



MULTI-COMMODITY MINER EXPLORER
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ASX : ALK
OTCQX : ANLKY

“Not Only Rare Earths - Dubbo Zirconia Project”

New South Wales, Australia

11th International Rare Earth Conference
Singapore 9-12 November 2015



Alkane Strategy



Focused on NSW Central West



Multi-commodity
company



Strategic
relationships



Community & environmentally
responsible

Tomingley Gold Operations

- **\$115 million TGP funded from internal financial resources – no debt**
- Resource – 688,000oz of gold (21 September 2015)
- Mine Method – open cut & underground
- Mine Life – 7.5 years (targeting 10+ years)
- Processing plant throughput – 1.0Mtpa
- 2.00g/t Au and 93% recovery standard CIL
- Gold Production – ~400,000oz over base case life

Gold production commenced February 2014

FY15 at 30 June 2015:

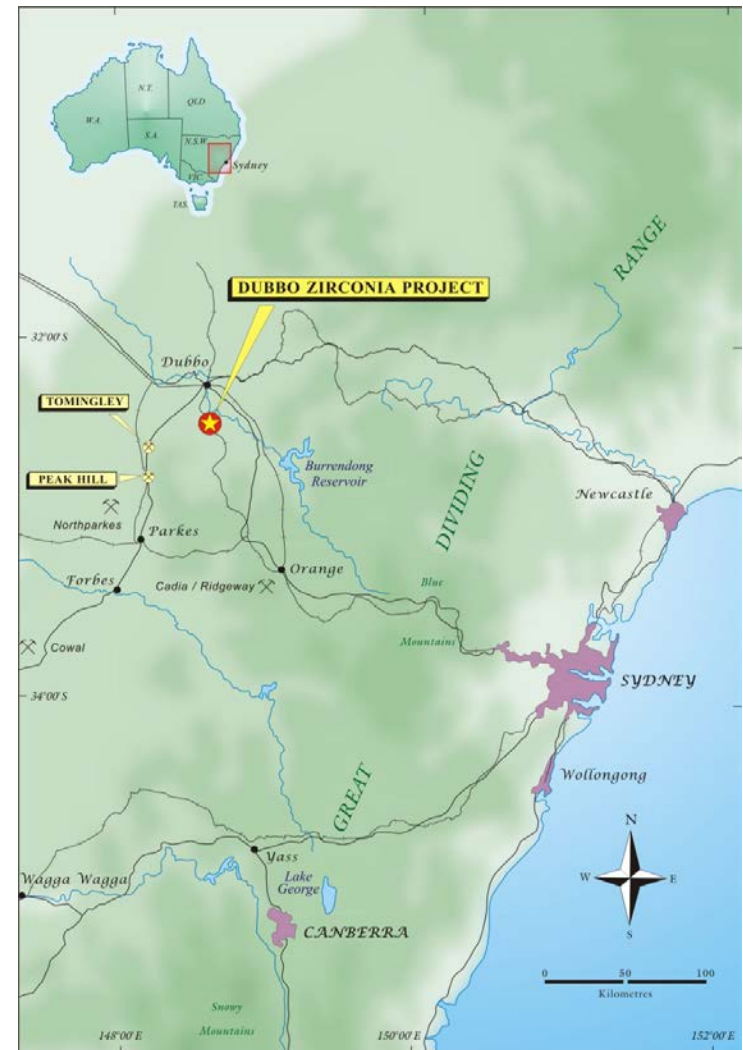
- Produced 69,612oz
- Revenue A\$101.9M
- Cash flow A\$28.6M
- Current hedge 22,500oz @ A\$1,596/oz



Note: ASX announcement 21 September 2015 - the Company confirms that all material assumptions and technical parameters underpinning the estimated Mineral Resources and Ore Reserves, and production targets and the forecast financial information as disclosed continue to apply and have not materially changed.

Dubbo Zirconia Project

- Located 400km northwest of Sydney within a region that has substantial infrastructure – roads, rail, power, gas, light engineering, people (~100,000), being a large agricultural and mining area
- A very large polymetallic resource of the metals zirconium hafnium, niobium (tantalum), yttrium and rare earths
- Important and strategic metal mix
- Reserve supports 35 year mine life at 1 million tonne ore processing per annum with defined resource supporting an 80 year open pit operation
- Demonstrated flow sheet with pilot plant and products for market evaluation operated at ANSTO since 2008
- August 2015 Front End Engineering Design (FEED) study confirmed the robust technical and financial DFS of April 2013
- State and Federal environment approvals in May and August 2015
- Finnish technology/engineering solutions company Outotec appointed for Early Contractor Involvement (ECI) in September to present a fixed price EPC

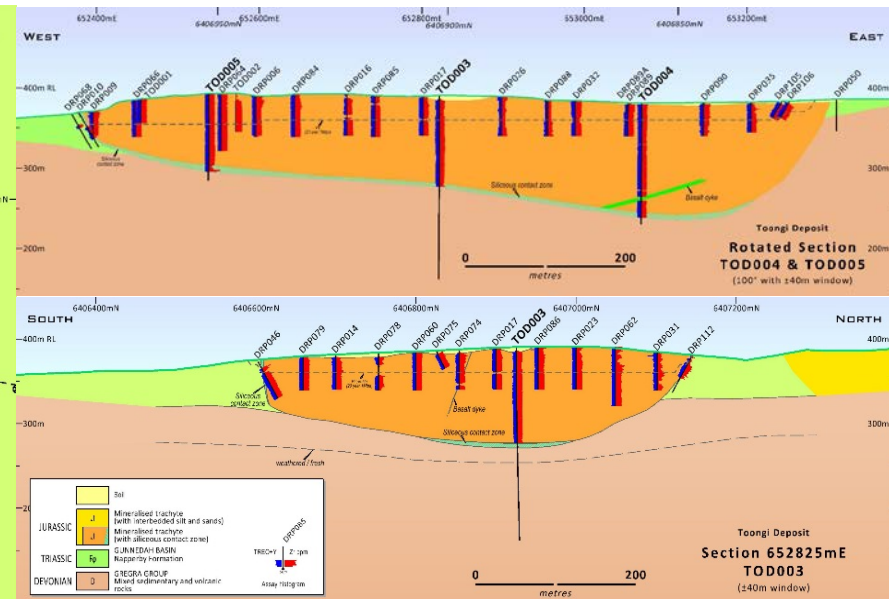
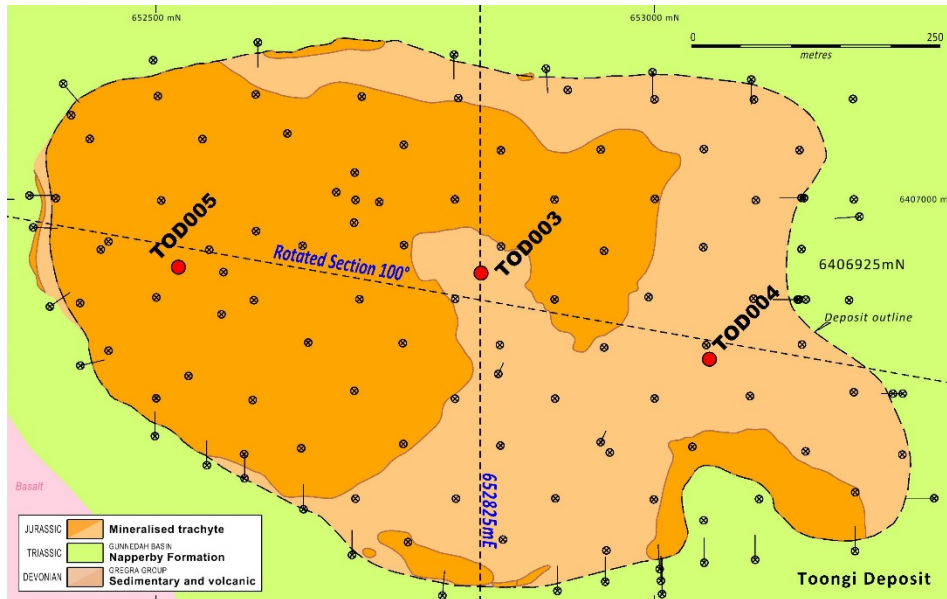


