

August 1<sup>st</sup>, 2014

James Rajotte, M.P.  
Chair  
House of Commons Standing Committee on Finance  
[Finapbc-cpb@parl.gc.ca](mailto:Finapbc-cpb@parl.gc.ca)

## **RE: Canadian Rare Earth Element Network (CREEN)**

Dear Mr. Rajotte,

Please consider the following as a request from the Canadian Rare Earth Element Network (CREEN) to appear before the House of Commons Standing Committee on Finance as part of the pre-budget consultation process.

The three main points CREEN wants to share with the Committee are:

- Canada has the real opportunity of securing a significant position, and its commensurate economic benefits, by establishing and feeding global rare earth supply chains. Canada has unique resources and some of the most advanced projects in the world outside of China.
- There are technical challenges unique to Canadian projects that can be addressed through research and development (R&D), yet the sector is made up of junior companies without the individual financial resources to ensure Canada wins this 'race to supply'.
- Government support through R&D funding, coupled with general promotion of the industry, will allow Canada to capitalize on this once in a lifetime opportunity to be a global leader in a developing industry.

### **Context**

With its well-known mining and processing expertise, Canada is currently in a strong position to capture and capitalize on the economic opportunities and strategic importance of the country's unique rare earth element (REE or REEs) deposits. This would firmly establish Canada as a significant, secure, and sustainable supplier to the global REE supply chain.

With Canada as a world leader in REEs, clearly two key priorities of the Canadian Government, would be supported:

- Increasing the competitiveness of Canadian businesses through research, development, innovation and commercialization
- Maximizing the number and types of jobs for Canadians

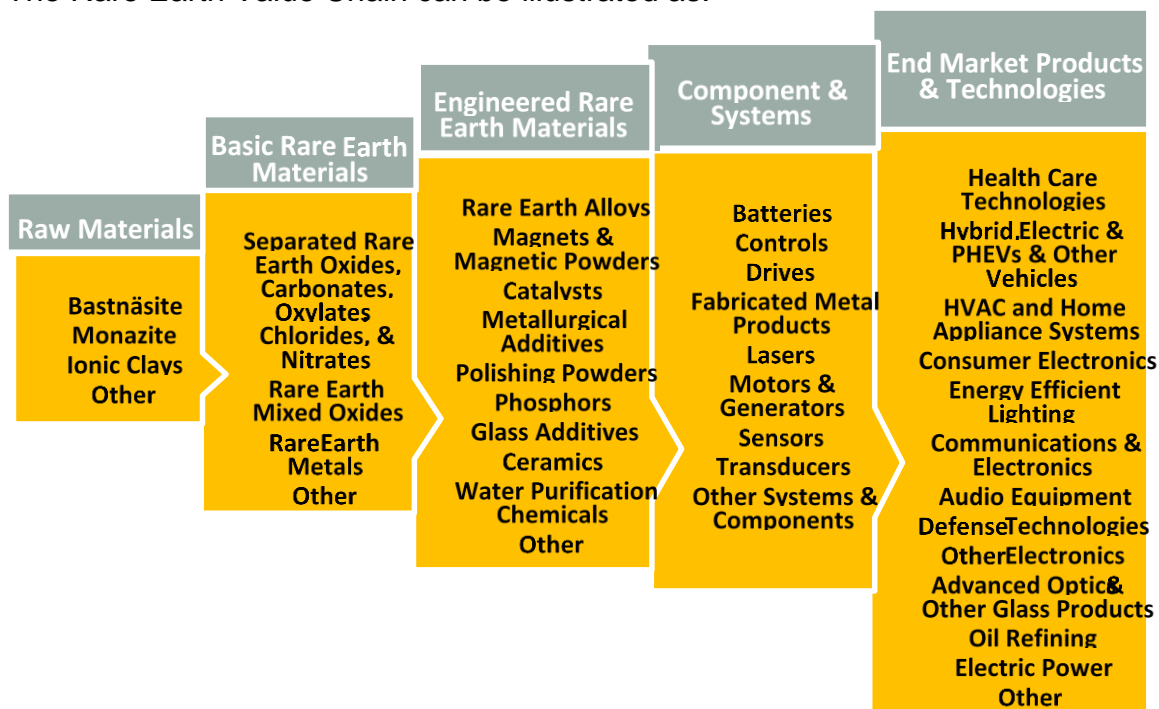
To capitalize on this opportunity, Canada’s emerging REE industry would greatly benefit from focused R&D funding support to help it surmount some of the technical challenges that are specific to Canadian deposits. Support from the Government of Canada is critical to not only the development work, but also in securing the capital markets’, as well as national and international partners and consumers’, confidence in Canada’s industry.

