



## Arafura Resources Limited

*Up and coming supplier of NdPr to permanent magnets used in the growing clean energy industry*

May 2018

7<sup>th</sup> Annual InvestorIntel Summit

## Important Notice

This presentation has been prepared by Arafura Resources Limited (**Arafura Resources**). It is of a summary form only and therefore contains general background information which may not be complete. It should be read in conjunction with and full review made of Arafura Resources' disclosures and releases lodged with the Australian Securities Exchange (**ASX**) and available at [www.asx.com.au](http://www.asx.com.au).

This presentation contains certain statements which may constitute "forward-looking statements." Such statements are only expectations or beliefs and are subject to inherent risks and uncertainties which could cause actual values, results or performance achievements to differ materially from those expressed or implied in this presentation. No representation or warranty, express or implied is made by Arafura Resources that any forward-looking statement contained in this presentation will occur, be achieved or prove to be correct. You are cautioned against relying upon any forward-looking statement. Except for statutory liability which cannot be excluded, each of Arafura Resources and its related body corporates and their officers, employees and advisers expressly disclaims any responsibility for the accuracy or completeness of the material contained in this presentation and excludes all liability whatsoever (including in negligence) for any loss or damage which may be suffered by any person as a consequence of any information in this presentation or any error in it or omission from it. Arafura Resources accepts no responsibility to update any person regarding any inaccuracy, omission or change in information in this presentation or any other information made available to a person, nor any obligation to furnish the person with any further information.

This presentation does not constitute an offer of any securities in Arafura Resources, in any jurisdiction, nor an invitation to apply for such securities, in any jurisdiction. This presentation does not provide investment advice or financial product advice. You should obtain professional advice and carry out your own independent investigations and assessment of the information in this presentation (including any assumptions) before acting.

Information in this presentation which is attributed to a third-party source has not been checked or verified by Arafura Resources.

The information in this presentation that relates to Exploration Results or Mineral Resources is based on information compiled by Mr Kelvin Hussey BSc (Hons). Mr Hussey is a Member of the Australian Institute of Geoscientists and he 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 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code)". Mr Hussey consents to the inclusion in this presentation of the matters based on his information in the form and context in which it appears.

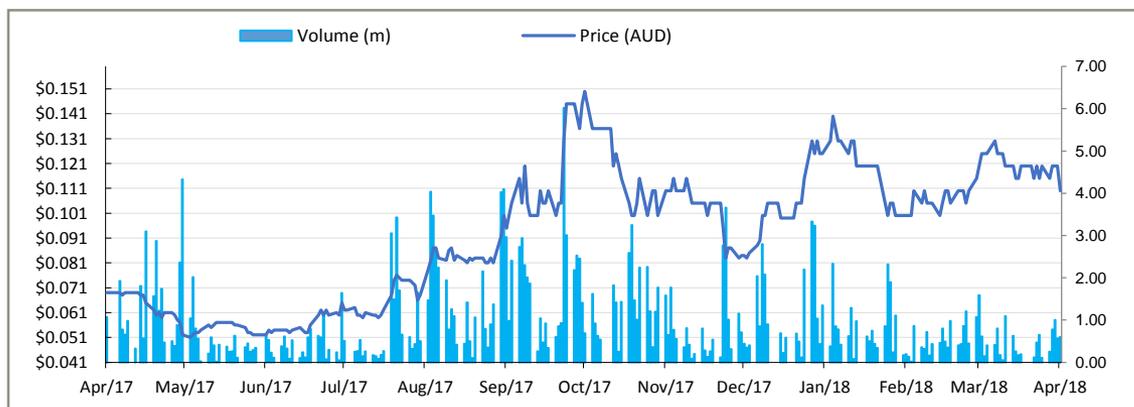
Mr Hussey is a full-time employee of Arafura Resources.

# Company Snapshot

3

- ASX listed company developing the **Nolans Rare Earths Project** in the Northern Territory, a **long-life** mining and chemical processing operation
- Arafura has the capability of meeting **5-10% of global demand for NdPr**
- Nolans has been afforded **major project status** by the Northern Territory and Australian governments
- Nolans is in **advanced feasibility and environmental assessment**

ASX Code	ARU
Share Price (24-Apr-18)	A\$0.10
Issued Shares	575.8m
Market Cap	A\$57.6m
Cash (31-Mar-18)	A\$10.7m
Debt	Nil
Options - Employee Performance	8.4m



Shareholder Spread	
JP Morgan Nominees	21.34%
ECE Nolans Investment (China)	19.05%
Citicorp Nominees	2.05%
HSBC Custody Nominees	1.54%
BNP Paribas Nominees	0.92%

