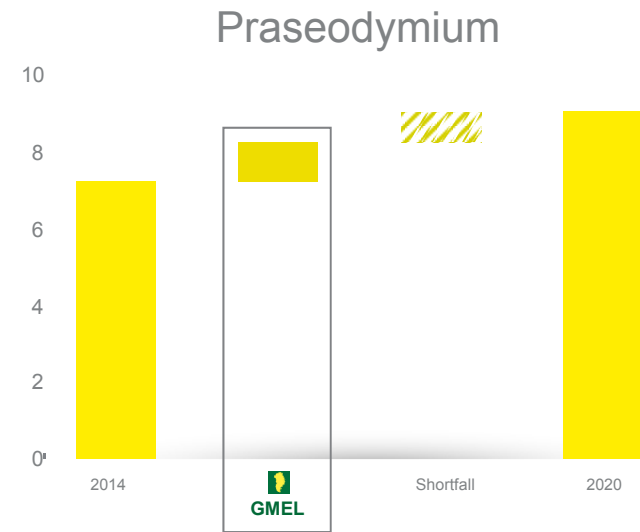
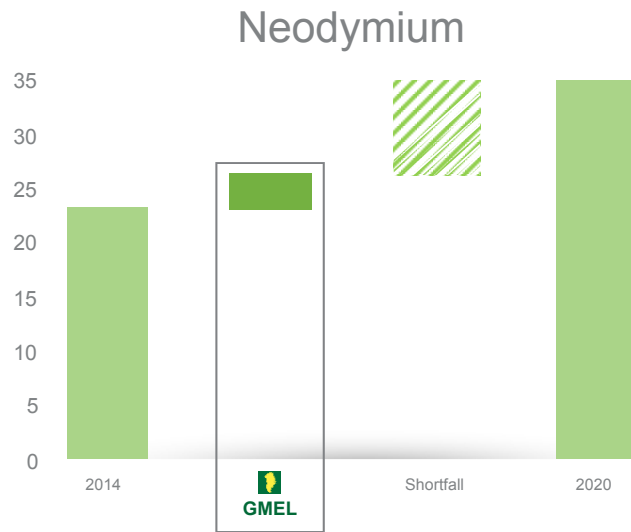