CREEN is requesting R&D funding support of \$25 million over 5 years.

## Economics of Rare Earth Elements

These unique materials are highly leveraged when measured against the economic value of the end-use products and industries they make possible and support. Domestic production of REEs will give Canada a significant position in downstream manufacturing opportunities that rely on these elements.

The Rare Earth Value Chain can be illustrated as:



The reality is, we all use rare earth elements multiple times a day, and do not realize it. Substitutes for these materials are either more expensive and/or offer inferior performance and/or are just not available.

Global demand for REEs is expected to rise significantly in support of key emerging industries (e.g. green energy technologies, defence, computing & communications, medical diagnostics and treatments, etc.). The current market for REE compounds is

approximately 110,000 tonnes per year of rare earth oxides valued around US\$4 billion annually. Growth over the last 10-15 years has been 8% to 12% per annum, and most experts agree the rate of growth will continue or even accelerate.<sup>1</sup> With certain individual REEs (specifically the heavy rare earths – the focus of Canadian resources), there will continue to be shortages. A recent European Commission report entitled, “*Report on Critical Raw Materials for the EU*”, deemed heavy rare earths to be the critical raw materials with the highest supply risk. The EU noted various demand projections, with the most conservative being 205,000 tonnes per year with approximately 17,000 tonnes of this demand being in the “heavy” category by 2017. The U.S. Department of Energy has also deemed heavy rare earths as “critical” to clean energy with a high supply risk. Furthermore, rare earth elements have been designated as a critical resource by the Canadian Government (<http://o.canada.com/news/canada-looking-to-break-into-critical-rare-earth-elements-mining>).

A recent report by the Rare Earth Technology Alliance (RETA) titled, “*The Economic Benefits of the North American Rare Earths Industry*”, provides an in-depth look at the economic footprint of the rare earth industry.

- The rare earth industry directly contributes to the North American economy with \$795 million in shipments, employing nearly 1,050 workers with a payroll of \$116 million.
- Adding other upstream impacts (indirect and induced) to its direct impact, the rare earth industry generates a total of \$1.9 billion in economic output in North America.
- The rare earth industry is supportive of \$329.6 billion in economic output in “downstream” end-market products and technologies that employ 618,800 workers (with a combined payroll of \$37.6 billion) in the United States and Canada. Canada’s portions of these estimates are 84,000 and \$4.2 billion.

## Canada’s Competitive Advantage

China has had a monopoly position over REE production and processing since the mid-1990s. While there are now purported to be hundreds of REE deposits outside of China at different stages of development (from early prospecting and exploration, through to detailed engineering studies and project permitting), Technology Metals Research LLC (‘TMR’), a respected US-based advisory firm, has created an Advanced Projects Index. Of the 28 Advanced Projects, 9 are located in Canada, and they tend to be deposits with high percentages of the critical (primarily heavy) REEs.

Manufacturers and new technology innovators outside China and even within China are looking for secure, sustainable, alternative supply of REEs, thus providing Canada with the logical and ideal opportunity of transforming these important resources into downstream economic returns.

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<sup>1</sup>[http://www.parl.gc.ca/Content/HOC/Committee/412/RNNR/WebDoc/WD6669744/412\\_RNNR\\_reldoc\\_PDF/RareEarthElements-Summary-e.pdf](http://www.parl.gc.ca/Content/HOC/Committee/412/RNNR/WebDoc/WD6669744/412_RNNR_reldoc_PDF/RareEarthElements-Summary-e.pdf)

## **Government's Role in Rare Earth Industry**

Government support for this emerging industry would build on the recent House of Commons Standing Committee on Natural Resources report titled, "*The Rare Earth Elements Industry in Canada – Summary of Evidence*" (June 2014). The Report outlines some of the basics of the rare earth element industry (e.g. applications, global market related to supply and demand, and the role of China) and discusses the potential economic and strategic opportunity for Canada and the key challenges faced in the industry. It also speaks to initiatives that support Canada's REE industry, including CREEN, in its concluding section titled, "*The Role of the Federal Government in Advancing Canada's Rare Earth Industry*".