# NdPr Market Update

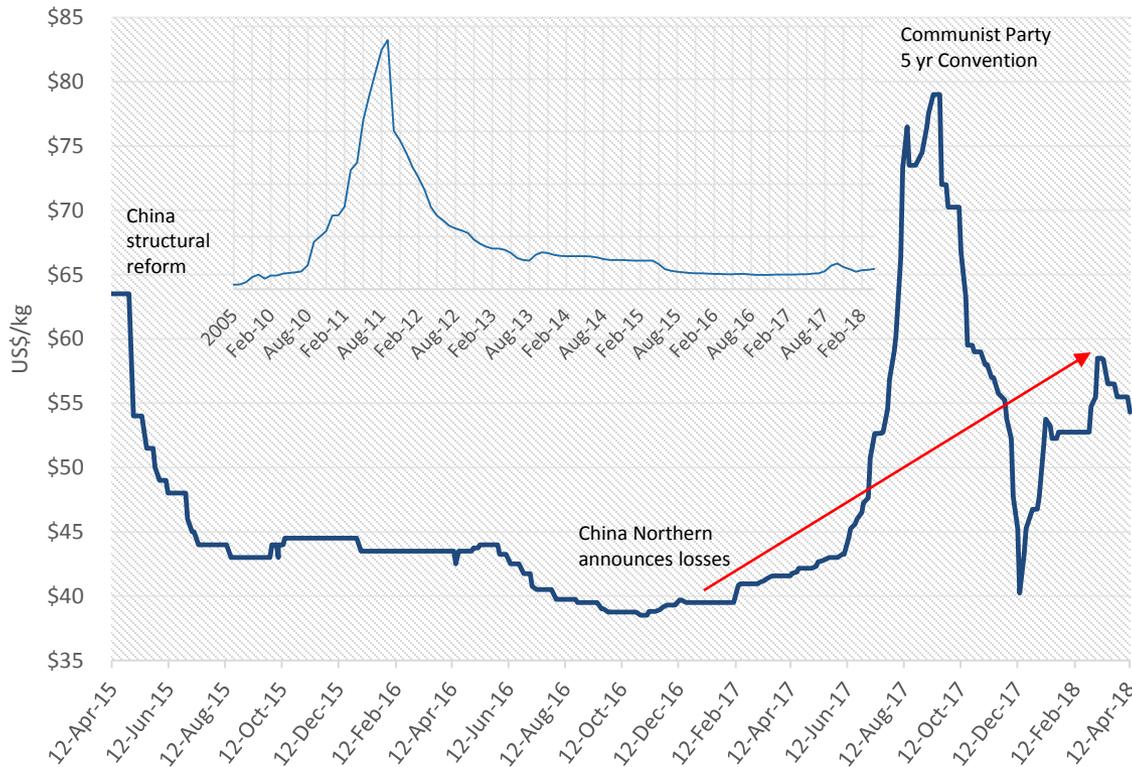
## Secure Supplier of NdPr to Permanent Magnets Used in Clean Energy

- **NdPr is a key component** in the manufacture of high-strength NdFeB permanent magnets used in electric vehicles (EVs), wind turbines, portable electronic devices, and many industrial applications
- EVs use an additional **1 kg of NdPr per electric drive motor** over a standard vehicle's use of 0.7 kg
- NdPr accounts for 26.4% of Nolans rare earths composition by volume and **85% by value**
- China has been the dominant NdPr producer but recently analysts are forecasting **China to become a net importer**
- Structural changes are being implemented in China to **weed out illegal operators, close unsustainable operations**, and push bigger players to consolidate

# NdPr Price – Supply & Environmental Reform

6

NdPr Oxide Price



Source: Independent price reporting agency

- **Removal of rare earth export tariffs and quotas**
- **Enforced closure of illegal and unsustainable mines and smelting impacted NdPr price in 2017**
- **China “big 6” consolidation creates a more sophisticated supply chain**
- **China rehabilitation costs yet to be realised**
- **Emerging demand for NdFeB magnets may also impact demand-supply balance**
- **New supply is required if industry wants a sustainable price**

# NdFeB Magnet Vital To Auto Market

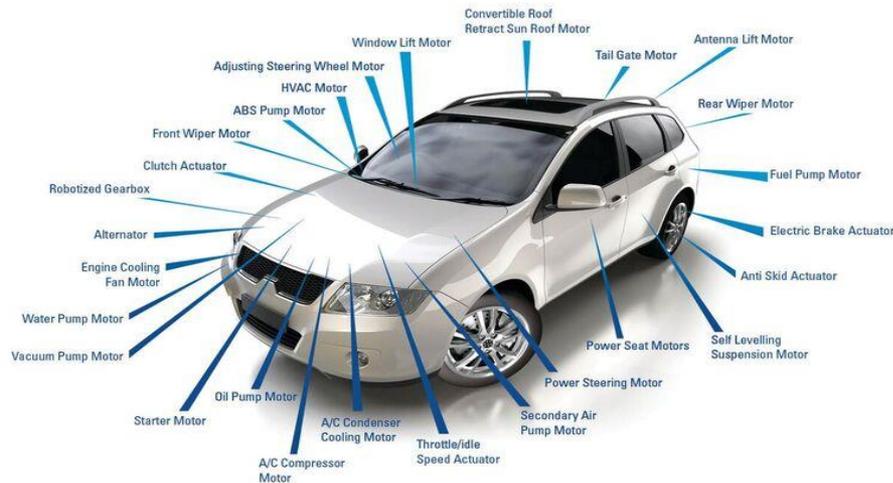
7

25,000 tonnes NdFeB magnets used in 2016 auto market growing at around 8% CAGR (total market around 135,000 tonnes)

EVs and hybrids represent additional growth through Permanent Magnet Synchronous Motors (PMSM)

PMSM is dominant drive train technology for EVs. Recent announcements include:

- Most car manufacturers have EV targets of 10-60% by 2025
- Tesla moving to PMSM for mass produced Model 3
- Toyota to sell more than 10 EV models in 2020s and have EV versions of every Toyota and Lexus model by 2025 (Dec 2017)
- Ford increasing planned investment in EVs from US\$4.5 billion to US\$11 billion by 2022 and to introduce 16 EVs and 23 hybrid and plug-in hybrid models (Jan 2018)
- EV demand forecasts range from 'big' to 'very big' (HSBC Mar 2018)
- OPEC raises forecast global EV sales in 2040 from 50 million to 250 million, Bloomberg forecasts 500 million (Mar 2018)