# Rare Earth Production Profile [by Value]



“Kvanefjeld’s output is strongly aligned to market, balancing risk

# GMEL Will Not Meet The Demand Shortfall



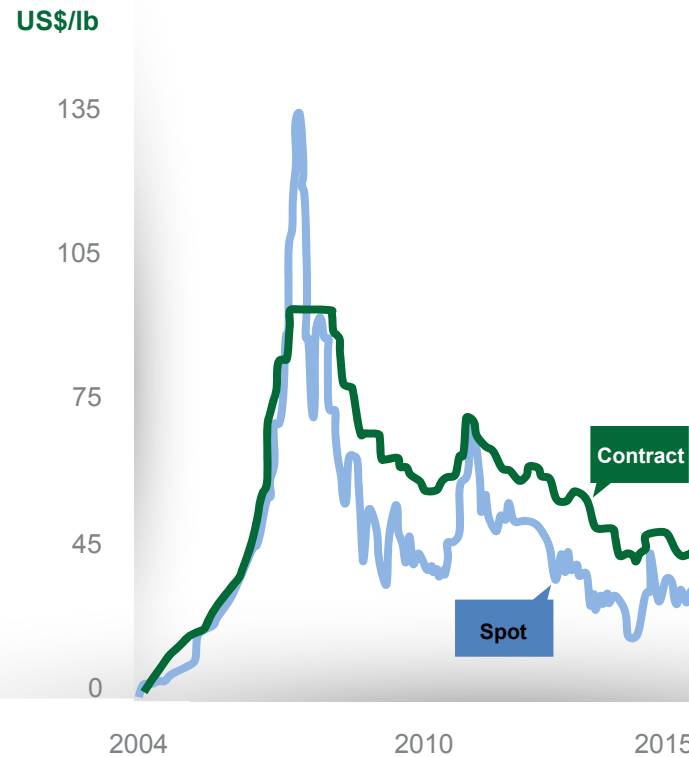


# Uranium - Stable Co-Product Revenue Stream

## Annual Deliveries



## Prices

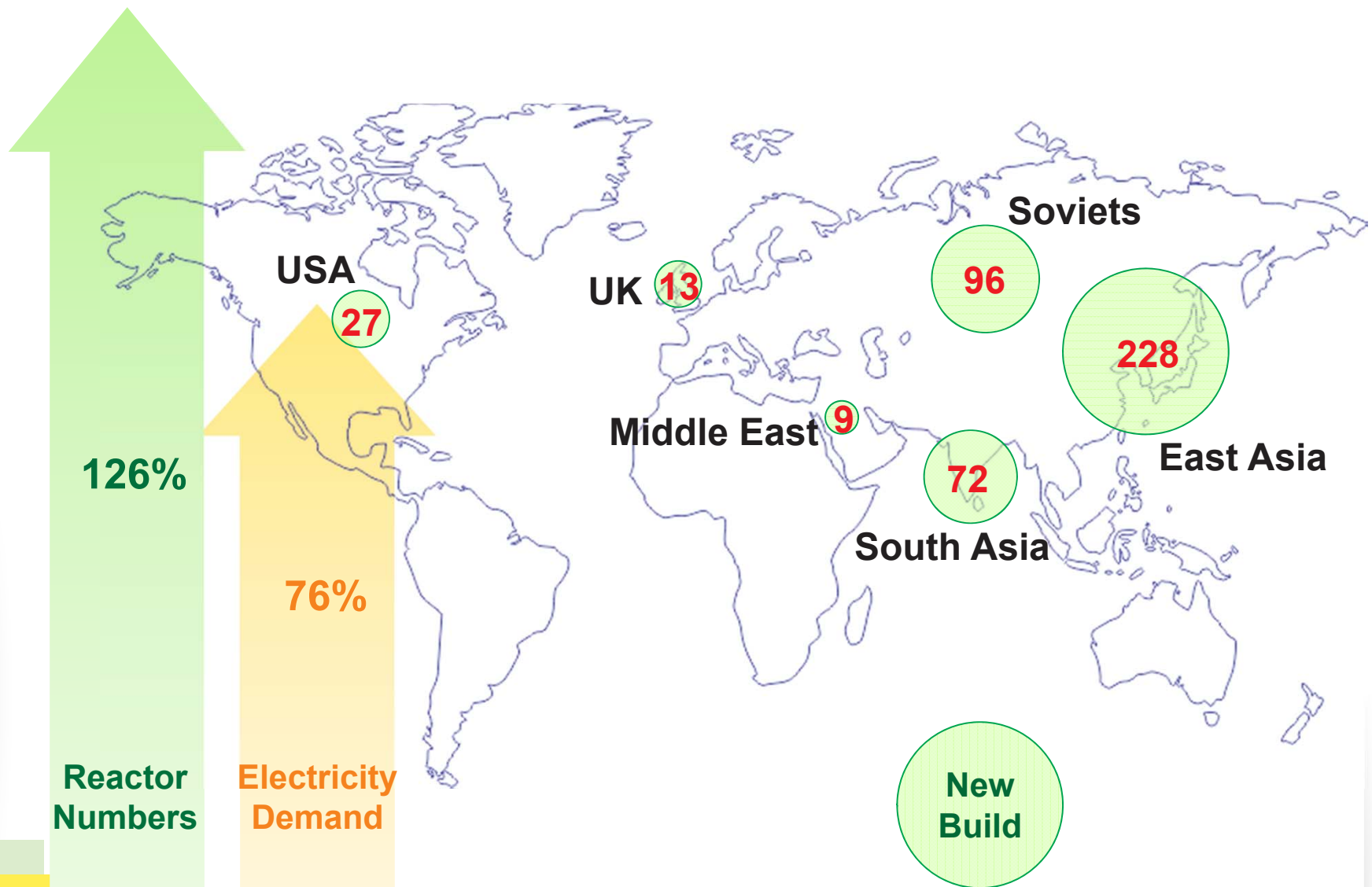


## Customers

**435**  
reactors