Note: ASX announcements 16 November 2011, 11 April 2013, 30 October 2013 and 27 August 2015 - the Company confirms that all material assumptions and technical parameters underpinning the estimated Mineral Resources and Ore Reserves, and production targets and the forecast financial information as disclosed continue to apply and have not materially changed.

DZP 2015 Key Milestones

- **State Approval 28 May**
 - **Federal Department of Environment Approval 25 August**
 - **Front End Engineering Design (FEED) completed 27 August**
 - **Revamped flowsheet, with specific rare earth separation on site, improved waste management and reduced water consumption**
 - **Technology engineers Outotec appointed for Early Contractor Involvement (ECI) to produce EPC (Fixed price) construction cost 29 September**
-
- **Environmental Protection Licence (EPL) and Mining Lease approval expected shortly**
-
- **Financing and product off-take agreements – continued progress**

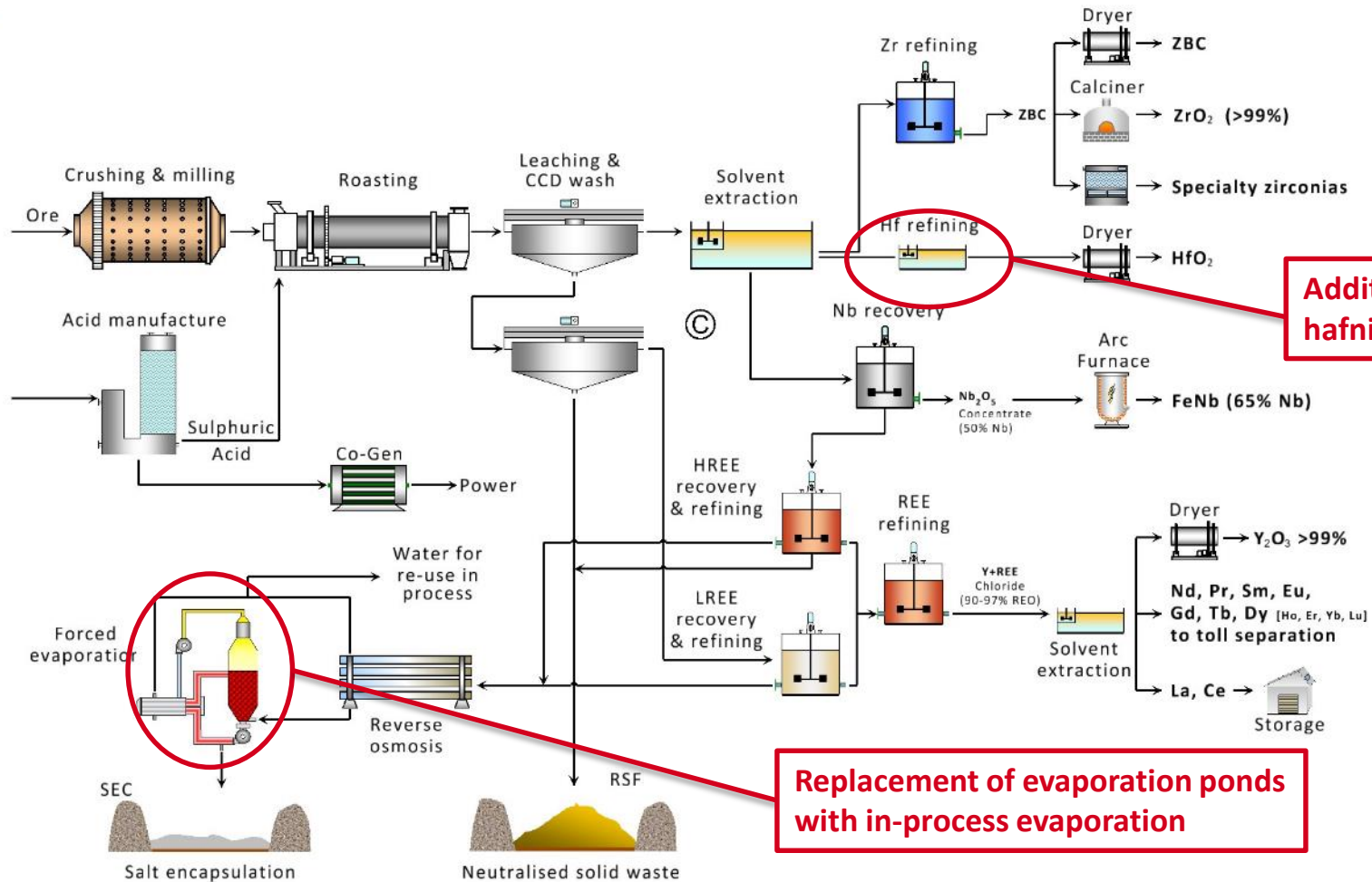
Geology and Resources



- Trachyte lava ~190 million years age
- Largely homogeneous ore body
- Ore mineralogy:
 - eudialyte "like" Zr hydrous silicate (Zr, Hf, Y, HRE)
 - natroniobite (Nb-Ta)
 - bastnaesite (LRE)
- Ore minerals readily soluble in sulphuric acid forms basis of recovery process

- Simple open pit mining (quarry like) – depth of ~35 metres after 20 years of operation
 - Resources and reserves detailed in slide 28
 - Reserves defined for 36 years
 - Resources – open pit for 80 years

