



Company Announcement, July 4<sup>th</sup>, 2017

**Rare Earth Market Prices Rise, Sector Outlook Improves,  
Kvanefjeld Project Well-Positioned**

- **Rare earth (RE) prices are increasing steadily in response to improving fundamentals**
- **Reforms to the rare earth industry in China have been substantive, with positive impacts, the result of industry consolidation and a crackdown on illegal production**
- **China's Rare Earth Industry Development Plan for 2016-2020 (the Plan) provides a road map for continued reform in China, and insight into future global industry structure**
- **As the Plan is implemented RE supply will be increasingly constrained, shortages will develop and there will be a need for new mine developments outside China**
- **China's downstream processing technology, capacity, and market presence means it continue to have a dominant influence on the evolution of the industry**
- **Demand has returned, with strong outlook for the markets for permanent magnets and catalysts (Nd, Pr, Tb, Dy, and La)**
- **Demand growth is being driven by the electrification of transport systems (electric vehicles, train systems) and, new and clean technologies, many of which are closely linked to government policies worldwide**
- **These government policies are aiming to reduce pollution associated with carbon emissions, promote clean technologies, energy efficiency and renewables**
- **GMEL's Kvanefjeld Project ideally placed for the next phase of sector growth; positioned at the interface of sustainable new primary supply with Chinese downstream processing technology and international market presence**

## Rare Earth Industry Outlook

Greenland Minerals and Energy Ltd's ('GMEL' or 'the Company') Kvanefjeld Project is one of very few advanced rare earth projects globally and is well-positioned to be an internationally important point of primary rare earth (RE) supply in what continues to be a rapidly evolving market. Kvanefjeld is projected to be a significant, cost-competitive producer of all key rare earths including neodymium, praseodymium, terbium and dysprosium.

As the future structure of the RE industry becomes clearer, largely due to Chinese reforms, the projected demand outlook is increasingly strong. Demand growth is underpinned by government policy (notably China and India) that is pushing to reduce pollution associated with carbon emissions, and promote clean, energy efficient technologies.

This is driving strong growth in the permanent magnet sector to which RE's are essential. Hybrid and electric vehicles, wind turbines, industrial robots (manufacturing) and a growing range of energy efficient technologies all utilise permanent magnets.

GMEL is currently working with strategic partner and 12.5% shareholder Shenghe Resources Holding Co Ltd (Shenghe) to connect Kvanefjeld to the growing international RE market through leading downstream processing technology. Owing to Kvanefjeld's scale, favourable production profile across all key REs and long projected mine life, successful development will see Greenland become a globally significant, long-term supplier of these important metals.

## Rare Earth Prices

After a long period of consolidation through 2016 RE prices have been on the increase since the start of 2017. For the magnet metals (especially neodymium, praseodymium and terbium) and lanthanum the price increases have been significant (Figure 1).

Using January 1 2016 as a base, the price of terbium oxide is up over **40%**, the prices of lanthanum oxide is up nearly **30%** and for praseodymium and neodymium oxide up around **20%**.

Prices have not moved in response to a short term stimulus to the market, rather prices are moving to reflect underlying changes to the supply and demand dynamics for rare earths. Demand is increasing and China's Rare Earth Industry Development Plan for 2016 – 2020 will see continuing tightening of rare earth supply.

It has taken until the end of 2016 for the improved market dynamics to be reflected in RE prices because of the level of stock of intermediate RE products that had built up in the supply chain since 2012. The sharp fall in demand after the price spike in 2011 was not matched by a cutback in

production and significant stocks of intermediate products developed as a consequence, particularly through illegal supply networks.

