## Rare Earths WE TOUCH THEM EVERYDAY

**Investor Presentation** 

March 2011











ONLINE IN 2011, DELIVERING RARE EARTHS GLOBALLY.













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## Rare Earths cannot be substituted in many applications

### **RARE EARTHS: LANTHINIDES PLUS YITTRIUM – UNIQUE PROPERTIES**

Rare Earth Elements								<b>Y</b> 39									
La	C	e I	Pr	Nd	Pm	Sm	Eu	Gd	Tb	D	y∣ł	Ho	Er	Tr	n Y	/b	Lu
57	58		59	60	61	62	63	64	65	66		67	68	69		70	71
ij.	Lanthanides																
H					He												
Li	Be						1					B	С	Ν	0	F	Ne
Na	Mg				1	1						AI	Si	Ρ	S	CI	A
Κ	Са		Sc	Jł	Ń	Cr M	In Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kı
-	21		v	7r	Nb	No T	ć Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Те	Ι	Xe
Rb	Sr		l ' .			· ·					_						_
Rb Cs	Sr Ba		Lu	<u>⊢</u> . Hf	Ta	WR	e Os	; Ir	Pt	Au	Hg	TI	Pb	Bi	Ро	At	Rr

- Chemical
  - > Unique electron configuration
- Catalytic
  - Oxygen storage and release
- Magnetic
  - High magnetic anisotropy and large magnetic moment
- Optical
  - > Fluorescence, high refractive index
- Electrical
  - High conductivity
- Metallurgical
  - Efficient hydrogen storage in rare earths alloys





## Rare Earths underpin new materials technology required to sustain the needs of today's society

Energy efficiency through lower consumption

Environmental protection through lower emissions

Smaller yet more powerful digital technology



- Compact Fluorescent Lights
- Hybrid vehicle
- Weight reduction in cars



- Wind turbine
- Auto catalytic converter
- Diesel additives



- Flat panel displays
- Disk drives
- Digital cameras





Supply shortfall and increasing prices are a result of structural change as China addresses environmental issues and illegal mining

### HISTORIC AND FORECAST SUPPLY, DEMAND AND PRICING







## Magnets will be the growth driver for Rare Earths demand to 2014. Polishing powder demand has dropped due to activities to improve productivity

### **DEMAND FORECAST BY APPLICATION**

2010 Demand by A	pplication		2014 Demand Forecast by Application			
Application	Demand (%)	Demand (t)	Application	Growth (%)	Demand (	
Magnets	25%	31,500	Magnets	12%	49,60	
<ul> <li>Battery Alloy</li> </ul>	15%	18,600	<ul> <li>Battery Alloy</li> </ul>	15%	32,50	
<ul> <li>Metallurgy ex batt</li> </ul>	9%	11,700	<ul> <li>Metallurgy ex batt</li> </ul>	2%	12,70	
<ul> <li>Auto catalysts</li> </ul>	7%	9,000	<ul> <li>Auto catalysts</li> </ul>	8%	12,20	
• FCC	17%	21,300	• FCC	4%	24,90	
<ul> <li>Polishing Powder</li> </ul>	11%	14,000	<ul> <li>Polishing Powder</li> </ul>	10%	20,60	
<ul> <li>Glass Additives</li> </ul>	6%	7,800	<ul> <li>Glass Additives</li> </ul>	0%	7,80	
<ul> <li>Phosphors</li> </ul>	6%	7.900	<ul> <li>Phosphors</li> </ul>	8%	10.80	
<ul> <li>Others</li> </ul>	4%	5,700	Others	8%	6,10	
Total	100%	127,500	Total	8%	177,20	

Source: Non China market = aggregate of estimated manufacturer demand by application, China Market = IMCOA and China Rare Earths Information Centre.

Note : Totals may not add due to rounding.



## The market outside of China is growing strongly. Japan with an auto and high-tech manufacturing industry is the largest non-China market

### **DEMAND FORECAST, NON-CHINA REGIONS**



Source: Lynas research



- Japan with an automotive and high-tech manufacturing industry is the largest market for Rare Earths outside of China
- Europe imports significant quantities for automotive catalytic converters and FCC production
- The majority of the USA demand is within the FCC industry
- The USA and EU consume significant additional amounts of Rare Earths within finished products manufactured in China and Japan



## China is a strong growth market, driven by cleantech and high-tech industry within China

#### CHINA DEMAND 1990 to 2009 (t REO)



Source: CSRE, Critical Metals Investment Summit, Vancouver, Canada Jan 21, 2011

#### CHINA FORECAST DEMAND 2010 - 2015 (t REO)



Source: IMCOA and China Rare Earths Information Centre





China's maximum production p.a. will be 100kt REO after the industry is restructured - and as such China will move to a net importer in 2014/15

### **CSRE PRODUCTION FORECAST FOR CHINESE RARE EARTHS INDUSTRY**

## **China's Production Control**

- **Objective: Reduce environmental** damage; curb illegal mining and smuggling
- The quantity control goal is 89.2 thousand tons in 2010, in that, 77 thousand tons is light rare earth products(86%), and 12.2 thousand tons is middle and heavy rare earth products(14%).