Process Flowsheet – 2015 Changes



Addition of hafnium circuit

Further onsite separation of rare earths

Replacement of evaporation ponds with in-process evaporation

ANSTO Demonstration Pilot Plant



DPP Filtration, PLS, SX, Zr & Nb recovery



Zirconium refining & precipitation



DPP Facility



Y and HREE refining & recovery

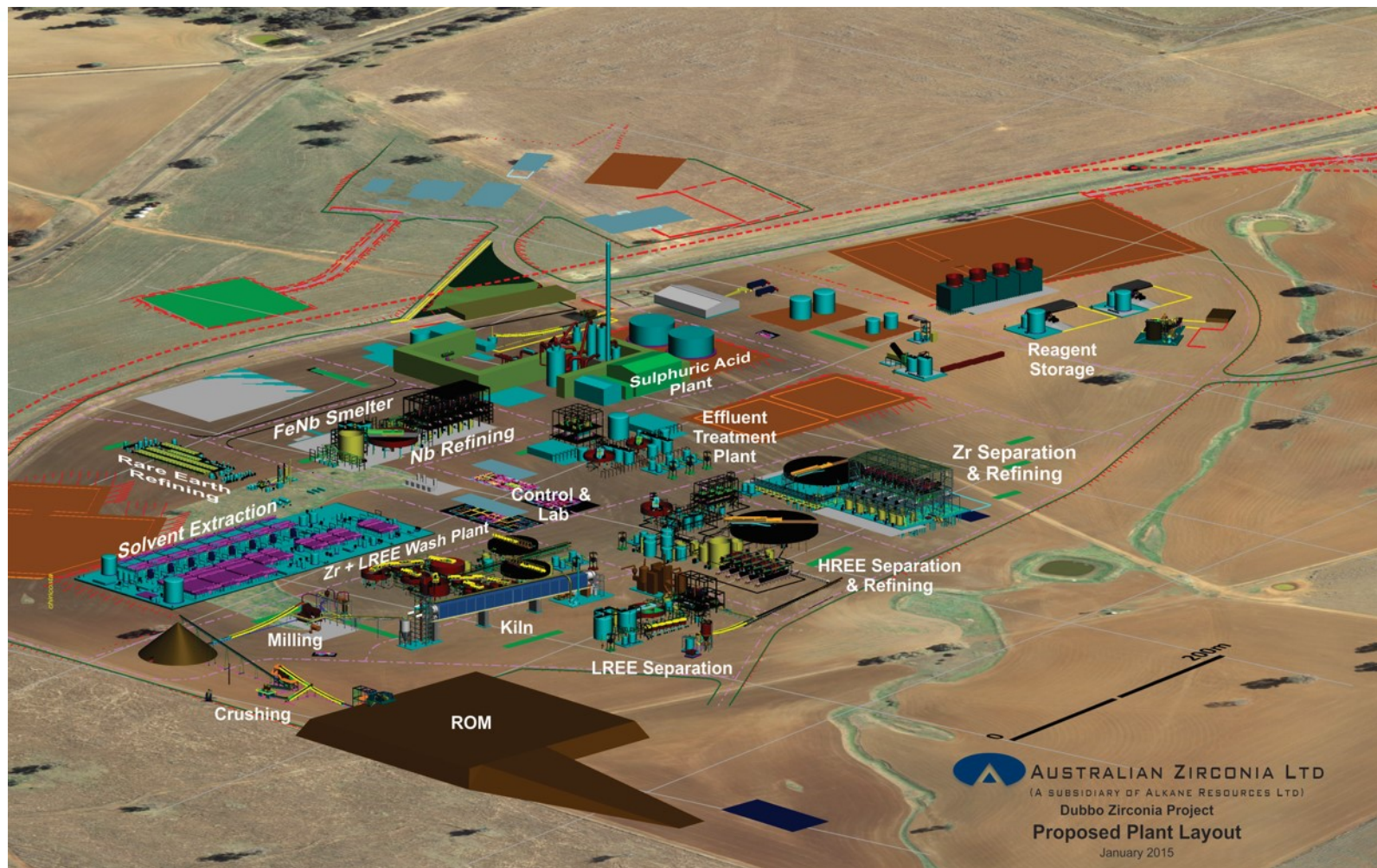


Reverse osmosis & water recycle



Hafnium recovery & refining

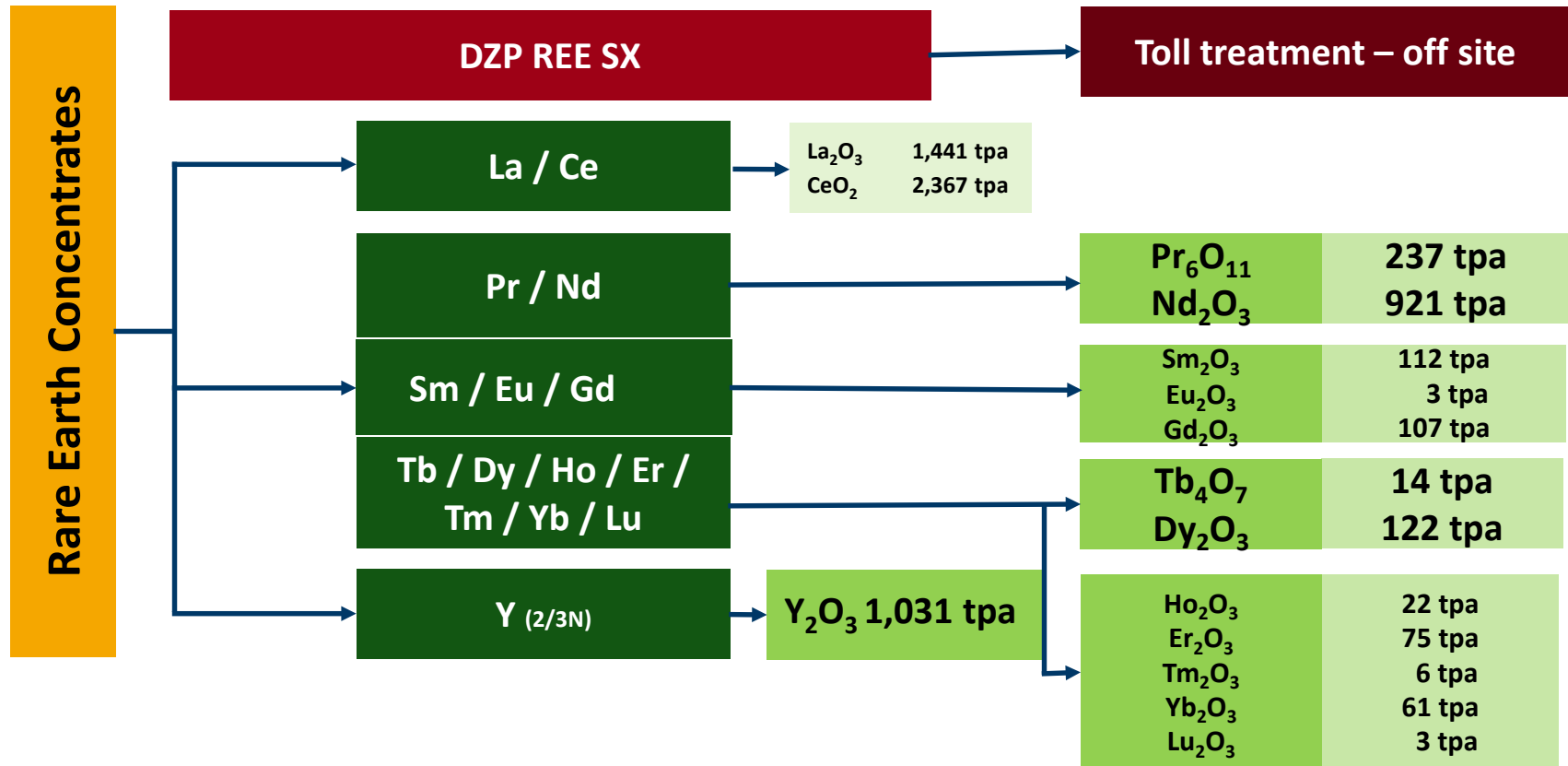
3D Plan of Commercial Plant



Product Output	Rare earth chemical concentrate	95% REO	6,664 tpa (REO units)
	Zirconium as ZBC (carbonate) & zirconia	99% ZrO ₂	16,374 tpa (ZrO ₂ units)
	Hafnium as HfO₂	Assumed 50% recovery	200 tpa (Hf units)
	Niobium as ferro-niobium	65% Nb	1,967 tpa (Nb units)

Tonnage based upon recoveries developed from mass balances of the demonstration pilot plant.
Total output approximately 25,200 tpa of all products

Rare Earth Output



Tonnage based upon recoveries developed from mass balances of the demonstration pilot plant, and preliminary solvent extraction stages on site at the DZP. Total saleable RE products from site ~1,030 tpa and off site ~ 1,675 tpa.