**11.5%**  
of world electricity  
production

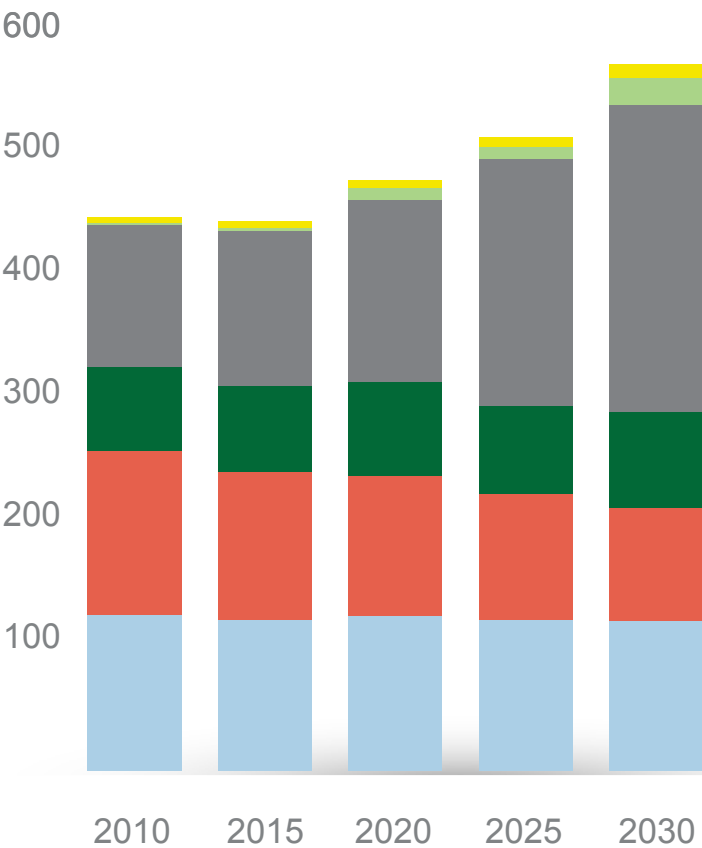
# Energy from Nuclear by 2030



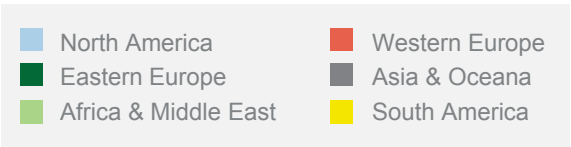
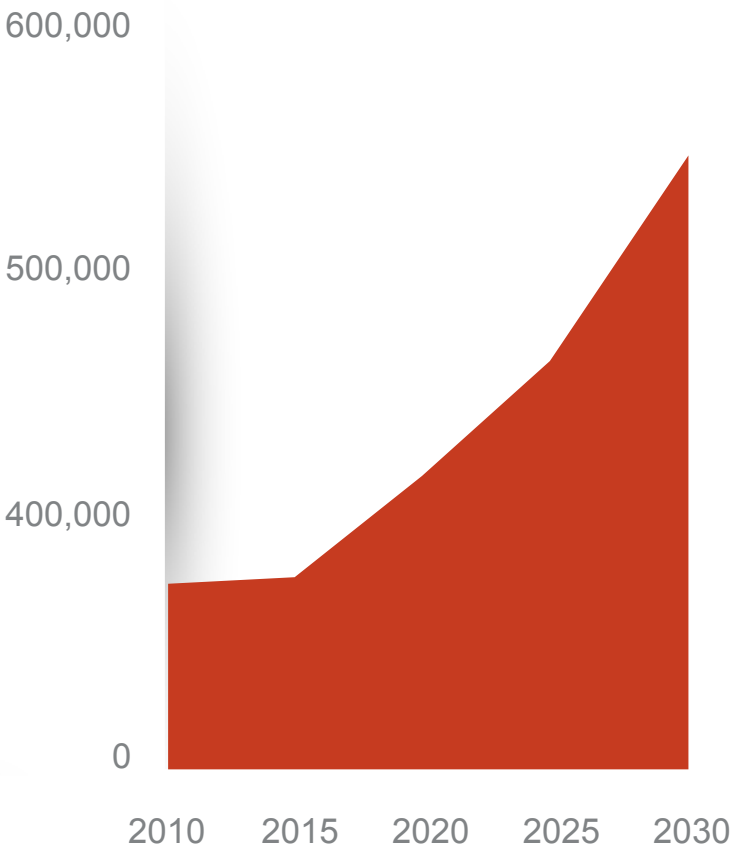
Source: World Nuclear Association

# Growth in Reactors and Nuclear Capacities

Reactor Units

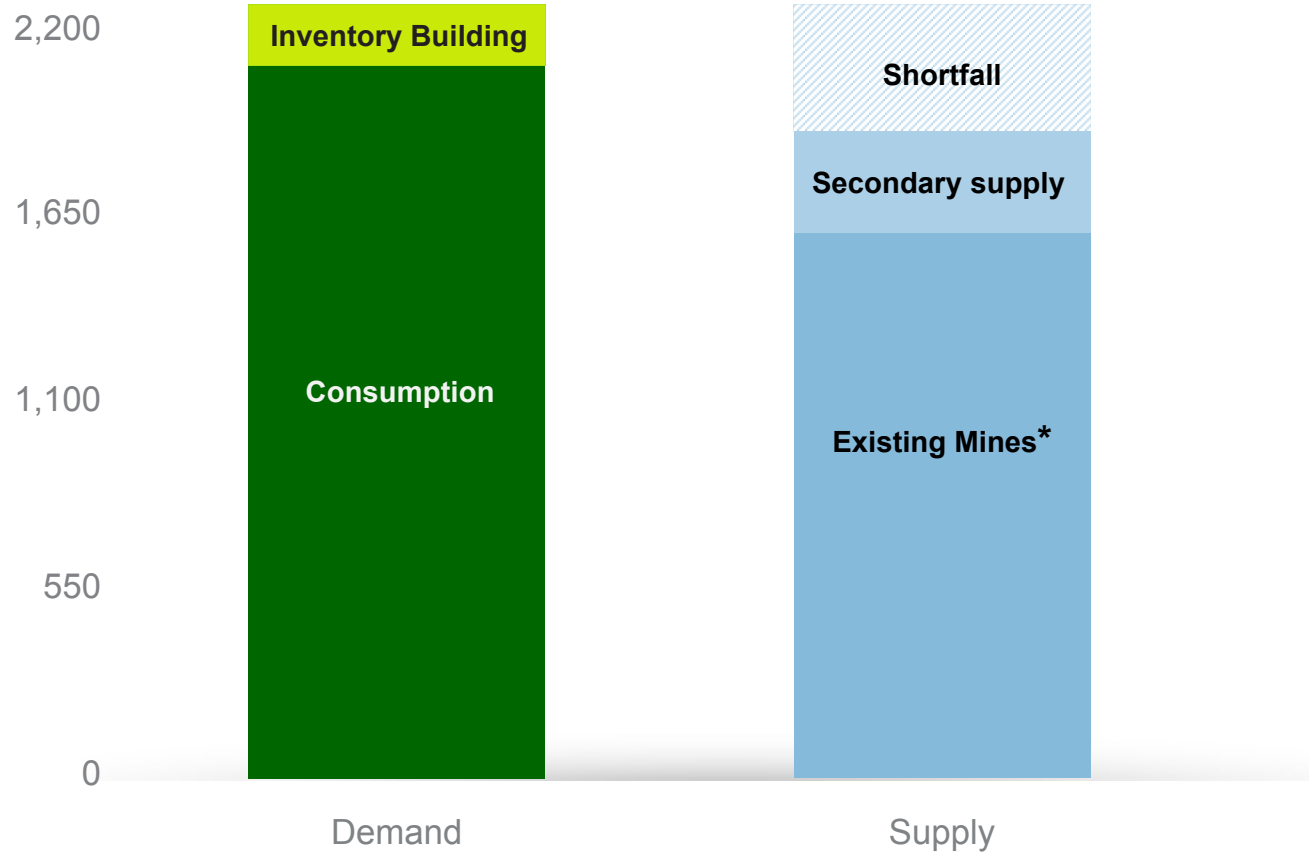


Capacity (MWe)