Source: CSRE, Critical Metals Investment Summit, Vancouver, Canada Jan 21, 2011



中国稀土学会

RE

# The environmental issues which China references in communications about restrictions in Rare Earths exports are real





Source: Google Earth



## China aims to improve "return on resources" as well as stimulate Rest of World supply

### **CHINESE POLICY FOR THE RARE EARTHS INDUSTRY**



### Export Quota (Tonnes of Rare Earths bearing commodity product)



2007

- 1H 2011 Export Quota 14,446t
- Chinese Government Rare earths new policy paper expected soon
- No prospecting or mining licences for Rare Earths until July 2011.
- Recognition by government of grey exports without quota; 20,000t in 2008, 10,000t in 2010.



2005

2006

2004

20%

0%

-20%

Source: Asian Metal, Metal Pages, Lynas research.

2010

2009

2008

Lights

Vat rebate

All



## In 2010 Rare Earths supply (115kt REO), was outstripped by demand (128kt REO)

### CHINESE SUPPLY SOURCES (2010 CAPACITY, REO)

### NON CHINESE SUPPLY SOURCES (2010 CAPACITY, REO)

Sour		rces and Lynas research	
Total	103,300t	Total	11,500t
lower impurities and Rare Earths Tailing facilities near capacity Sichuan Jiangxi Copper to invest ¥1.2Bn Target to increase value added Capacity expected to increase Ionic clay regions Reportedly 14 yrs of resource Large amount of illegal mining Government action taking effect Recycling	5 10,000t 35,000t 3,300t	<ul> <li>firm with Japanese distribution</li> <li>Russia <ul> <li>Limited expansion capacity</li> <li>By product of Mg production</li> </ul> </li> <li>Recycling <ul> <li>Magnet swarf</li> <li>Batteries – future potential</li> </ul> </li> <li>USA – Mountain Pass <ul> <li>Reprocessing stockpiles</li> </ul> </li> </ul>	4,000t 1,500t 3,000t
<ul> <li>Baotou</li> <li>By product of iron ore mine</li> <li>Moving to higher grade iron, with</li> </ul>	<b>55,000t</b>	<ul> <li>India</li> <li>Subsidiary of Indian AEA</li> <li>Toyota Tsusho bought trading</li> </ul>	3,000t



## Our assumptions have 2014 global supply at 157kt REO, compared to demand of 177kt REO

### 2014 FORECAST SUPPLY ASSUMPTIONS

### SUPPLY SOURCES

•	Baotou	60,000t
•	Sichuan	20,000t
•	Ionic Clay Regions	17,000t
•	Recycling in China	3,600t
China Total		100,600t
•	Mount Weld	22,000t
•	Mountain Pass	20,000t
•	Others (India & Russia)	12,000t
•	Recycling outside China	1,600t
Οι	itside China Total	55,600t
Gr	and Total	156,200t

### **KEY UNDERLYING ASSUMPTIONS**

- Baotou 10% production increase 2010 / 2014
- Sichuan full production quota to be utilised
- Iconic Clay reduced further in line with CSRE statements
- Mountain Pass 20,000tpa production (20,000tpa)
- Recycling Nd, Pr & Dy recycled from previous year's magnet production (~30% SWARF losses)



Source: Industry resources and Lynas research



## Additional supply is required, with favourable elemental balance - inside and outside China

### **2014 SUPPLY VS DEMAND** (REO, SEPARATED PRODUCTS)

### SUPPLY/DEMAND ESTIMATED IMBALANCE (REO, SEPARATED PRODUCTS)

		<b>Demand</b>	<u>vs</u> Supply
•	Lanthanum	53,800t	40,000t
•	Cerium	52,800t	66,300t
•	Praseodymium	14,400t	8,300t
•	Neodymium	40,900t	27,900t
•	Samarium	1,100t	2,900t
•	Europium	540t	375t
•	Gadolinium	1,200t	1,700t
•	Terbium	600t	250t
•	Dysprosium	2,500t	1,100t
•	Yttrium	9,300t	6,000t



	<u>Balance</u>	<u>Comments</u>
Lanthanum	- 13,800t	FCC outside China
Cerium	+ 13,500t	mainly inside China
Praseodymium	- 6,100t	short everywhere
Neodymium	- 13,000t	short everywhere
Samarium	+ 1,800t	short outside China
Europium	- 165t	short inside China
Gadolinium	+ 500t	oversupply
Terbium	- 350t	short everywhere
Dysprosium	- 1,400t	thrifting may help
Yttrium	-3,300t	available stockpiles

Source: Industry resources and Lynas research.