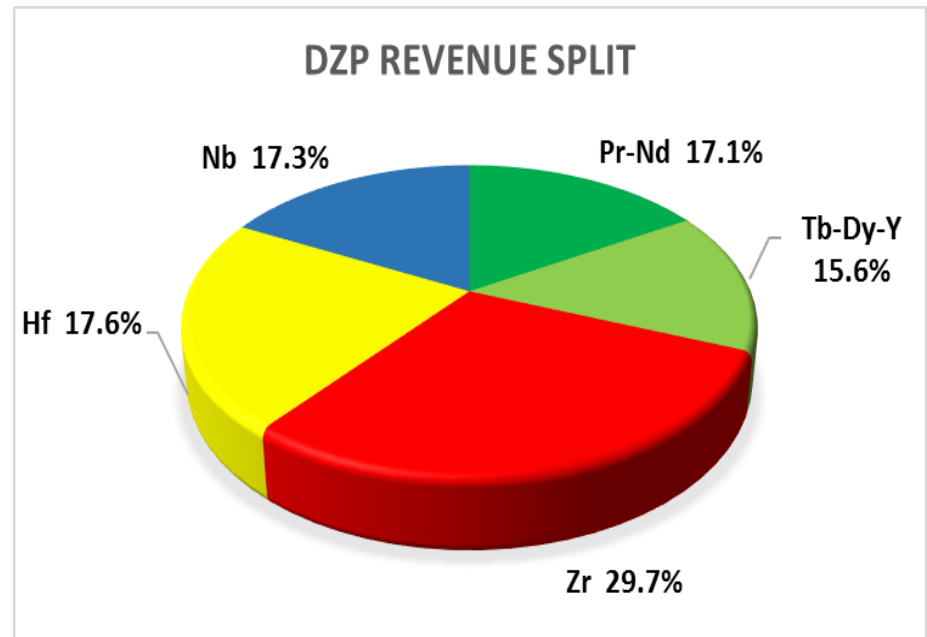
2015 Financial Summary

Front End Engineering Design (FEED) completed August 2015

Capex US\$0.97B / US\$77M contingency
 Revenue US\$430 - \$470Mpa
 Opex US\$195Mpa
 EBITDA US\$235 - \$275Mpa
 20 year NPV US\$0.92B (8%) and 17.5% IRR

Revenue based upon Chinese domestic rare earth prices and current spot ranges for Zr, Hf and Nb

Rare earth revenues largely derived from Pr, Nd, Tb, Dy and Y (for production of RE magnets and special ceramics/alloys)



Operating costs to produce a kilogram of product range from US\$7.50 to US\$8.00/kg

Revenue averages US\$17.00/kg (REO US\$23/kg or US\$56/kg without La/Ce; Zr US\$8.26/kg; Hf US\$500/kg; Nb US\$40/kg)

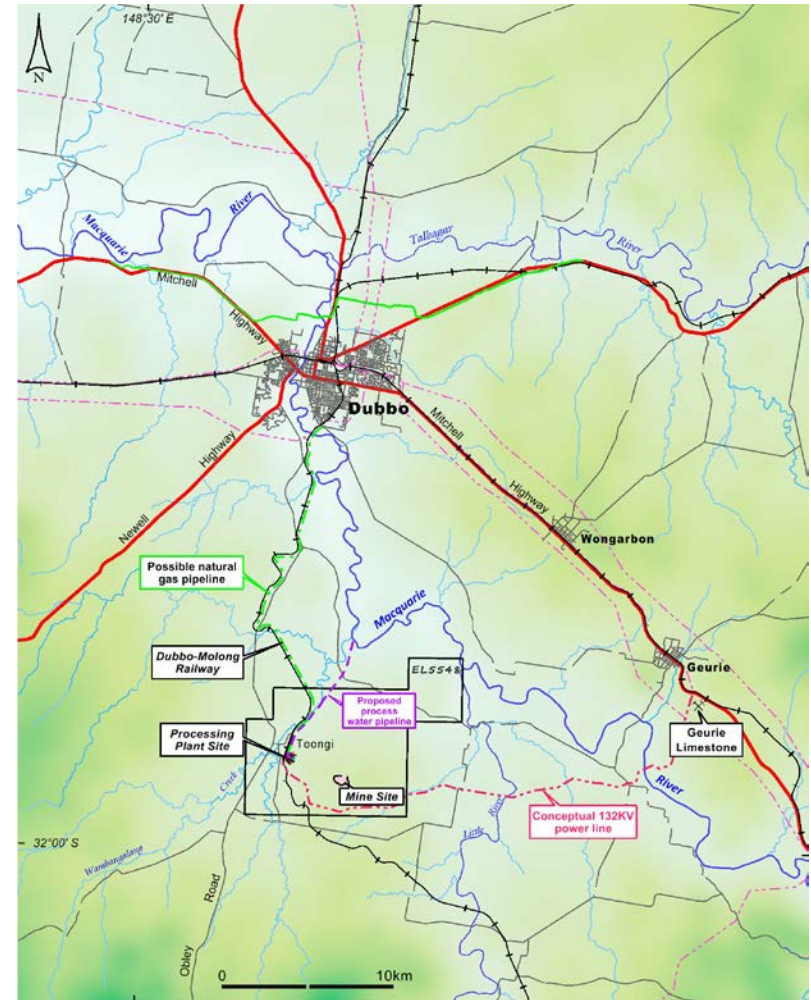
Capital intensity ~ US\$35/kg of product

Marketing and Off-take

- Joint venture with Treibacher Industrie AG to produce and market ferro-niobium
- Finalising a zirconium product marketing agreement for world wide sales
- Advancing the off-site rare earth processing agreement to enable marketing of separate rare earth products
- Continued discussions with multiple end users for all products



- Existing infrastructure to be utilised and upgraded as required
- Upgrade Obley Road to B-double standard (27km)
- 132kV powerline Geurie to Toongi
- 8km Macquarie River Water Pipeline
- 30km gas pipeline in rail corridor
- Construction to commence by March 2016



Alkane has a 25 year history of sustainable mine management

Community

- Strong support from local area and Dubbo city

Water

- 70% recycle of process water currently achievable
- Limited site groundwater aquifers – minimal impact
- Water secured from existing water licenses

Transport

- Mixture of rail and road preferred

Power

- State grid. The sulphuric acid plant will generate (cogen) about 35% of energy onsite

Fauna

- Farming/industry co-habitation; sheep/cattle farming across available farming land
- Endangered species identified and potential impacts mitigated

Naturally occurring radioactive material (NORM)

- Waste salts remain onsite and emit less radioactivity than ore



Snags provide spawning sites and territorial markers for several species of native fish, including the threatened blue-nose cod (trout cod).

