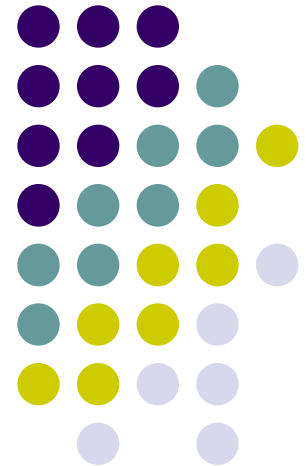


The Case for Global Collaboration of Rare Earth Technology Stakeholders

Keith A. Delaney
Executive Director
Rare Earth Industry and Technology Association

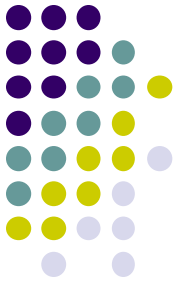
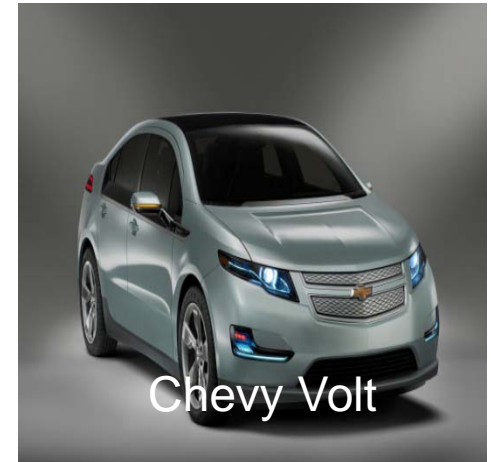


Metals for Energy & the Environment 2011
June 2 & 3, 2011
Las Vegas, Nevada



Key Premise

The degree of success of Rare Earth technology stakeholders *will be directly related to the success of our OEM partners in creating markets for Clean Energy products.*