Lynas will offer the first new source of supply of Rare Earths outside of China - Q3 2011

### LYNAS VITALS AT A GLANCE

VISION: Be the leader in Rare Earths for a

sustainable future.

EXCHANGE: ASX Top 100; code LYC

SHARES: 1,662m on issue

OPTIONS: 85m strike range 11c - \$1.60

MARKET CAP: A\$3.1bn as at 22 Feb 2011

CASH: A\$272m as at 31 Dec 2010

#### DEBT: Nil







## As at September 2010, 15% more resources in Mount Weld; New Total Resource of 1.4 million tonnes of REO

### **CENTRAL LANTHANIDE DEPOSIT AND DUNCAN DEPOSIT RESOURCES**



#### CLD & Duncan Mineral Resource (2.5% REO cut-off)

	Category	Tonnes Mt	Grade % REO	Tonnes (kt) REO
	CLD	9.88	10.7	1,057
it	Duncan	7.62	4.8	366
	Total	17.49	8.1	1,416

Current mine plan (within Central Zone Pit)

- 4.47 Mt @ 13.6% REO for 608kt REO

Low Thorium content, 44ppm ThO<sub>2</sub>/1% REO





## Mount Weld Rare Earths initial mining campaign complete, loss-time-injury-free, on budget

### MOUNT WELD STOCKPILES WITH RARE EARTH OXIDE PERCENTAGES







## Schematic - Concentration Plant process at Mount Weld, which has been fully pilot plant tested







## Concentration Plant commissioning process has commenced, first ore into plant due March 2011

### **CONCENTRATION PLANT - FLOTATION SECTION**







## Majority of pre-commissioning complete, both dry and wet commissioning underway in various sections of the plant

### **CONCENTRATION PLANT**



Ball mill and classification circuit



**Flotation cells** 





## First ore into Concentration plant is scheduled for March 2011

### **CONCENTRATION PLANT**



Utilities - power and water



Thickener





## Containers of Rare Earths concentrate will be trucked to Fremantle for shipping to Malaysia







Lynas will expand the Malaysian processing hub, with the ability to take multiple sources of material

### PROCESSING HUB WITH EXCEPTIONAL INFRASTRUCTURE

#### INDUSTRIAL INFRASTRUCTURE

**KNOWLEDGE INFRASTRUCTURE** 

#### **GOVERNMENT INFRASTRUCTURE**

Including FDI incentives

(12 years tax exemption for pioneer status)







## Schematic - Lynas Advanced Materials Plant core process, which uses mature industry technology







## Lynas Advanced Materials Plant (LAMP)



## The Lynas Advanced Materials Plant (LAMP) is 0.8km wide (N-S) and 1.4 km long (E-W)

### **COLLAGE OVERVIEW OF LYNAS ADVANCED MATERIAL PLANT SITE**







## Select long lead time equipment and tankage is now being installed













## The Lynas Advanced Materials Plant (LAMP) is scheduled to come online in Q3 2011









## We are industrialising our operations to meet our customers' expectations

### FOUR PILLARS UNDERPINNING LYNAS' OPERATIONS

#### Marketing and Sales

• Serving long-term customer requirements and commitments, and thus providing input for plant extensions and new facilities.

#### Industrial

• Key value drivers are responsible care, customer satisfaction, asset optimisation and growth management.

#### **Research and Technologies**

• Working with customers to analyse and develop technologies to enable a cost-effective product offering

#### **Business Excellence**

 Providing and optimising services to support cost-effective operations at the processing plants.







Eight customer agreements have been signed; Strategic Alliance with Sojitz to provide stable supply to Japanese customers

#### Rhodia Customer Agreement -Supply Contract

- >US\$200M<sup>1</sup>
- Long term 10 year contract, Phase I
- Cerium, Europium, Terbium & Lanthanum

#### 2nd Customer Agreement -Supply Contract

- ~US\$200M<sup>1</sup>
- Long term 5 year contract, Phase 1
- Neodymium & Praseodymium

#### **3rd Customer Agreement**

- Supply Contract
- ~US\$20M<sup>1</sup>
- Long term multiple year contract
- Product from Phase I & Phase II