Critical snag the goal for Macquarie River project



Dubbo Catches
Macquarie
NATIVE fish species will benefit from a snag removal project in the Macquarie River, south-west of Dubbo, NSW. The project, which is part of the Macquarie River Catchment Management Program (MCP), aims to improve the river's health by removing snags that block the flow of water and create a barrier to fish. The project is being funded by the NSW Government and the Macquarie Shire Council. The MCP is a long-term plan to manage the Macquarie River catchment, which is one of the most important water sources in NSW. The MCP includes a range of measures to improve the river's health, including snag removal, riparian zone revegetation, and water quality monitoring. The snag removal project is a key part of the MCP and is expected to be completed by the end of 2015. The project will involve the removal of approximately 100 snags from the river. The snags are made of wood and are a major problem for the river, as they block the flow of water and create a barrier to fish. The project is being funded by the NSW Government and the Macquarie Shire Council. The MCP is a long-term plan to manage the Macquarie River catchment, which is one of the most important water sources in NSW. The MCP includes a range of measures to improve the river's health, including snag removal, riparian zone revegetation, and water quality monitoring. The snag removal project is a key part of the MCP and is expected to be completed by the end of 2015. The project will involve the removal of approximately 100 snags from the river. The snags are made of wood and are a major problem for the river, as they block the flow of water and create a barrier to fish.

Alkane out to protect native lizard



Alkane out to protect native lizard
The Macquarie River Catchment Management Program (MCP) is a long-term plan to manage the Macquarie River catchment, which is one of the most important water sources in NSW. The MCP includes a range of measures to improve the river's health, including snag removal, riparian zone revegetation, and water quality monitoring. The snag removal project is a key part of the MCP and is expected to be completed by the end of 2015. The project will involve the removal of approximately 100 snags from the river. The snags are made of wood and are a major problem for the river, as they block the flow of water and create a barrier to fish. The project is being funded by the NSW Government and the Macquarie Shire Council. The MCP is a long-term plan to manage the Macquarie River catchment, which is one of the most important water sources in NSW. The MCP includes a range of measures to improve the river's health, including snag removal, riparian zone revegetation, and water quality monitoring. The snag removal project is a key part of the MCP and is expected to be completed by the end of 2015. The project will involve the removal of approximately 100 snags from the river. The snags are made of wood and are a major problem for the river, as they block the flow of water and create a barrier to fish.

Funding Strategy

Investment at Project Level

- Strategic Investment(s)
- Advisors: Sumitomo Mitsui Banking Corp & Credit Suisse
- Strategic interest(s) in long term supply of critical metals
- Intro of cornerstone investor(s)

Government Assistance Programs

- ECA Style Funding
- Lead coordinator: Sumitomo Mitsui Banking Corp (SMBC)
- Attractive Project
 - Long life, low cost
 - Long term off-take-agreements with international companies

Commercial Bank Debt (CBD)

- Advisors: SMBC & Credit Suisse
- Attractive Project
 - Strong operating cash flows
 - Diversified revenue stream
 - New markets

Equity Capital Markets (ALK)

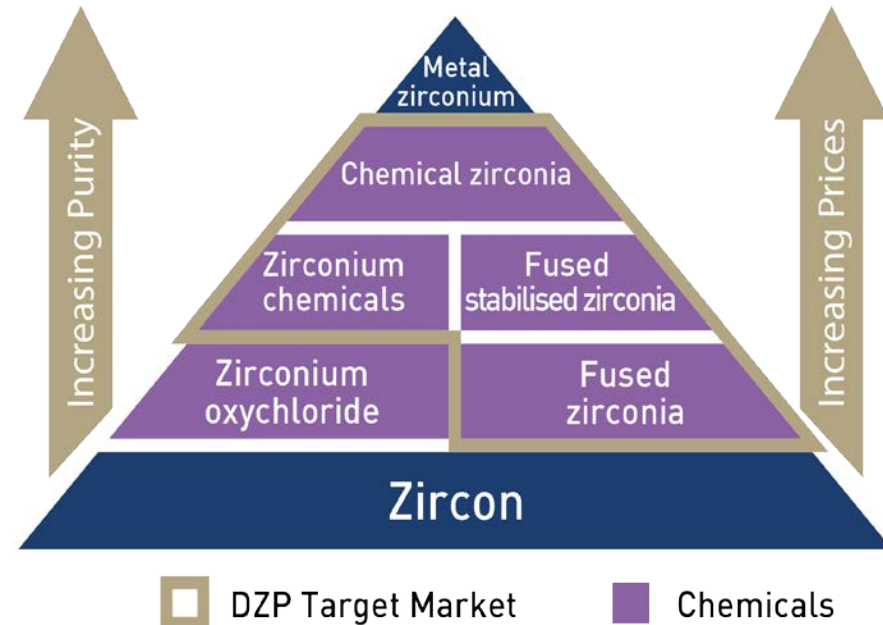
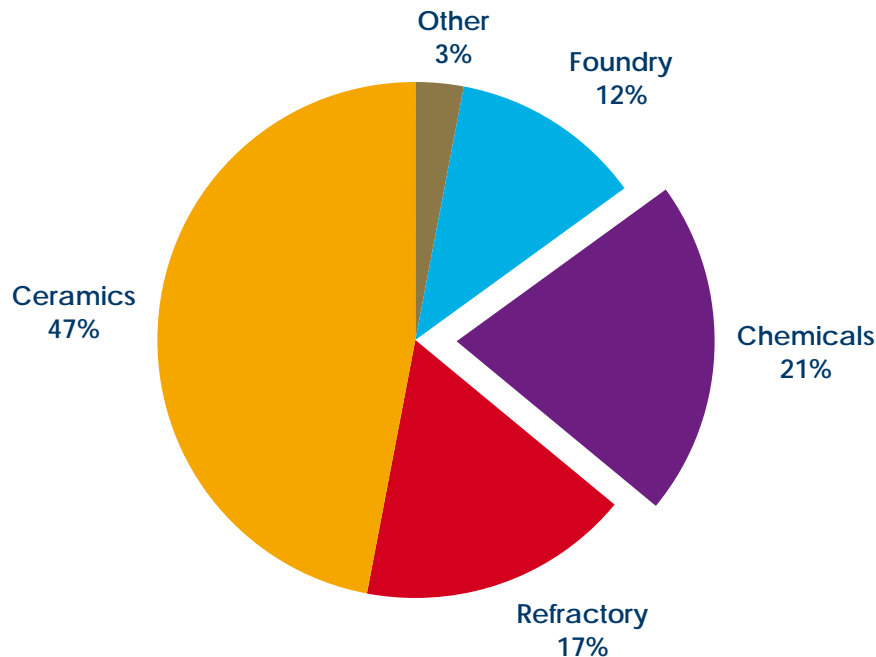
- Advisors: Credit Suisse & Petra Capital