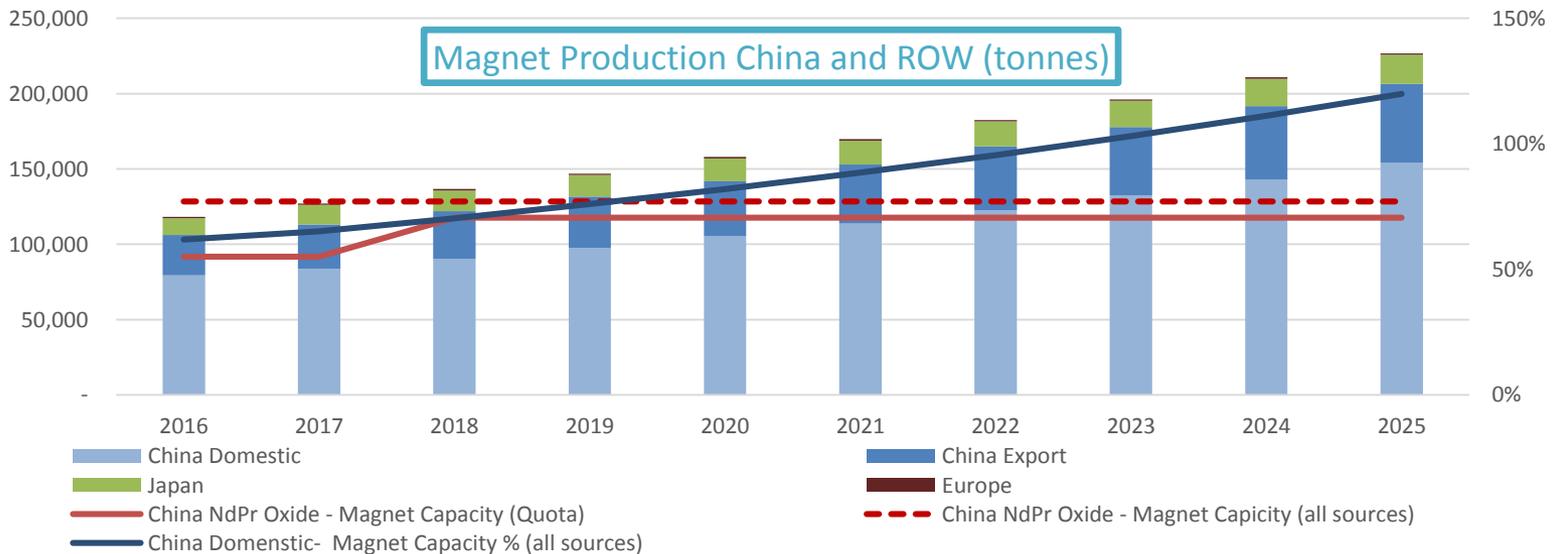


EV Drivetrain: Additional 1 kg of NdPr



# Emerging Demand Dynamic – China 2025 Strategy

- **China’s domestic NdPr consumption will increase** as it pursues clean energy objectives and global leadership in EV manufacturing
- Expect to see Chinese investment in producers operating outside the quota, to bring them to a sustainable operating standard. This will have a **flow-on impact for operating costs** and will need to compete with capital demands for other downstream value-add opportunities.
- Chinese NdFeB magnet manufacturers to **expand production 30-50% over the next 5 years** targeting export markets
- Chinese (non-SOE / private) NdFeB magnet manufacturers with large export sales are **advancing long-term non-China offtake** to diversify NdPr supply, sometimes at the request of OEMs
- **In the early 2020s China will become a net importer of NdPr**