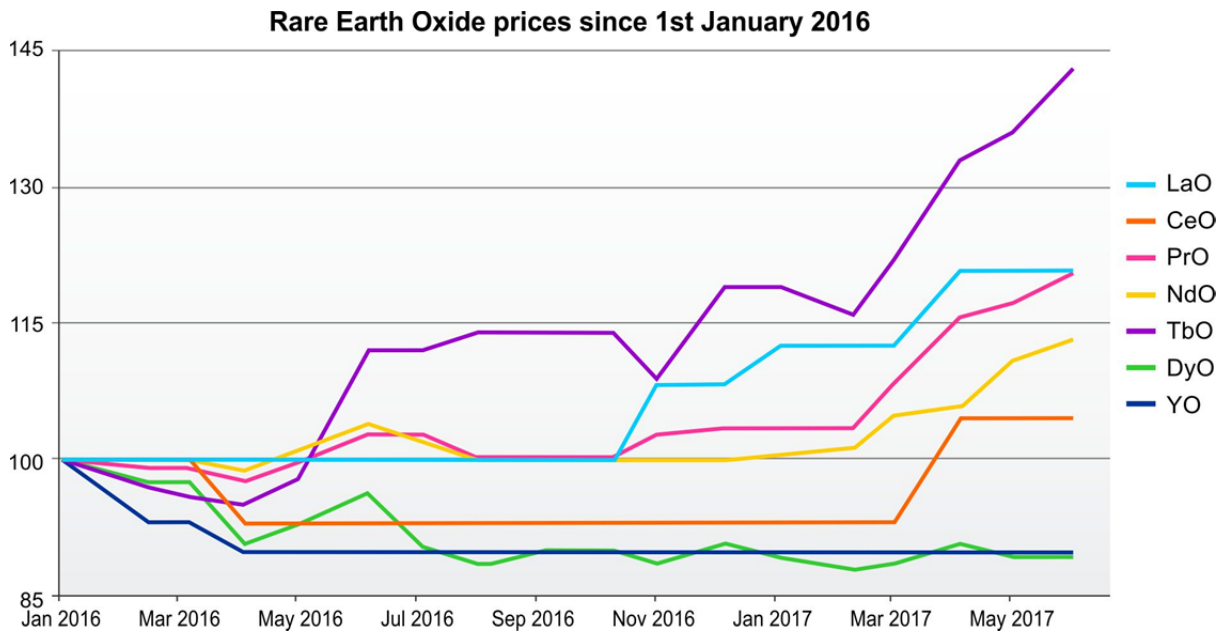


Figure 1. Indexed rare earth prices (source: the Association of China Rare Earth Industry ACREI).

### Rare Earth Supply – An Evolving Backdrop

China established its dominant position in the RE processing industry on the back of a secure and abundant domestic source of RE raw materials coupled with a commitment to developing downstream processing technology and capacity. Over the last decade the Chinese Government has taken a number of strategic steps to protect the dominant position of its domestic RE industry.

Acknowledging that domestic reserves of REs were being depleted at an unsustainable rate, from 2005 the Chinese Government steadily reduced quotas allocated to exporters of rare earths. In 2005 export quotas totalled ~65,000 tonnes.

In 2010 the volume of allocated export quotas [~30,000t] was, for the first time, set below expected demand. This precipitated panic in the market and the RE pricing bubble of 2011 was the result.

The 2011 price bubble stimulated mining and processing outside of the official channels in China and compromised Government efforts to date to conservatively utilise what were increasingly being regarded as long term strategic assets.

The Chinese Government responded with a number of initiatives with the objective of reasserting control over its domestic rare earth industry. These steps include:

- 1 Consolidation of the industry into 6 major state run regional entities.**
- 2 Elimination of export quotas and tariffs and the introduction of an export licenses**
- 3 Curbing production occurring outside of the formal production quota system [the steady decline in prices has helped to organically curb this unauthorized production]**

While it has taken some time for the impact of these changes to be felt, a general tightening of the supply of RE is now occurring as a result and it is clear that developments in China will continue to drive the evolution of the RE market.