- **Total project capex ~US\$0.97B (including ~10% contingency)**
- **SMBC financial modelling indicates Export Credit Agency/CBD capacity 60% - 70%**
- **ECA discussions suggest 30% - 40%**
- **Strategic investment will be an important catalyst to funding**
- **Discussions have advanced since Project approval in May**



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Zircon Demand by End Use (2015 ~ 1 million tonnes)



- **Global market US\$2-3B**
- **2015 producer zircon inventories still high**
- **Market expected to stabilise through 2016 - 2017**
- **CAGR anticipated at 5% - 7% pa after stabilisation**

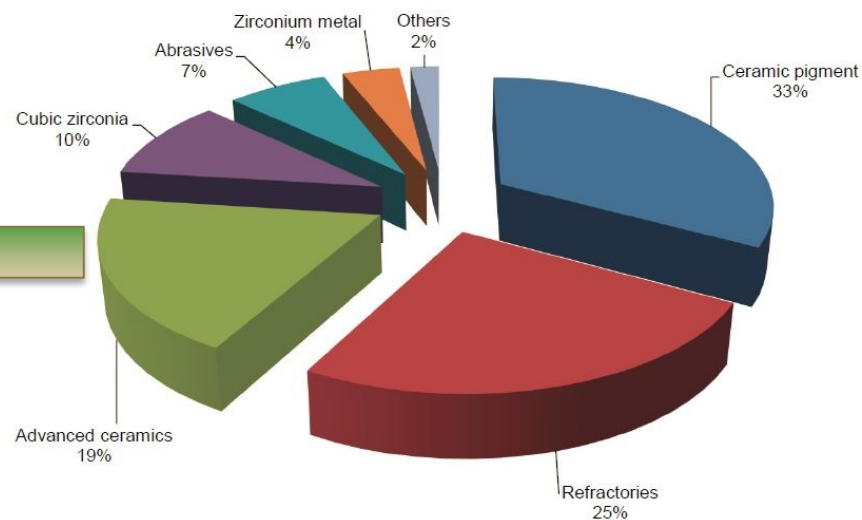
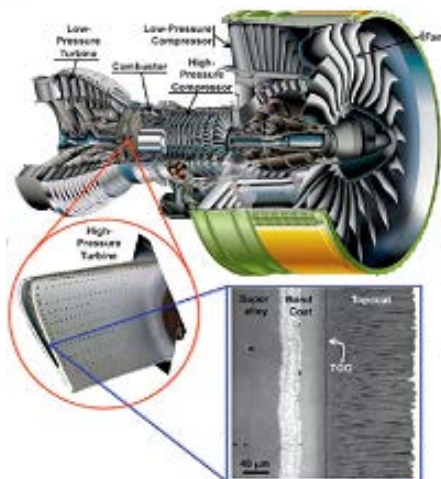
- **China dominates downstream zirconium industry (85-90%)**

Zirconium Applications

Auto exhaust catalysts – ceria stabilised zirconia



Thermal barrier coatings – yttria stabilised zirconia for jet and industrial gas turbines, and many other applications

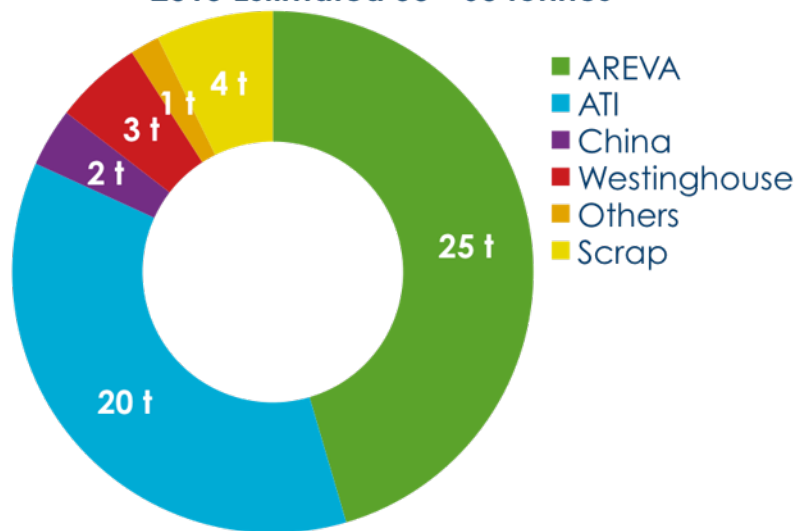


Substantial growth in advanced ceramics and cubic zirconia (jewellery)

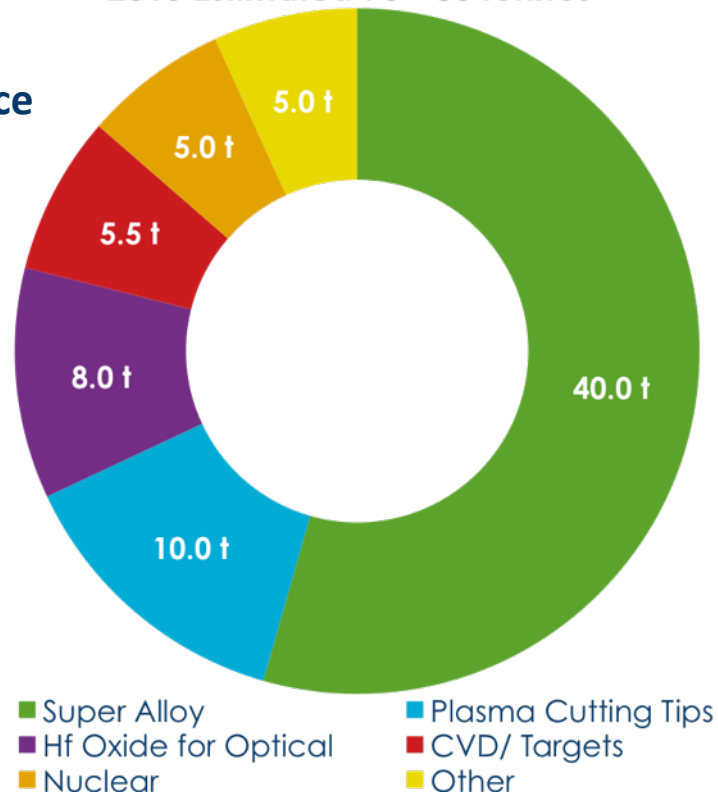
Current world demand for zirconium chemicals / zirconia ~ 160,000tpa

- **Super Alloys - 73% of 2015 supply**
- **By-product from zirconium metal**
 - Depends on nuclear industry
- **Prices escalating through demand by aerospace industries 2014 into 2015**