Source: ACREI, Argus Metals and industry sources

# Non-China Supply Peer Comparison

9

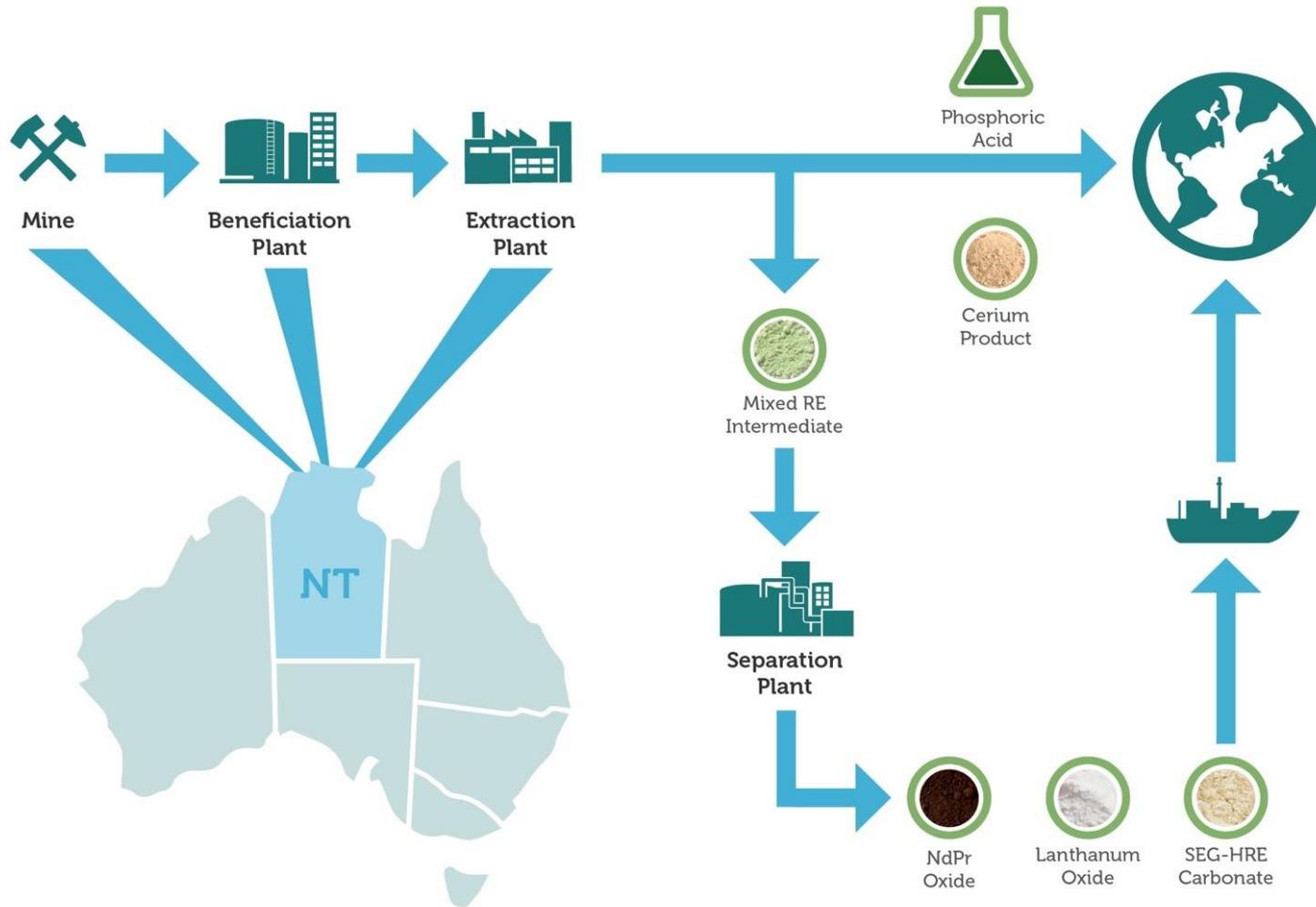
- Non-China NdPr supply will be constrained by the **sector's historical inability to attract capital**
- **Nolans is one of the world's largest and more advanced NdPr projects which provides investors with a compelling investment opportunity in a low-risk jurisdiction**
- Nolans has the potential to provide meaningful NdPr production in the **lowest cost quartile due to its NdPr enrichment**, and advanced project development status

Asset	Nolans	Mount Weld/LAMP	Yangibana	Ngualla	Kvanefjeld
Owner	Arafura Resources	Lynas Corporation	Hastings Technology Metals	Peak Resources	Greenland Minerals and Energy
Country	Australia	Australia / Malaysia	Australia	Tanzania	Greenland
Status	Development	Production	Development	Development	Development
Contained NdPr (kt)	255	242	52	210	907
NdPr "enrichment" (%)	26.4%	23.3%	34.9%	21.2%	17.7%
Annual NdPr Production (kt)	3.6	5.5	3.0	2.8	4.6
OPEX (US\$/kg NdPr)	\$34.72	\$28.60	\$37.70	\$32.24	\$72.90
OPEX (US\$/kg NdPr) - after by-product credits	\$24.40	\$28.60	\$37.70	\$32.24	\$58.60

Source: Resource Capital Research Pty Ltd (AFSL 325340). See Appendix C for notes and assumptions used in the preparation of the Peer Comparison.