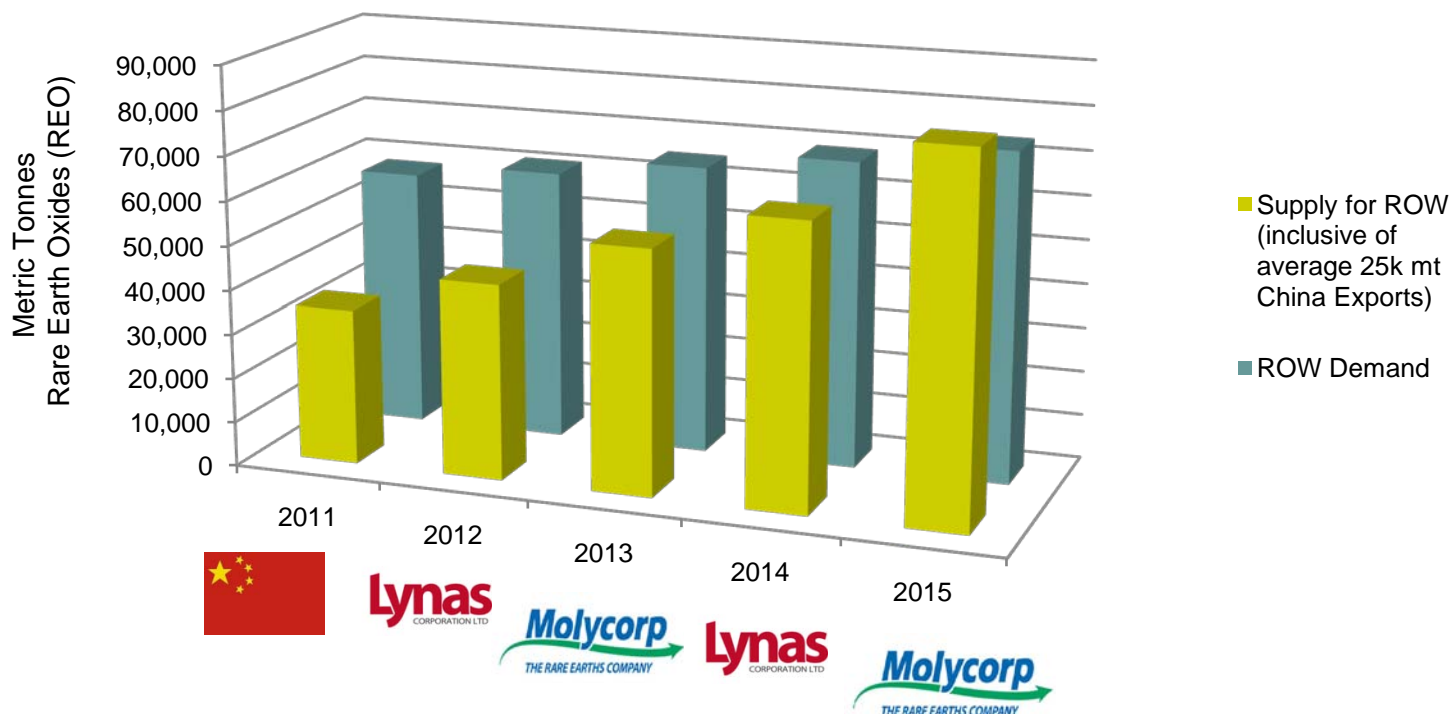
OEM Clean Energy Investment Requirement



For sustained investment in Clean Energy technologies, OEMs must be assured of *reliable* sources of supply of Rare Earth materials / components / devices at *manageable* prices

(As long as there is a *perceived* supply gap, price and availability of REO will continue to remain unstable and problematic to OEM sustained investment)

Rest of World Demand¹ for REO and the Sources of Supply Increments 2011 - 2015



¹ Kingsnorth, Dudley, presentation to *The Hague Centre for Strategic Studies, January, 2011*

Where Will 2016 – 2020 REO Supply Increments Come From?



Light Rare Earth Resources

Heavy Rare Earth Resources



Dy for “under the hood” magnet applications

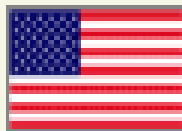
Arafura Resources



Alkane Resources



Rare Element Resources



Avalon Rare Metals



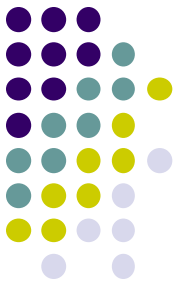
Toyota/Sojitz/Govt. of Vietnam






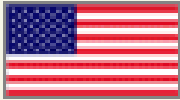


Great Western Minerals Group

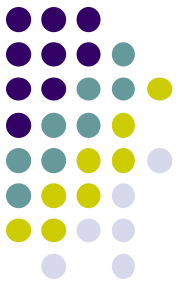


Other High Profile Heavy RE Resources

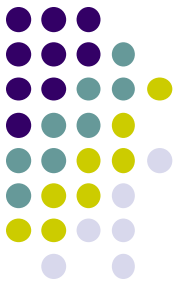


Heavy Rare Earth Resources	
Matamec Resources	
Mitsubishi / Neo Material Technologies	
Quest Rare Metals	
Sumitomo / Kazatomprom	
Toyota/Indian Rare Earths JV	
Ucore Rare Metals	