Hafnium Supply
2015 Estimated 50 - 60 tonnes



Hafnium Demand
2015 Estimated 70 - 80 tonnes

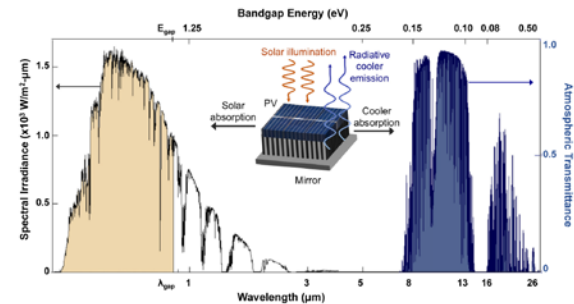


Hafnium Applications

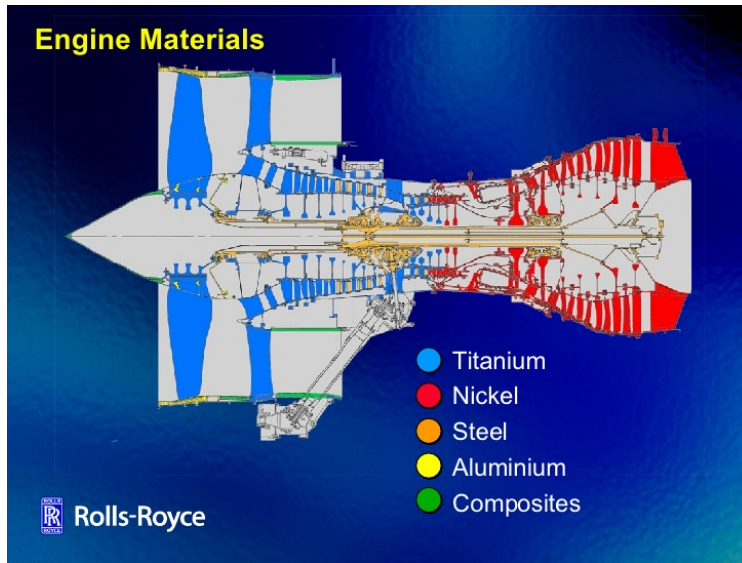
Many innovations developing around hafnium

Stanford Report, November 26, 2014

Stanford engineers invent high-tech mirror to beam heat away from buildings into space



Reflective $\text{HfO}_2\text{-SiO}_2$ layer pushes energy in to space and does not add heat to the atmosphere

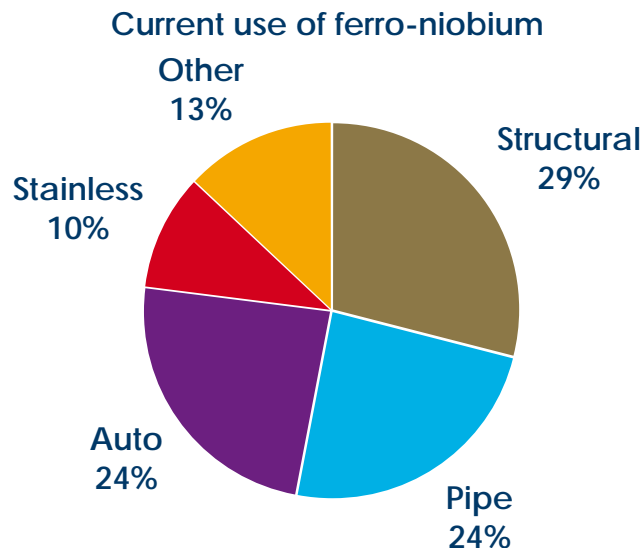


Addition of 1%-2% Hf to NiCo alloys raises operating temperature from 1,400°C to 2,000°C providing fuel efficiencies, energy output and emission minimisation.

Applicable to both jet engines and industrial gas turbines

Both passenger and military aircraft growth at plus 100% over the next five years

- 90% of Nb used in standard grade ferro-niobium for the production of high strength low alloy (HSLA) steels
- World production estimated at 80,000t Nb in 2014. CBMM in Brazil accounts for 85%
- Global market US\$3-4B. Price stability since 2008, including GFC
- CAGR anticipated at 5-10%. Demand expected to be driven by greater intensity of use in steels by BRIC producers

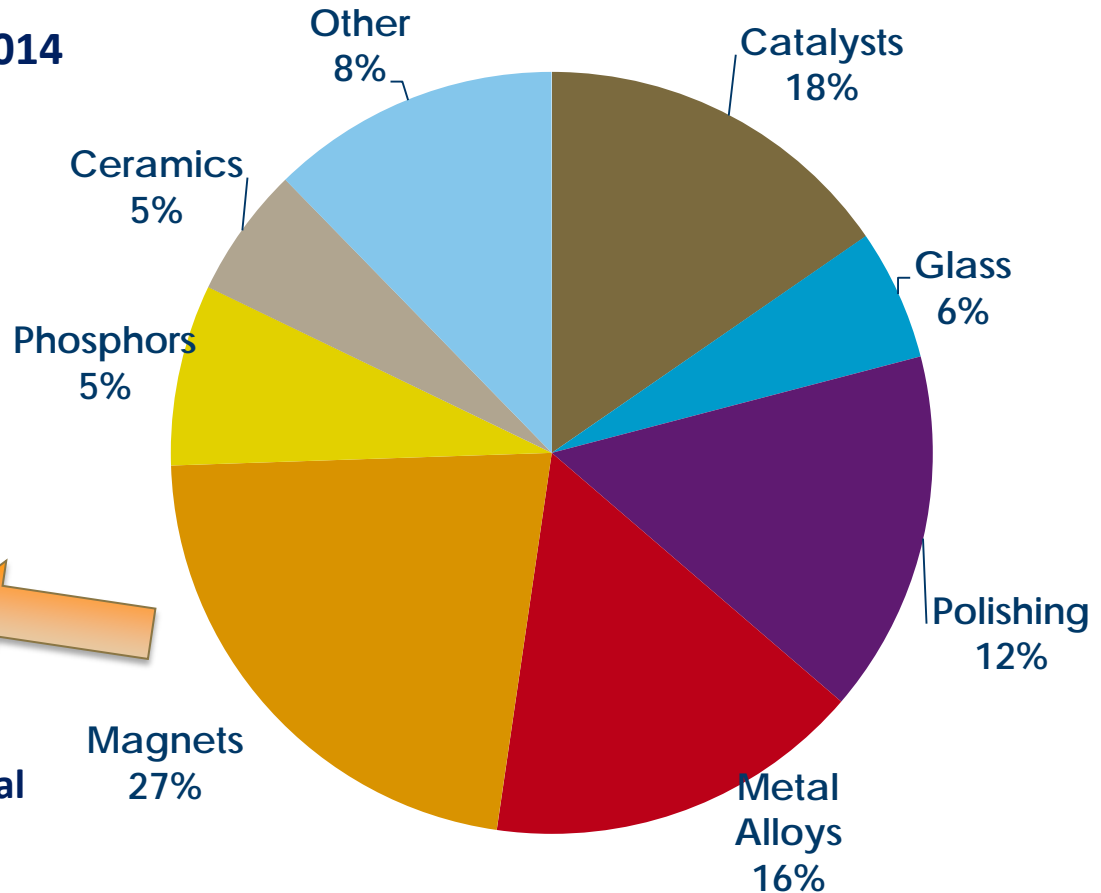


Rare Earth Industry

- **US\$3-5B Global market**
- **136,000t Annual consumption 2014**
- **3-5% Annual growth estimates**
- **85-90% REE produced by China**