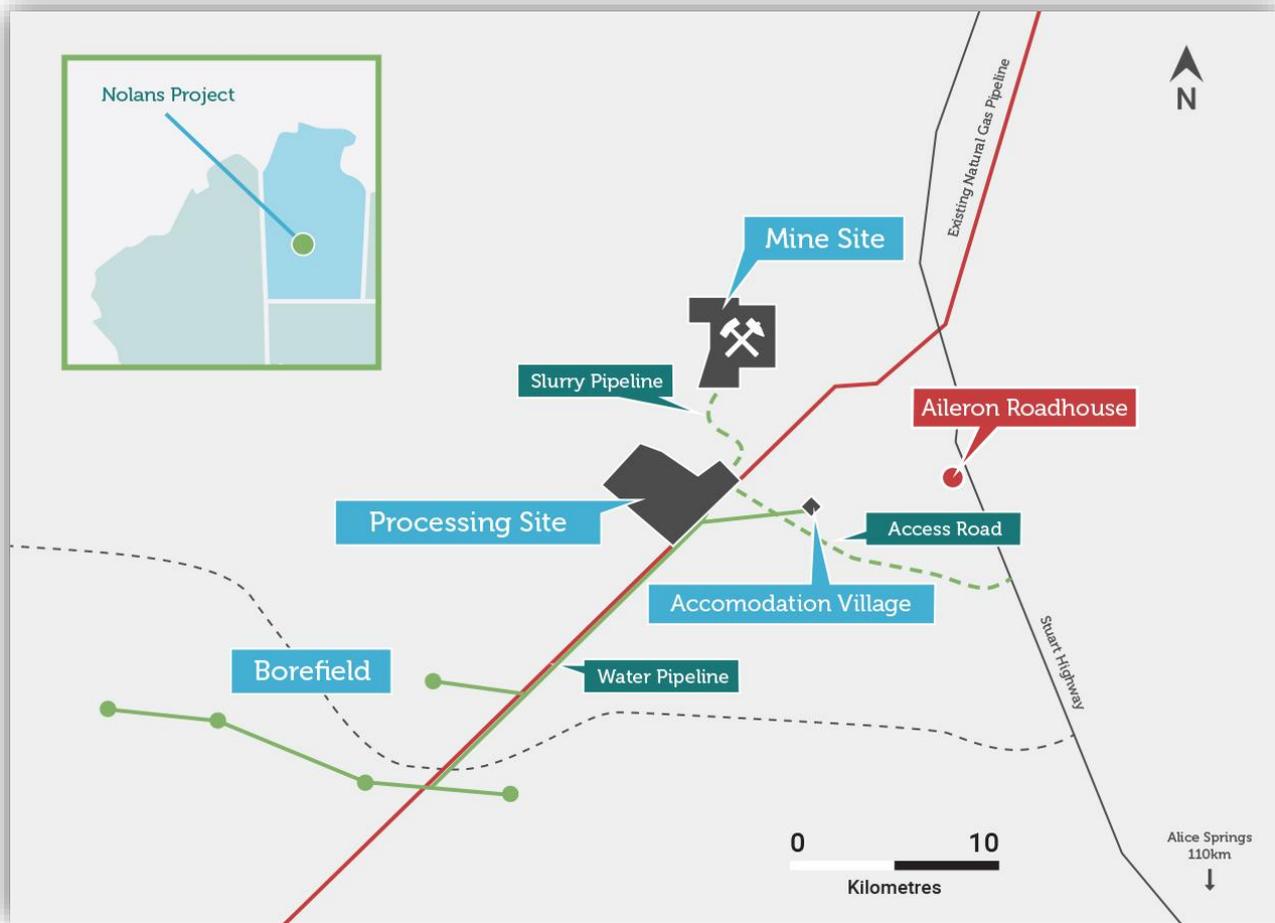
# Nolans Project

# Project Configuration



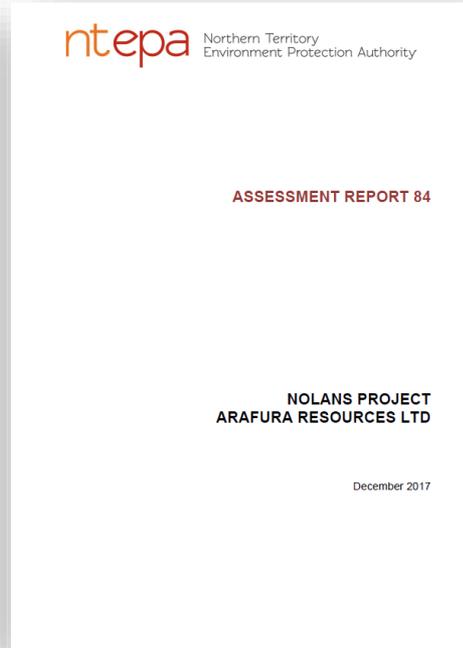
# Close To Key Infrastructure

12



- Stuart Highway – **10 km east**
- Alice Springs railyard, airport and other services – **135 km south**
- Amadeus gas pipeline – **adjacent to processing site**
- Water supply – **30 km south**
- Tailings and process wastes **remain at site**