### **China's Next Five Year Plan – Towards Integration**

In October 2016 China's Ministry of Industry and Information Technology issued its Rare Earth Industry Development Plan (Plan) for the period to 2020. The key objectives of the Plan are to:

- \* Limit RE mine production to no more than 140,000 tpa**
- \* Reduce separation plant capacity by a third**
- \* Ensure that 90% of RE operations are in compliance with increasingly stringent environmental regulations, and**
- \* Ensure that the proportion of REs exported as raw materials is significantly reduced**

Once implemented the Plan will restrict rare earth production from domestic raw materials and will further restrict RE raw mineral exports.

This is a very significant long term development for the RE industry and there is already evidence that Chinese RE producers have refined their strategic approach in response.

As the objectives of the Plan are achieved it will become increasingly difficult for Chinese processors to guarantee secure long term domestic supplies of RE raw materials. Companies will have to develop new sources of raw materials outside of China to guarantee long term supplies for existing separation plants and to underwrite investments in capacity or technology. Chinese RE processors will need to be prepared to invest in, or facilitate the financing of, RE mining projects overseas.

The Plan will create the circumstances whereby a select few ex-China mines (primary supply) will be integrated with leading Chinese processors to ensure that sufficient RE products are available to end-user industries.

## Rare Earth Demand

Demand for REs was severely affected by the price bubble in 2011. The extreme price rises prompted consumers to develop substitutes for REs in their products and prompted other consumers to refine manufacturing processes in order to minimize the quantity of REs per unit of production. In some instances the result was poorer performance in the final product but this was balanced against lower input costs.

However, albeit in a gently declining trend, prices have slowly normalised over the last 3 years. Stability in prices has allowed consumers to regain confidence in the market and, as a result, RE demand has recovered the losses precipitated by the price volatility in 2011 and the market is growing strongly again.

The graph below (Figure 2) shows Chinese exports of RE products since the beginning of 2015. It is clear that demand for Chinese RE products has been growing strongly since the beginning of 2015.