# New Uranium Supply Needed Through 2024

$U_3O_8$  Mlbs



\* Excludes projects under construction  
Source: Cameco

# Milestones and Achievements

A solid foundation for project development

## Government

<b>2016</b>	<b>Agreements with Denmark on U</b>
<b>2015</b>	<b>International safety conventions ratified</b>
<b>2014</b>	<b>New pro development coalition Government</b>
<b>2013</b>	<b>Zero tolerance for uranium removed</b>
<b>2011</b>	<b>Uranium added to GMEL's exploration license</b>
<b>2010</b>	<b>Greenland assumes responsibility for its mineral endowment</b>
<b>2009</b>	<b>Self Government replaces Home Rule</b>
<b>1979</b>	<b>Denmark grants Home Rule</b>

## Company

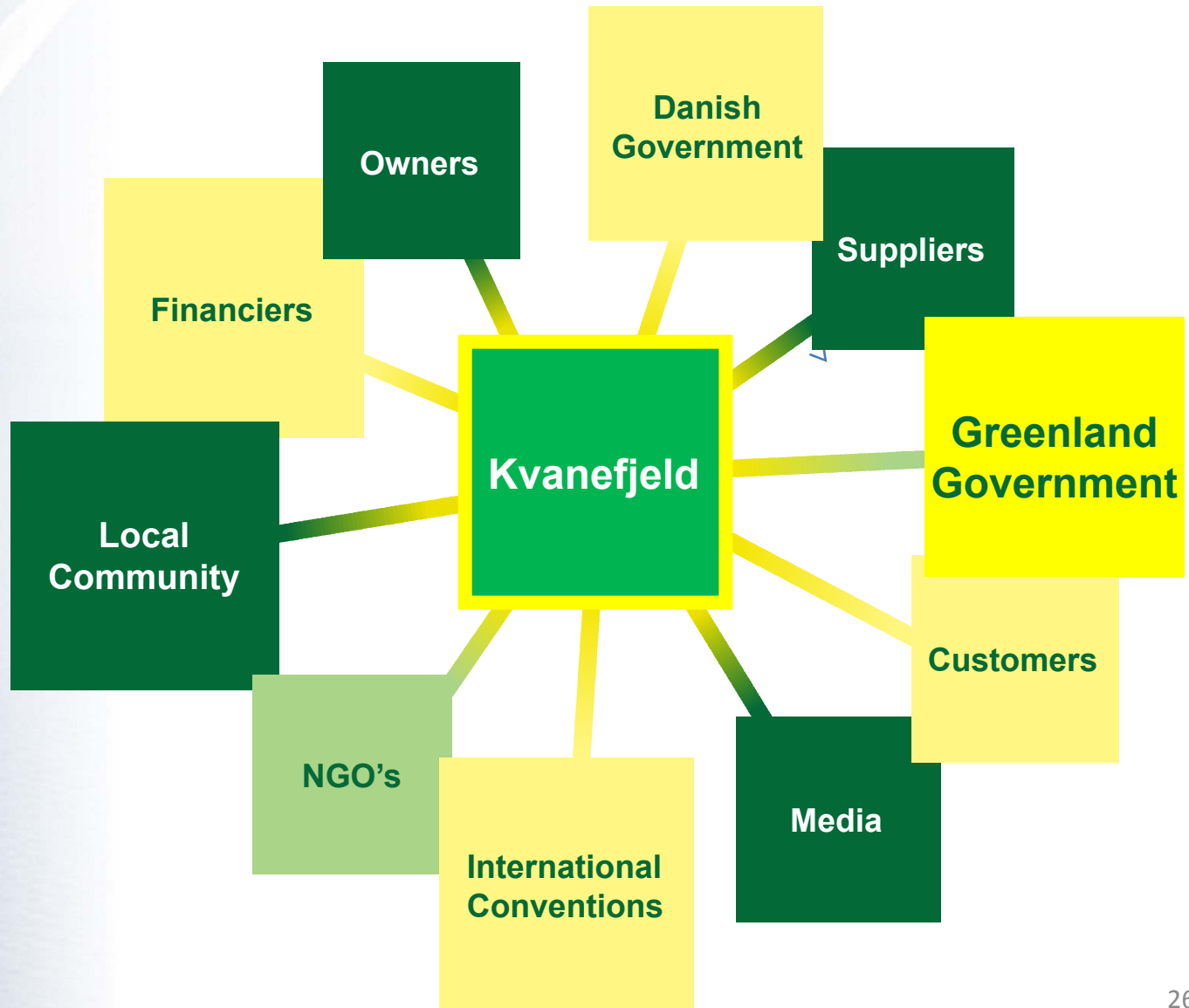
<b>2015</b>	<b>Lodged Mining Application First mining reserve, &gt; 100Mt Completed Feasibility Study Resource &gt; 1 Billion tonnes</b>
<b>2014</b>	<b>Signed MoU with NFC</b>
<b>2013</b>	<b>Completed Mine and Concentrator Study</b>
<b>2012</b>	<b>Moved to 100% ownership of Kvanefjeld Completed Pre-Feasibility Study</b>
<b>2011</b>	<b>Completed 50,000m of drilling</b>
<b>2008</b>	<b>Announced first JORC resource</b>
<b>2007</b>	<b>Commenced drilling Acquired interest in Kvanefjeld project</b>

“ Systematic progress at both project  
” and government/regulatory levels



# Stakeholder Engagement

Ongoing Cooperation Integral to Achieve Positive Outcome



# Towards a License to Operate

Uranium is a projected by-product at Kvanefjeld, but establishing regulations to manage the production and exports of uranium has been essential to project permitting and development. On this front, a solid foundation is in place.