# Environmental Assessment Nearing Completion

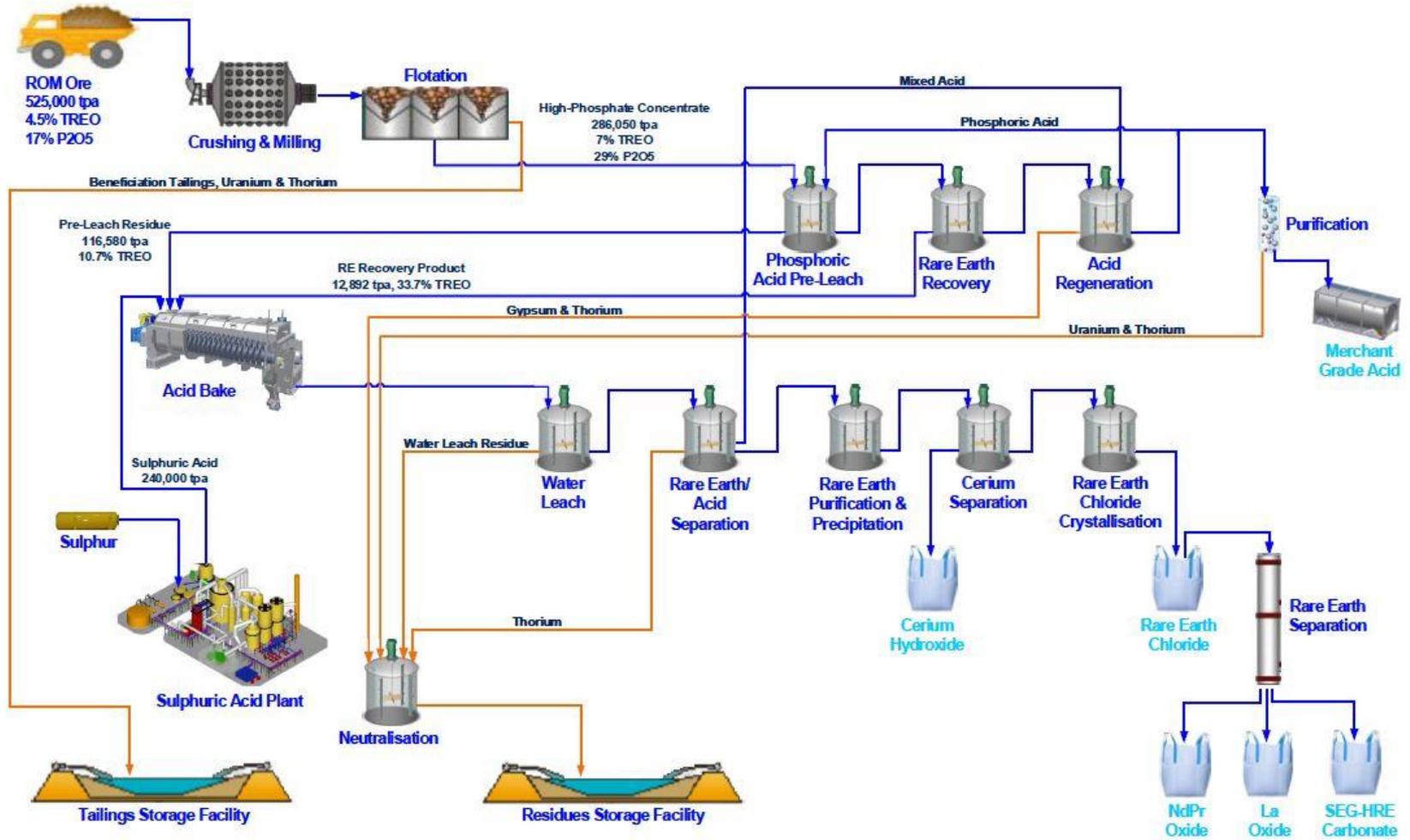


**NT Environment Protection Authority (EPA) Recommends Environmental Approval**

*“The NT EPA considers that ..... the Project can be managed in a manner that ..... avoids significant or unacceptable environmental impacts and risks.”*

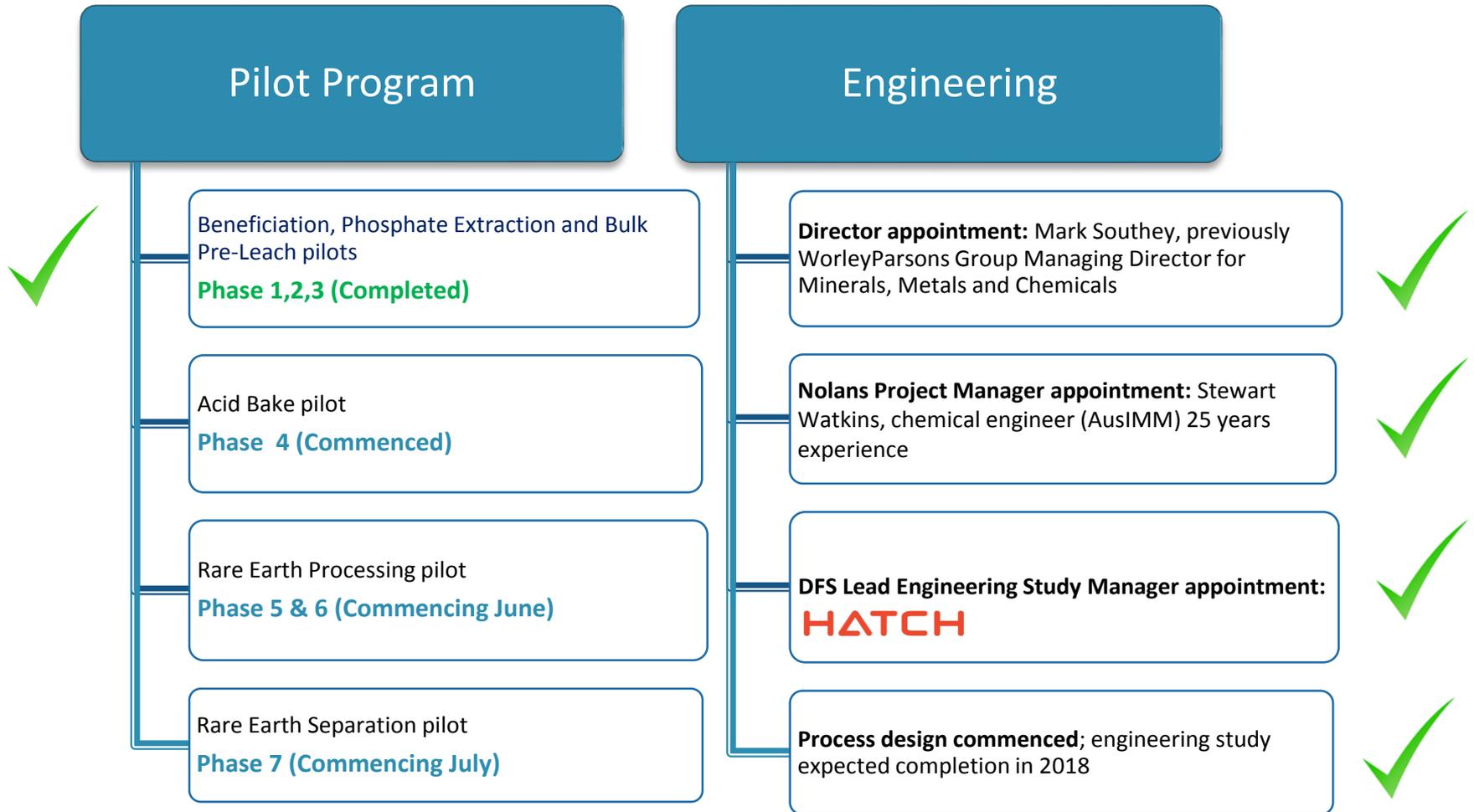
Source: NT EPA Assessment Report 84, December 2017