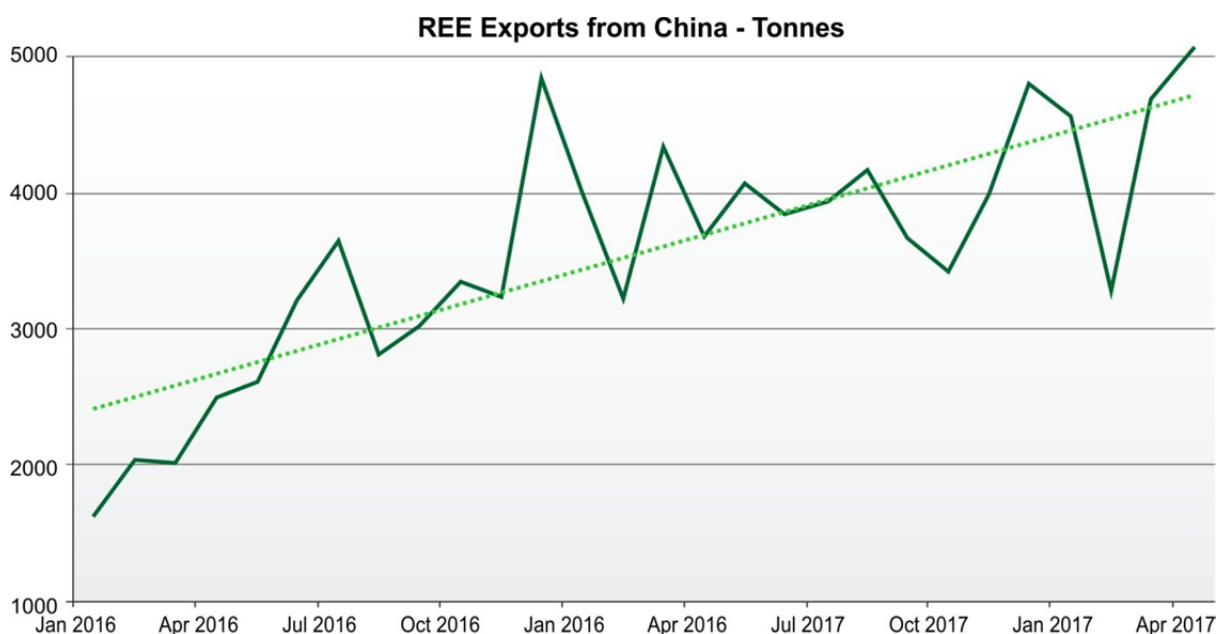


Figure 2. Rare earth exports from China since January 2016.

## Looking Forward

Commentators on the RE market are forecasting significant long term growth for the RE market. Forecasts typically suggest compound annual growth of around 5% for the long term.

The most significant growth is expected for those REs with application in the markets for magnets and catalysts [Nd, Pr, La]. Significantly, it is becoming increasingly the case that global RE demand is inextricably linked to government policies and regulations. In particular policies and regulations that are related to:

- **Production of clean energy**
- **Electric mobility**
- **Energy efficiency**
- **Emission controls**

The link between forecast demand and Government policies adds confidence to expectations for demand growth over time.

On the supply side, with the Government of China planning to cap mine production of REs, it is clear that the development of RE mines outside of China will be required to meet expected demand. It is unlikely that mine development can occur sufficiently rapidly to meet growing demand, particularly for key REs required for the manufacture of magnets and catalysts, and scarcity of key inputs will help to push price higher.

### **Greenland's Role in New RE Supply Chains**

GMEL is at the vanguard of this strategic evolution in rare earth supply. Prior to establishing a strategic relationship with leading rare earth company Shenghe in 2016, the Company had been actively engaging the Chinese rare earth industry for a number of years; a process which provided strong insight into how the industry was reshaping.

Kvanefjeld has a number of key attributes that, when integrated with Shenghe's downstream processing technology and capacity, can provide the potential to play an important role in new supply networks. These include:

- Scale – largest core-compliant rare earth resource
- By-product revenue streams to strengthen project economics
- Composition – ideal production profile across key rare earths
- Advantageous processing that has been extensively pilot plant tested
- Favourable country and project location with direct shipping access

-ENDS-

## ABOUT GREENLAND MINERALS AND ENERGY LTD.

Greenland Minerals and Energy Ltd (ASX: GGG) is an exploration and development company focused on developing high-quality mineral projects in Greenland. The Company's flagship project is the Kvanefjeld multi-element deposit (rare earth elements, uranium, zinc). A pre-feasibility study was finalised in 2012, and a comprehensive feasibility study was completed in May, 2015, and updated in April, 2016. The studies demonstrate the potential for a large-scale, long-life, cost-competitive, multi-element mining operation. An exploitation (mining) license application for the initial development strategy is currently being processed by the Government of Greenland and their advisory groups.

In 2017, GMEL is focussed on working closely with Greenland's regulatory bodies on the processing of the mining license application, and maintaining regular stakeholder updates. The Company is undertaking technical work programs with Shenghe Resources Holding that aim to further enhance the Kvanefjeld Project, and ensure it is aligned with downstream processing.

**Dr John Mair**  
**Managing Director**  
**+61 8 9382 2322**

**David Tasker**  
**Professional PR**  
**+61 8 9388 0944**

**Christian Olesen**  
**Rostra Communication**  
**+45 3336 0429**

Greenland Minerals and Energy Ltd will continue to advance the Kvanefjeld project in a manner that is in accord with both Greenlandic Government and local community expectations, and looks forward to being part of continued stakeholder discussions on the social and economic benefits associated with the development of the Kvanefjeld Project.

---

### **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 reserve estimate was released in a Company Announcement on June 3<sup>rd</sup>, 2015. There have been no material changes to the resource estimate, or ore reserve since the release of these announcements.