This document suggests the Canadian government publicly support the development of this important emerging sector as a serious a global player in the industry. "Canada's opportunity is now", the document notes, while also alluding to the fact that, "Canada has not invested in rare earth industry development to the same extent as other countries."

It should be noted that the companies leading the development of Canadian projects are junior mining companies, and do not have the financial resources of the traditional large and multi-national base metal mining companies. These companies and their shareholders have invested over \$200 million in Canadian projects to date, however, current capital markets and lack of revenue generation at this time have hindered R&D abilities and project advancement. This funding request is not for the benefit of any particular company, but for the industry, and regardless of individual companies' success, the expertise and methods developed will be available to any Canadian project developer and CREEN member while creating and improving REE expertise in Canada.

## **CREEN's Goal and Multi-Staged Priorities**

As an industry-led, multi-stakeholder network, CREEN provides the platform for industry, academia, commercial and national labs, and experts to deliver collaborative solutions that will advance Canada's REE sector to produce and secure 20 percent of the global supply market for separated critical rare earth products by 2018. CREEN is focused on addressing pre-competitive economic and technical issues needed to establish further downstream material processing and applications. CREEN has advanced discussions with both the Canadian Institute of Mining & Metallurgy (CIM) and the Canadian Mining Innovations Council (CMIC) for them to provide their established governance and administrative services, such that any funding will be directed toward only the needed R&D solutions.

CREEN's short term focus is on industry driven project work to support rapid production opportunities to secure Canada's position as a key producer in the global marketplace. This can be accomplished through innovative application of existing mineral processing,

hydrometallurgy and chemical process engineering to develop unique solutions. Canada has the internal resources for this challenge but the work needs to be coordinated and financially supported by all concerned groups.

A number of specific pre-competitive R&D projects have already been identified by collaborative discussions among technical experts from across Canada. These projects seen as instrumental to Canada's success in this emerging global supply chain include:

- Separation Plant Design
- High Temperature Acid Baking
- Fine Particle Processing
- Hydrochloric Acid Regeneration, and
- Fundamental Understanding of REE Collectors

In the medium to long term (2 - 5 years), CREEN will strive to deliver improved process solutions and target more strategic, fundamental technology development focused on further downstream processing towards finished products (e.g. metals, alloys, phosphors), and new applications and market opportunities for REEs.

During both the short and medium term, CREEN will continue to champion the training and development of highly qualified personnel (HQP) with academic partners to create the future leaders in this growing sector in Canada.

## **International Efforts**

National and international industry-academic-government championed rare earth initiatives have been launched over the past two years. Examples include:

- The US Critical Materials Institute (CMI), funded under the auspices of the US Department of Energy with \$120 million over 5 years, and includes partners from other national laboratories, universities and industry.
- The European Rare Earth Competency Network (ERECON), in conjunction with its related organizations EURARE and RARE3, is working with expert REE engineering & materials scientists, economists, and 27 companies. CREEN was recently invited to be a permanent observer.
- The Korean Institute for Rare Metals (KIRAM), established with USD\$15 million for REE-related R&D programs, with one of the more important actions being to organize the global network as well as domestic network on rare metals.
- UK Natural Environment Research Council's (NERC) Security of Supply of Mineral Resources, with a funding of £7 million, is in the final stages of a competition designed to identify 3 or 4 projects on REE supply and applications

Canada and CREEN have been approached by all of these international organizations to participate in and help foster collaboration efforts.

## Closing Remarks

Canada has the real opportunity of securing a significant position, and the commensurate economic benefits, by establishing and feeding global rare earth supply chains. The time for Canada to become a global leader and a sustainable supplier of rare earth elements is now.

This is why CREEN is requesting R&D funding support of \$25 million over 5 years.

Without this funding, other competing nations' projects will be allowed to beat Canada in the race to supply and acquire a larger portion of the developing downstream industry that will inevitably follow.

Yours sincerely,



Ian M London P.Eng, MBA  
Chair, CREEN

Current members of CREEN are:

- Avalon Rare Metals Inc.
- Commerce Resources Corp.
- Euro Pacific Canada
- General Electric Canada
- Hatch
- Innovation Materials Corp.
- McGill University
- Micon International Limited
- Orbite Aluminae Inc.
- Pele Mountain Resources
- Queen's University
- Quest Rare Minerals Ltd.
- Saskatchewan Research Council
- Search Minerals Inc.
- SGS Canada
- The University of British Columbia
- Université Laval
- University of Saskatchewan
- University of Toronto
- Xstrata Process Support