# Project Flowsheet



Where indicated, process flows are being used in the DFS. TREO and P<sub>2</sub>O<sub>5</sub> grades are from the pilot program.

# Current Process Focus



# Remaining Piloting Activities 2018

## Acid Bake Phase 4 Commenced



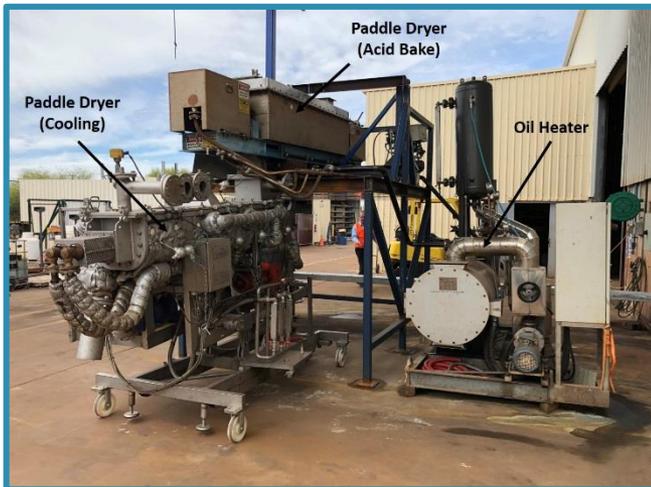
PLR and Acid Mixing



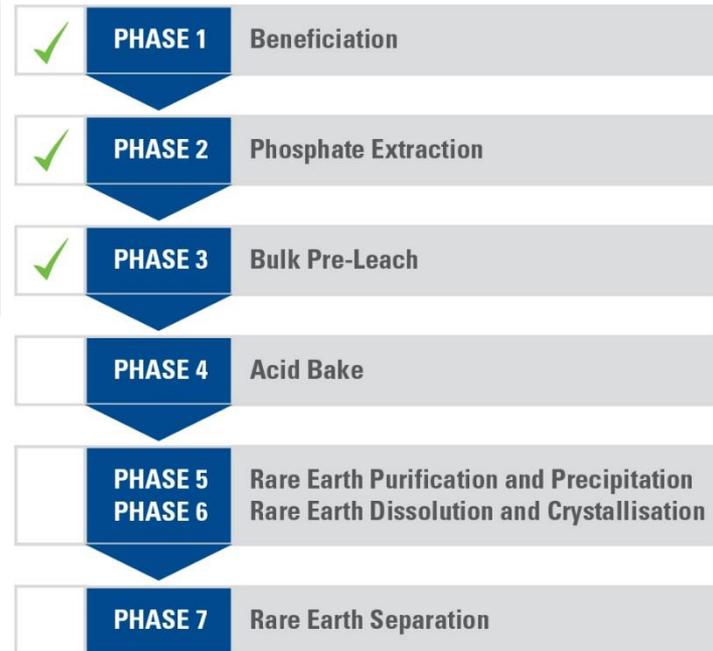
Baked Mixture Feeding



Acid Bake



Integrated Process Equipment



NdPr Oxide



Cerium Carbonate



Lanthanum Oxide



SEG-HRE Carbonate

Japan, South Korea and European Customer qualified product suite produced from previous work

# Project Metrics

17

- **Ultra competitive operating costs**  
US\$6.23/kg TREO or US\$24.38/kg NdPr oxide – lowest amongst peers
- Phosphoric acid recovered to **reduce commodity risk**
- **High rare earths recovery**
- NdPr oxide price **US\$55.50/kg**

*Refer Arafura ASX release 7 June 2017 for additional and qualifying information on the Mineral Resources that underpin the production target and provides the material assumptions on which the production target is based*

*The Company confirms that all material assumptions underpinning the forecast financial information derived from its 14,000 tpa TREO production target and the production target itself, continue to apply and have not materially changed since the 7 June 2017 ASX release*

*Based on 14,000 tpa TREO production processing Measured and Indicated Mineral Resources as per Appendix A*