RE Project Companies Issues to Address for OEMs

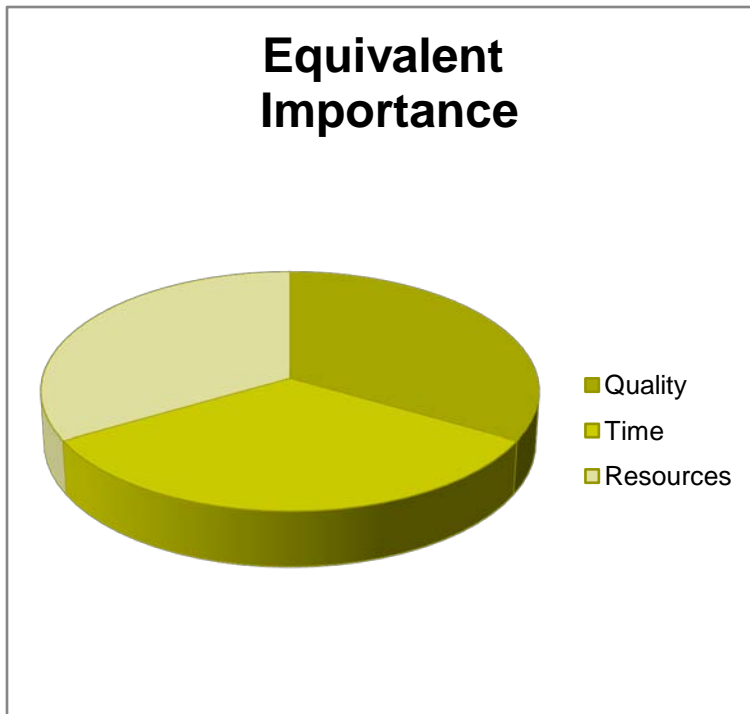


Reliable Supply	Manageable Pricing
Lack of accurate demand forecasts – <i>huge error bars</i>	Cost minimization – variable and fixed
Shortening of 5-12 year process to develop and commercialize a new RE resource	New profitable markets for Ce / La
Adequate development funding to accelerate the commercialization process	Enough RE properties in the queue so that ROW production capacity <i>gets ahead and stays ahead of ROW demand</i>

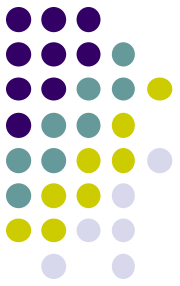


Reducing New RE Project Timeline

Project Management Lesson: Spend Extra Resources to Save Time While Maintaining Quality



Reducing New RE Project Timeline When Resources are Tight

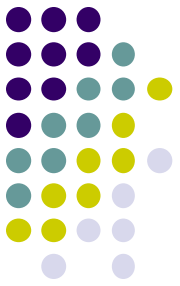


Single Project Companies with limited track records

Credit is tight in general – long payback for these investments is problematic

Technical talent scarcity?

New RE Project Funding / Support Sources



Lending Markets

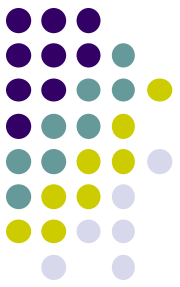
Capital Markets

Trading Companies – Sumitomo example

OEMs – Toyota, Sojitz and Mitsubishi

Government – JOGMEC example

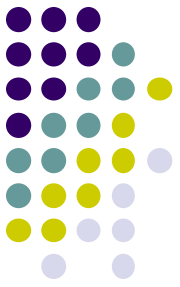
Cost Minimization Challenges for New RE Properties



Variable Costs	Fixed Costs
<p>Molycorp setting a high standard in terms of yields, costs and environmental excellence</p>	<p>For a \$1 billion investment amortized over 10 years, fixed costs are \$10 per kg for a 10k mt per annum plant</p>
<p>New producers need to be at least competitive with the Chinese at \$14 – 20 per kg REO²</p>	<p>Fixed cost allocations will at least double if this same producer has no customers for La and Ce</p>

² Kingsnorth, Dudley, personal correspondence May 2011

RE Unit Op Yield Improvements - Key to Variable and Fixed Cost Minimization



Such as:

Milling

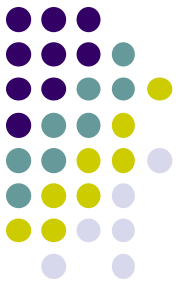
Extraction

Separation

Refining



The Process Yield Opportunity



	Unit Op 1	Unit Op 2	Unit Op 3	Overall Yield
Chemical Industry Standard	90%	90%	90%	73%
Not Untypical	62%	70%	65%	28%
Increase in Selected Unit Op Yields	62%	77%	80%	38%

Why Collaborate?