#### **Strategic Alliance with Sojitz**

 Minimum of 8,500t (+/-500t) of product distributed into Japan market

#### 8th Customer Agreement – Supply Contract

- Long term contract
- Product from Phase I & II

#### 7th Customer Agreement – Supply Contract

- Multi year contract
- Product from Phase I

### 6th Customer Agreement

- Supply Contract
- Long term multiple year contract
- Product from Phase I & Phase II

#### **5th Customer Agreement – Letter of Intent**

- ~US\$80M<sup>1</sup>
- Long term multiple year contract
- Product from Phase I & Phase II

#### 4th Customer Agreement – Letter of Intent

- ~US\$80M<sup>1</sup>
- Long term multiple year contract
- Product from Phase I & Phase II

### SIX SUPPLY CONTRACTS AND TWO LETTERS OF INTENT SIGNED



<sup>1</sup> Values reflect market prices at signing of contract



## The Strategic Alliance with Sojitz aims to provide a stable and long term source of supply for the Japanese market

### HIGHLIGHTS OF THE STRATEGIC ALLIANCE WITH SOJITZ

Funding of Phase 2 Expansion to 22,000t

8,500t (+/-500t) REO Allocated to Japanese Customers

<u>Sojitz – Lynas</u> Strategic Alliance



- Up to US\$250 million
- JOGMEC
- 31<sup>st</sup> March funds draw down

- Minimum 8,500t (+/-500t) per annum
- 10 year allocation
- Phase 2 start-up Q3 2012
- *Customer commitment* will determine Phase 2 products suite

- Professional organisation, speed, understanding of requirements, transparent communications
- Joint marketing by Sojitz and Lynas
- Successful performance to maintain exclusivity





## Summary of estimated capital and operating costs to fund Phase 1 of the Rare Earths Project

Construction & Other Capital Costs	Total A\$mm	Actual to 30 Dec '10 A\$mm	Spend to 1 <sup>st</sup> production A\$mm
Mount Weld Concentration Plant	72.0	52.9	19.1
Lynas Advanced Materials Plant, Malaysia	236.8	83.5	153.3
Engineering & Project Management Costs	138.5	106.8	31.6
Contingency	20.4	-	20.4
Other Capex including Land at Gebeng	67.5	49.0	18.6
Total Capital Costs <sup>1</sup>	\$535.2	\$292.1	\$243.1
Production Ramp-up Costs to 1 Sept 2011			Spend to 1 <sup>st</sup> production A\$mm
Mount Weld Concentration Plant			15.4
Lynas Advanced Materials Pant, Malaysia	19.7		
Finance, Admin, Marketing, Technical & Corporate Overh	neads		12.9
Total Operating Costs <sup>1</sup>			\$48.0
Total Cash Requirement as at 31 Dec 2010 <sup>1</sup>			\$291.2
Cash on Hand 31 December 2010			271.5
OCBC Working Capital Facility			21.1
Total Cash plus Facility			\$292.6
Headroom including contingency			\$21.8



1 Totals may not add up to sum of individual line items due to rounding



## Lynas is completing the acquisition of additional Rare Earths resources in Malawi, Africa



### Key points for Kangankunde (KGK)

- Fully permitted for operations
- Inferred Resource of 107,000 tonnes REO at an average grade of 4.24% REO, with a 3.5% cutoff grade.
- At a 3% REO cut-off grade the resource increases to 180,000 tonnes REO and remains open at depth
- Extremely low thorium levels for a Rare Earths deposit, 11ppm ThO<sub>2</sub> / 1% REO
- Pilot plant completed for gravity concentration process
- Unassembled gravity separation concentration equipment included in sale





## Lynas now has two JORC compliant deposits, work will commence forthwith on Kangankunde

### The Kangankunde Carbonatite



### Next steps for the Kangankunde RE deposit

- Initiate an environmental management plan
- Undertake drilling program to provide drill core and test resource extension
- Validate the concentrate production flow sheet
- Cracking and separation test work shall commence on the concentrate
- Concentrate may be processed in Africa to produce a mixed rare earths product which will then be shipped to Malaysia for separation, or may be full processed at the Malaysian processing facility





## Lynas – online in 2011, delivering Rare Earths globally

Our vision is to be the leader in Rare Earths for a sustainable future.

We are close to realising this vision.

Lynas will be online in 2011, delivering Rare Earths globally. This is the first new production outside of China.

The LAMP is scheduled to come online in Q3 2011, and the production capacity of Phase 1 will be 11,000tpa REO. Planning for Phase 2 is underway for an additional 11,000tpa REO.







## NOTE

The information in this report that relates to Exploration Results, Mineral Resources or Ore Reserves is based on information compiled by Brendan Shand, who is a member of The Australasian Institute of Mining and Metallurgy. Brendan Shand is an employee of Lynas Corporation Limited. Brendan Shand has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Brendan Shand consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.