# Greenland Minerals and Energy Ltd

## Materials for a Clean and Efficient Energy Future



### Greenland's Kvanefjeld – an optimum cornerstone to new rare earth supply chains

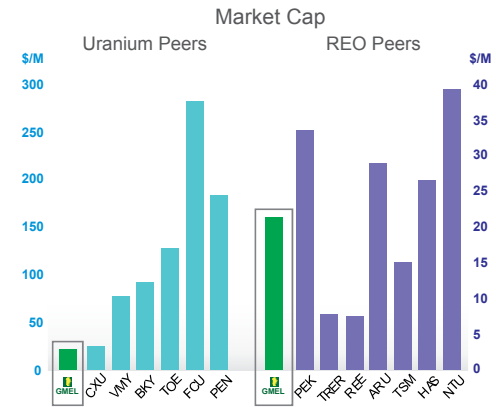
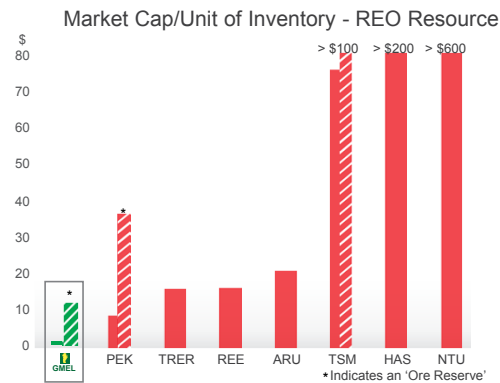
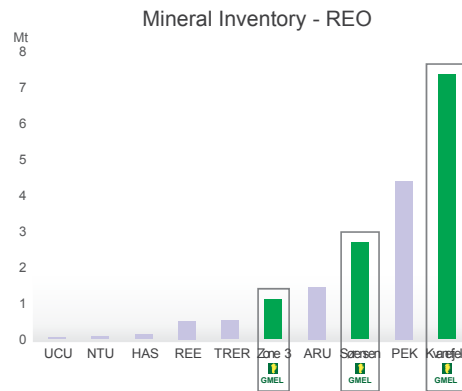
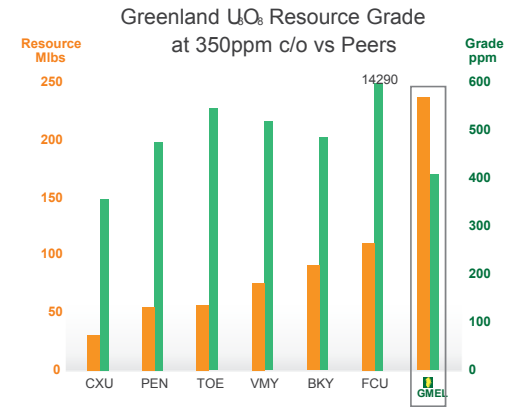
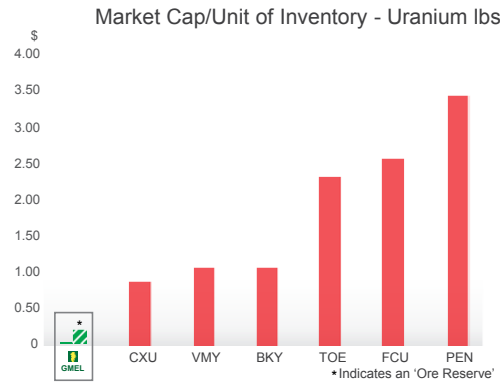
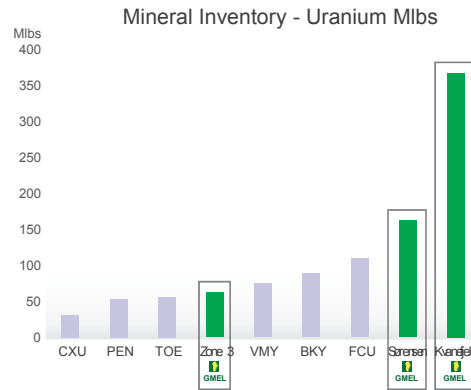
- **Scale** – world leading rare-earth uranium resources, poly-metallic advantage
- **Location and access** – direct shipping access, year round
- **Processing advantage** – pilot plant proven metallurgy, unique, simple methodology
- **Advanced project status** – permitting underway, clear political support

“ *A globally important natural resource project* ”



# Peer Comparisons

(as of Q1, 2016)



## Uranium:

GGG  
BKJ  
CXU  
FCU  
PEN  
TOE  
VMY  
Greenland Minerals and Energy Ltd  
Berkley Energia Ltd  
Cauldron Energy Ltd  
Fission Uranium Corp  
Peninsula Energy Ltd  
Toro Energy Ltd  
Vimy Resources Ltd

Advanced  
Intermediate  
Early  
Early - Intermediate  
Commissioning  
Advanced  
Intermediate