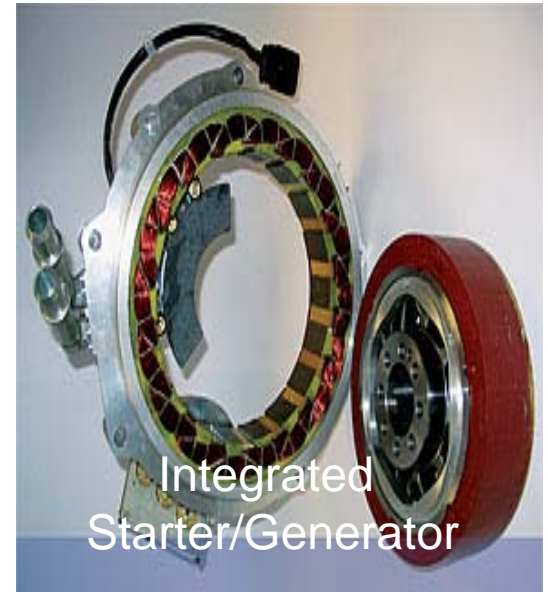


Speed to market

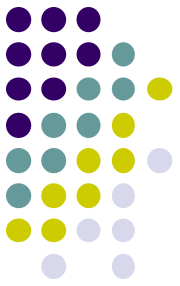
- Opportunity cost
- Environmental cost

Mitigate Technical Risk

Mitigate Commercial Risk



Areas Ripe for Global Collaboration to the Benefit of All Stakeholders

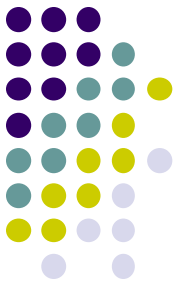


Accurate assessment of global RE usage by OEMs / suppliers

Recycling of end-of-life products: technologies needed / business opportunities

Manufacturing efficiencies and reduced waste of raw materials downstream of RE plant

Areas Ripe for Global Collaboration to the Benefit of All Stakeholders



Sematech-like <http://www.sematech.org/> collaborations on RE uses / reduction / recycling / substitutes to help demand match mine outputs

Long term fundamental research on RE properties and chemistries

Anticipating future trends in technologies that will use REs

What Should OEMs Be Doing?

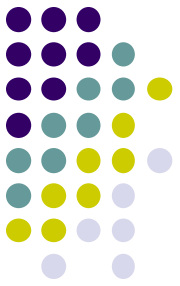


Understand the vulnerabilities within its individual supply chains. Address vulnerabilities and plan for diversification of supply.

Engage in conversations with RE property developers and the rest of its downstream supply chain.

Use transparency and frankness in communicating forecasted RE requirements

What Should OEMs Be Doing?

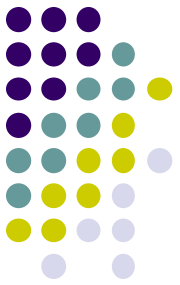













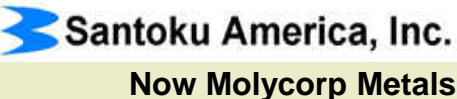




Demonstrate Commercial Commitment (Demand Pull)

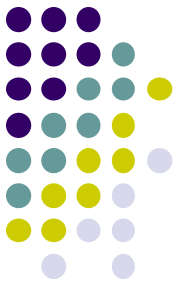
- LOIs
- Off-take agreements
- Loans
- JVs



REITA Members (as of May 31, 2011)



Industry	RE Resource Companies	Academia
 <p>imagination at work</p>		
		
		
		
 <p>Now Molycorp Metals</p>		
		
		



REITA

Rare Earth
Industry and
Technology
Association

Tomorrow's Technology Today

<http://www.reitausa.org>