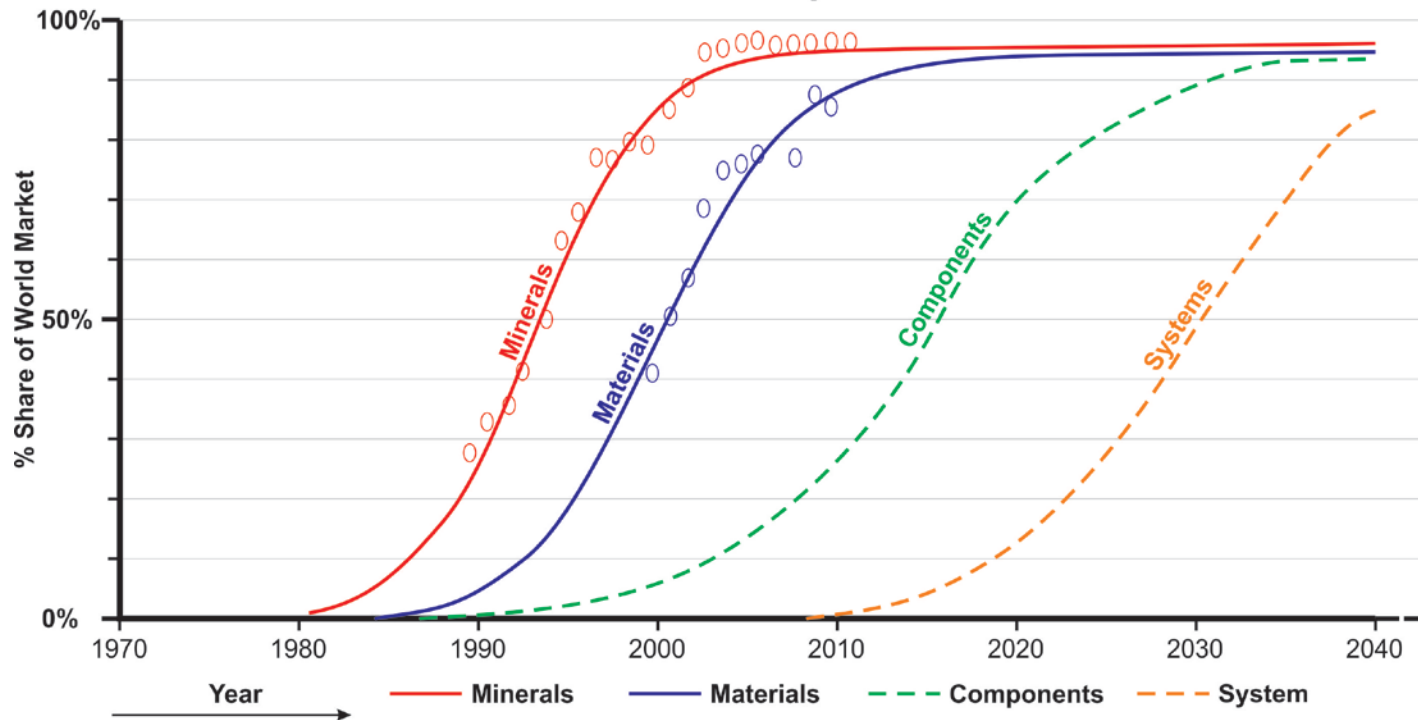
- **Permanent magnet dominant consumer and growth ~ 8% pa**
- **Annual magnet market ~US\$20B**
- **Major use for Nd, Pr, Dy and Tb**
- **Growth in other REs for special metal alloys and ceramics**

REE Demand 2016 by Application



China's REE dominance

China's market share on steps of REE value chain



The value increases from **US\$4B Minerals**; **US\$40B Materials**; **US\$400B Components**; to **US\$4T Systems**

Is the rest of the world prepared to accept China's domination of high-tech and advanced materials manufacture?

Source: Karl Gerald van den Boorgart, Polina Klossek and Andreas Klossek, "How Forward Integration along the Rare Earth Value chain Threatens the Global Economy", paper presented at 2014 Critical Minerals Conference, Denver, Colorado, August 3-5 2014. Referenced in "The Elements of Power, Gadgets, Guns and The Struggle for a Sustainable Future in the Rare Metal Age, David S Abraham, published by Yale University Press, October 2015.

- **Internationally strategic with supply of several critical metals from non-Chinese sources**
- **Business case has robust revenues, even at current Chinese domestic RE and Zr prices**
- **Full spectrum of rare earth magnet materials – neodymium, praseodymium, dysprosium and terbium produced, as well as other “heavy” rare earths and yttrium which have developing advanced materials applications**
- **The DZP’s diversified output gives a very different revenue profile to Lynas’ Mt Weld and Molycorp’s Mt Pass pure rare earth operations, which provides increased stability in variable markets**
- **Production of zirconium chemicals not related to zircon or the mineral sands industry**
- **Potential to be the world’s largest hafnium producer and supply long term stable production and pricing into the expanding aerospace and industrial gas turbine industries, not related to the production of nuclear grade zirconium metal**
- **Current estimated operating cost structure very competitive @ US\$7 - \$8/kg of product produced**



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Thank you



Mining the metals of the future.

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This document has been prepared in accordance with the requirements of Australian securities laws, which may differ from the requirements of United States and other country securities laws. Unless otherwise indicated, all ore reserve and mineral resource estimates included or incorporated by reference in this document have been, and will be, prepared in accordance with the JORC classification system of the Australasian Institute of Mining, and Metallurgy and Australian Institute of Geosciences.

Competent Person

Unless otherwise stated, the information in this presentation that relates to mineral exploration, mineral resources and ore reserves is based on information compiled by Mr D I Chalmers, FAusIMM, FAIG, (director of the Company) who 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 Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Ian Chalmers consents to the inclusion in the presentation of the matters based on his information in the form and context in which it appears.

Dubbo Zirconia Project – Mineral Resources

Toongi Deposit	Tonnage (Mt)	ZrO ₂ (%)	HfO ₂ (%)	Nb ₂ O ₅ (%)	Ta ₂ O ₅ (%)	Y ₂ O ₃ (%)	REO (%)
Measured	35.70	1.96	0.04	0.46	0.03	0.14	0.75
Inferred	37.50	1.96	0.04	0.46	0.03	0.14	0.75
Total	73.20	1.96	0.04	0.46	0.03	0.14	0.75

These Mineral Resources are based upon information compiled by Mr Terry Ransted MAusIMM (Alkane Chief Geologist) who is a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Terry Ransted consents to the inclusion in the report of the matters based on his information in the form and context in which it appears. The full details of methodology were given in the 2004 Annual Report.

Dubbo Zirconia Project – Ore Reserves

Toongi Deposit	Tonnage (Mt)	ZrO ₂ (%)	HfO ₂ (%)	Nb ₂ O ₅ (%)	Ta ₂ O ₅ (%)	Y ₂ O ₃ (%)	REO (%)
Proved	8.07	1.91	0.04	0.46	0.03	0.14	0.75
Probable	27.86	1.93	0.04	0.46	0.03	0.14	0.74
Total	35.93	1.93	0.04	0.46	0.03	0.14	0.74

These Ore Reserves are based upon information compiled by Mr Terry Ransted MAusIMM (Alkane Chief Geologist) who is a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. The reserves were calculated at a 1.5% combined ZrO₂+Nb₂O₅+Y₂O₃+REO cut off using costs and revenues defined in the notes in ASX Announcement of 16 November 2011. Terry Ransted consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

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