## Rare Earth:

GGG  
ARU  
HAS  
NTU  
PEK  
REE  
TRER  
TSM  
Greenland Minerals and Energy Ltd  
Arafura Resources Ltd  
Hastings Technology Metals Ltd  
Northern Minerals Ltd  
Peak Resources Ltd  
Rare Element Resources Ltd  
Texas Rare Earth Resources Corp  
Tasman Metals Ltd

## Status:

Advanced  
Intermediate  
Early  
Advanced  
Intermediate  
Intermediate  
Early  
Intermediate

Source: Company Announcements or Websites

# Greenland Minerals and Energy Ltd

**ASX-Listed, Greenland-Focused Mineral Explorer and Developer**



## Board

Non-Executive Chairman	Tony Ho
Managing Director	Dr John Mair
Non-Executive Director	Simon Cato

## Top Shareholders

Tracor Limited	53M (6.7%)
Global X Uranium ETF	31.3M

## Capital Structure

Shares outstanding	788M
Options outstanding	105.7M ex \$0.2, June 30 2016 100.7M ex \$0.08, Sept 20 2018 7.5M ex \$0.2, Feb 24 <sup>th</sup> 2018 7.5M ex \$0.25, Feb 24 <sup>th</sup> 2018
Undiluted market capitalization	<b>A\$24M</b> (@3 cents)

## Project Ownership - 100%



# Kvanefjeld Project – Mineral Resources

## Statement of Identified Mineral Resources – (JORC-Code 2012 Compliant)

Cut-off (U <sub>3</sub> O <sub>8</sub> ppm) <sup>1</sup>	Multi-Element Resources Classification, Tonnage and Grade									Contained Metal				
	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
<b>Kvanefjeld - February 2015</b>														
150	<b>Measured</b>	143	12,100	303	10,700	432	11,100	978	2,370	<b>1.72</b>	0.06	0.14	<b>95</b>	0.34
150	<b>Indicated</b>	308	11,100	253	9,800	411	10,200	899	2,290	<b>3.42</b>	0.13	0.28	<b>172</b>	0.71
150	<b>Inferred</b>	222	10,000	205	8,800	365	9,200	793	2,180	<b>2.22</b>	0.08	0.18	<b>100</b>	0.48
150	<b>Grand Total</b>	673	10,900	248	9,600	400	10,000	881	2,270	<b>7.34</b>	0.27	0.59	<b>368</b>	1.53
200	<b>Measured</b>	111	12,900	341	11,400	454	11,800	1,048	2,460	<b>1.43</b>	0.05	0.12	<b>83</b>	0.27
200	<b>Indicated</b>	172	12,300	318	10,900	416	11,300	970	2,510	<b>2.11</b>	0.07	0.17	<b>120</b>	0.43
200	<b>Inferred</b>	86	10,900	256	9,700	339	10,000	804	2,500	<b>0.94</b>	0.03	0.07	<b>49</b>	0.22
200	<b>Grand Total</b>	368	12,100	310	10,700	409	11,200	955	2,490	<b>4.46</b>	0.15	0.35	<b>252</b>	0.92
250	<b>Measured</b>	93	13,300	363	11,800	474	12,200	1,105	2,480	<b>1.24</b>	0.04	0.10	<b>75</b>	0.23
250	<b>Indicated</b>	134	12,800	345	11,300	437	11,700	1,027	2,520	<b>1.72</b>	0.06	0.14	<b>102</b>	0.34
250	<b>Inferred</b>	34	12,000	306	10,800	356	11,100	869	2,650	<b>0.41</b>	0.01	0.03	<b>23</b>	0.09
250	<b>Grand Total</b>	261	12,900	346	11,400	440	11,800	1,034	2,520	<b>3.37</b>	0.11	0.27	<b>199</b>	0.66
300	<b>Measured</b>	78	13,700	379	12,000	493	12,500	1,153	2,500	<b>1.07</b>	0.04	0.09	<b>65</b>	0.20
300	<b>Indicated</b>	100	13,300	368	11,700	465	12,200	1,095	2,540	<b>1.34</b>	0.05	0.11	<b>82</b>	0.26
300	<b>Inferred</b>	15	13,200	353	11,800	391	12,200	955	2,620	<b>0.20</b>	0.01	0.01	<b>12</b>	0.04
300	<b>Grand Total</b>	194	13,400	371	11,900	471	12,300	1,107	2,530	<b>2.60</b>	0.09	0.21	<b>159</b>	0.49
350	<b>Measured</b>	54	14,100	403	12,400	518	12,900	1,219	2,550	<b>0.76</b>	0.03	0.07	<b>48</b>	0.14
350	<b>Indicated</b>	63	13,900	394	12,200	505	12,700	1,191	2,580	<b>0.87</b>	0.03	0.07	<b>54</b>	0.16
350	<b>Inferred</b>	6	13,900	392	12,500	424	12,900	1,037	2,650	<b>0.09</b>	0.00	0.01	<b>6</b>	0.02
350	<b>Grand Total</b>	122	14,000	398	12,300	506	12,800	1,195	2,570	<b>1.71</b>	0.06	0.15	<b>107</b>	0.31

# Kvanefjeld Project – Mineral Resources

## Statement of Identified Mineral Resources – (JORC-Code 2012 Compliant)

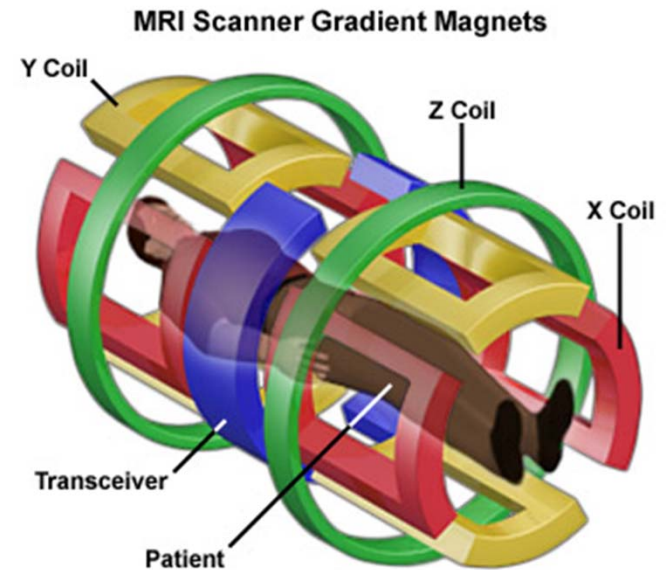
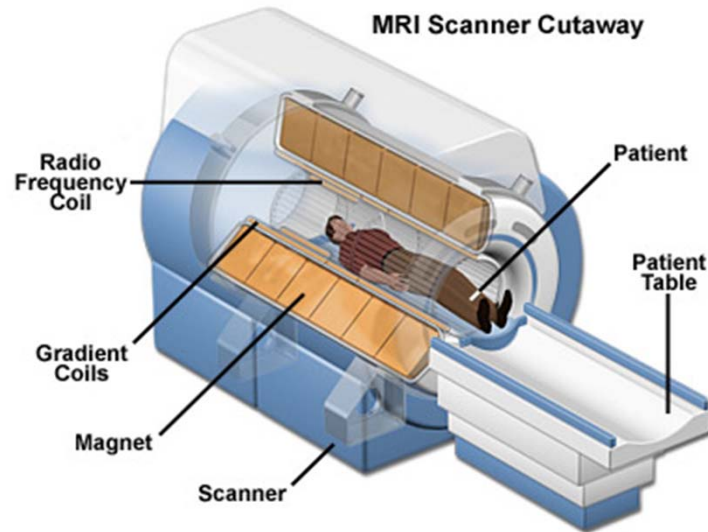
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<b>Sørensen - March 2012</b>														
150	Inferred	242	11,000	304	9,700	398	10,100	895	2,602	<b>2.67</b>	0.10	0.22	<b>162</b>	0.63
200	Inferred	186	11,600	344	10,200	399	10,600	932	2,802	<b>2.15</b>	0.07	0.17	<b>141</b>	0.52
250	Inferred	148	11,800	375	10,500	407	10,900	961	2,932	<b>1.75</b>	0.06	0.14	<b>123</b>	0.43
300	Inferred	119	12,100	400	10,700	414	11,100	983	3,023	<b>1.44</b>	0.05	0.12	<b>105</b>	0.36
350	Inferred	92	12,400	422	11,000	422	11,400	1,004	3,080	<b>1.14</b>	0.04	0.09	<b>85</b>	0.28
<b>Zone 3 - May 2012</b>														
150	Inferred	95	11,600	300	10,200	396	10,600	971	2,768	<b>1.11</b>	0.04	0.09	<b>63</b>	0.26
200	Inferred	89	11,700	310	10,300	400	10,700	989	2,806	<b>1.03</b>	0.04	0.09	<b>60</b>	0.25
250	Inferred	71	11,900	330	10,500	410	10,900	1,026	2,902	<b>0.84</b>	0.03	0.07	<b>51</b>	0.20
300	Inferred	47	12,400	358	10,900	433	11,300	1,087	3,008	<b>0.58</b>	0.02	0.05	<b>37</b>	0.14
350	Inferred	24	13,000	392	11,400	471	11,900	1,184	3,043	<b>0.31</b>	0.01	0.03	<b>21</b>	0.07
<b>Project Total</b>														
150	Measured	143	12,100	303	10,700	432	11,100	978	2,370	<b>1.72</b>	0.06	0.14	<b>95</b>	0.34
150	Indicated	308	11,100	253	9,800	411	10,200	899	2,290	<b>3.42</b>	0.13	0.28	<b>172</b>	0.71
150	Inferred	559	10,700	264	9,400	384	9,800	867	2,463	<b>6.00</b>	0.22	0.49	<b>326</b>	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.

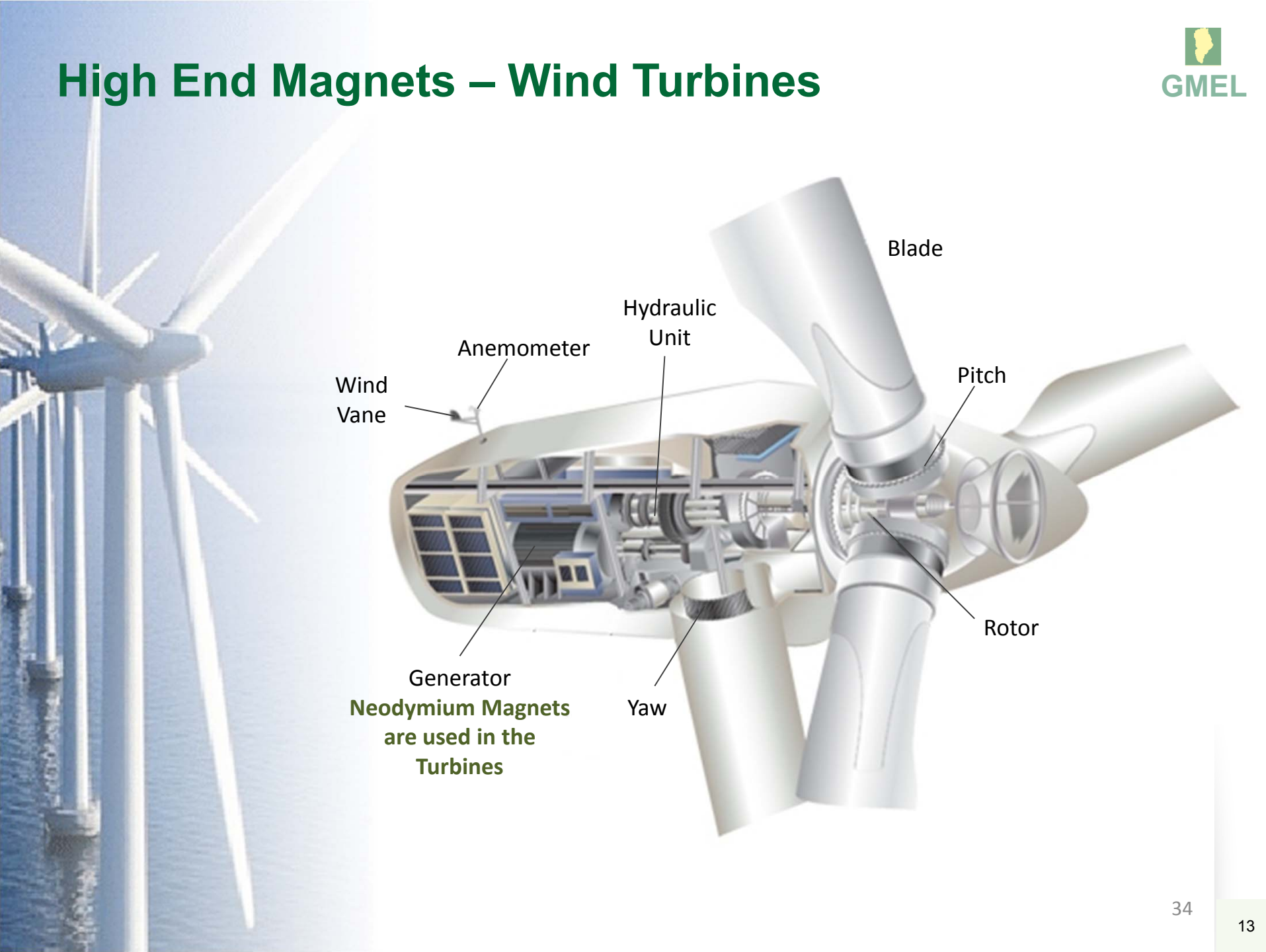
Note: Figures quoted may not sum due to rounding.

# High End Magnets - MRI

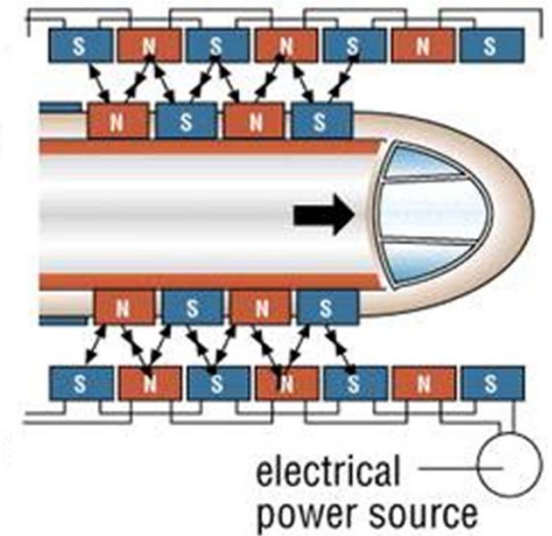
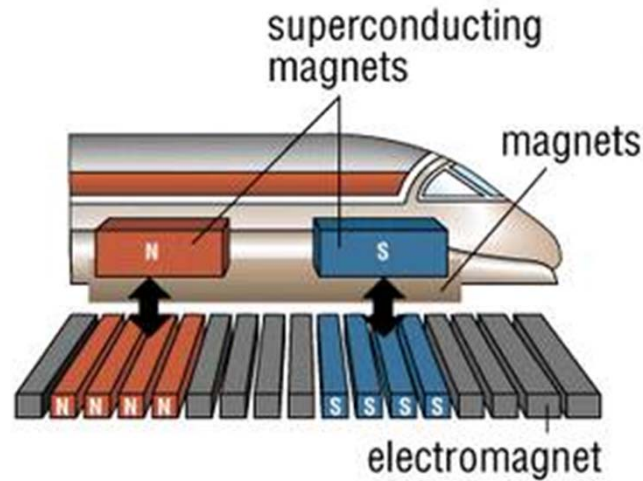


These diagnostic tools, powered by strong superconducting magnets, save countless lives with their ability to pinpoint tumours and other abnormalities

# High End Magnets – Wind Turbines



# High End Magnets – Maglev Trains



Maglev (magnetic levitation) trains use magnets to hover just above the track, reducing friction to zero and allowing the trains to achieve a much higher speed while using much less energy than a classic train.