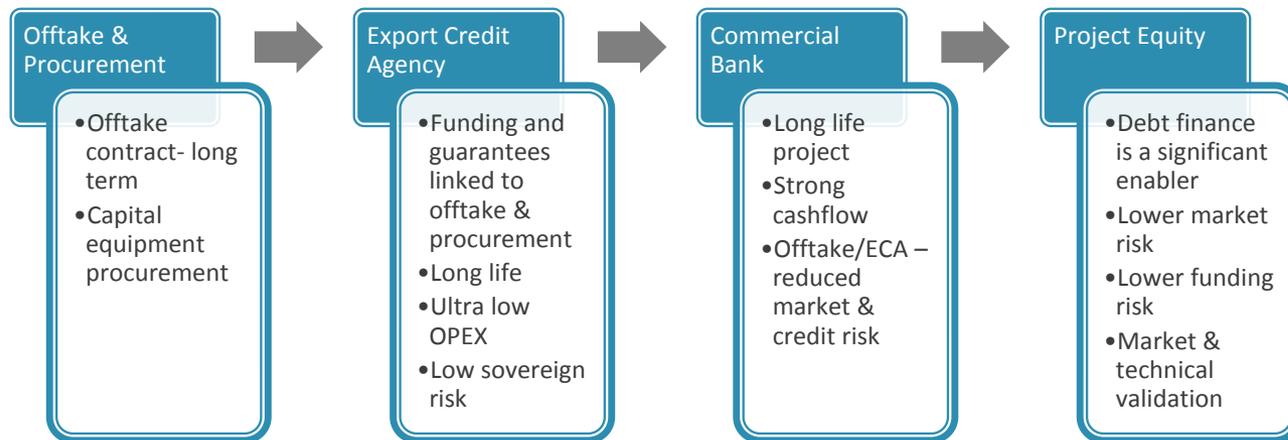
*NdPr oxide price as at 3 April 2018*

Mining & Processing		
ROM feed (tpa)		525,000
Mine life (years)		30+
Recovery (ROM to final product)	Total RE	76%
	NdPr	75%
	La	75%
	SEG-HRE	68%
Production		
TREO equivalent (tpa)		14,000
NdPr oxide (tpa)		3,600
La oxide (tpa)		2,660
SEG-HRE carbonate (tpa TREO equivalent)		660
Phosphoric Acid (tpa MGA)		110,000
Financial		
Capital cost (US\$m)		\$680
Operating cost (US\$m pa)		\$125
Operating cost (US\$/ kg TREO)		\$8.89
Operating cost (US\$/ kg TREO; less credit phos acid)		\$6.23
Operating cost (US\$/ kg NdPr; less credit phos acid)		\$24.38

# Project Funding Strategy

18

- **Advancement of environmental approval critical enabler** for engagement with offtakers, financiers & Export Credit Agencies (ECA)
- ECAs are key to providing government-backed funding and guarantees, leveraged against the strategic link to NdFeB magnet production
- ECA funding linked to offtake arrangements, capital equipment supply and construction
- ECA-linked project finance is a catalyst to attract equity at corporate and/or project level
- Project sell down may also be a source of project equity



# Timeline & Targets



**2018 targets include:**

- Securing **environmental approvals**
- Advancing **NdPr offtake arrangements**
- Completing the **DFS and definition stage engineering**
- Engaging with **strategic partners for capital equipment procurement and project funding**

# Summary

Attribute	Arafura
High-growth and high-value <b>NdFeB permanent magnet focus</b>	✓
NdPr production planned to <b>coincide with projected supply gap</b>	✓
<b>Lowest production cost</b> to remain competitive in a cyclical downturn	✓
Located in a jurisdiction with <b>low geopolitical risk and with strategic support</b>	✓
Long-life, low-risk resource with planned output that supports <b>&gt;30 years of production</b>	✓
Close to vital <b>transport, energy and water infrastructure</b>	✓
Regulatory approvals well advanced, including <b>all-important environmental</b>	✓
Dedicated team that has developed an <b>efficient, high-recovery flowsheet now in final piloting phase</b>	✓



## Contact:

Level 3, 263 Adelaide Terrace  
Perth, WA, 6000, Australia

T: +61 8 6210 7666

E: [arafura@arultd.com](mailto:arafura@arultd.com)

May 2018

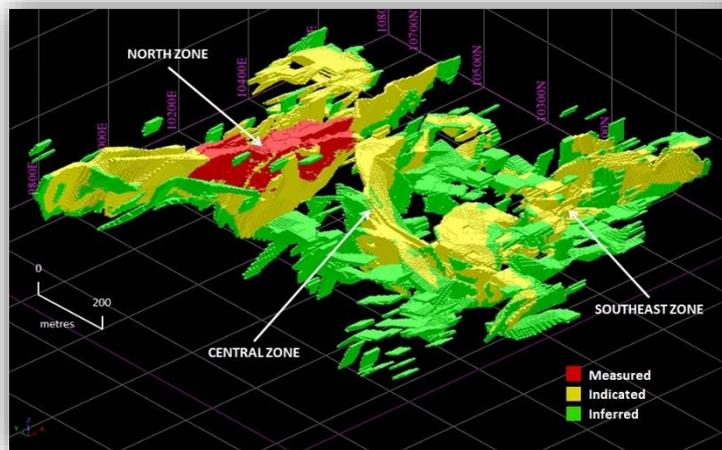
7th Annual InvestorIntel Summit

# Appendices

# Appendix A: Mineral Resources

RESOURCES	TONNES (m)	RARE EARTHS TREO %	PHOSPHATE P <sub>2</sub> O <sub>5</sub> %	NdPr Enrichment %
Measured	4.9	3.2	13	26.1
Indicated	30	2.7	12	26.4
Inferred	21	2.3	10	26.5
<b>TOTAL</b>	<b>56</b>	<b>2.6</b>	<b>11</b>	<b>26.4</b>

1% TREO cut-off grade. Numbers may not compute exactly due to rounding. "NdPr enrichment" is the proportion of TREO comprising Nd<sub>2</sub>O<sub>3</sub> and Pr<sub>6</sub>O<sub>11</sub>.

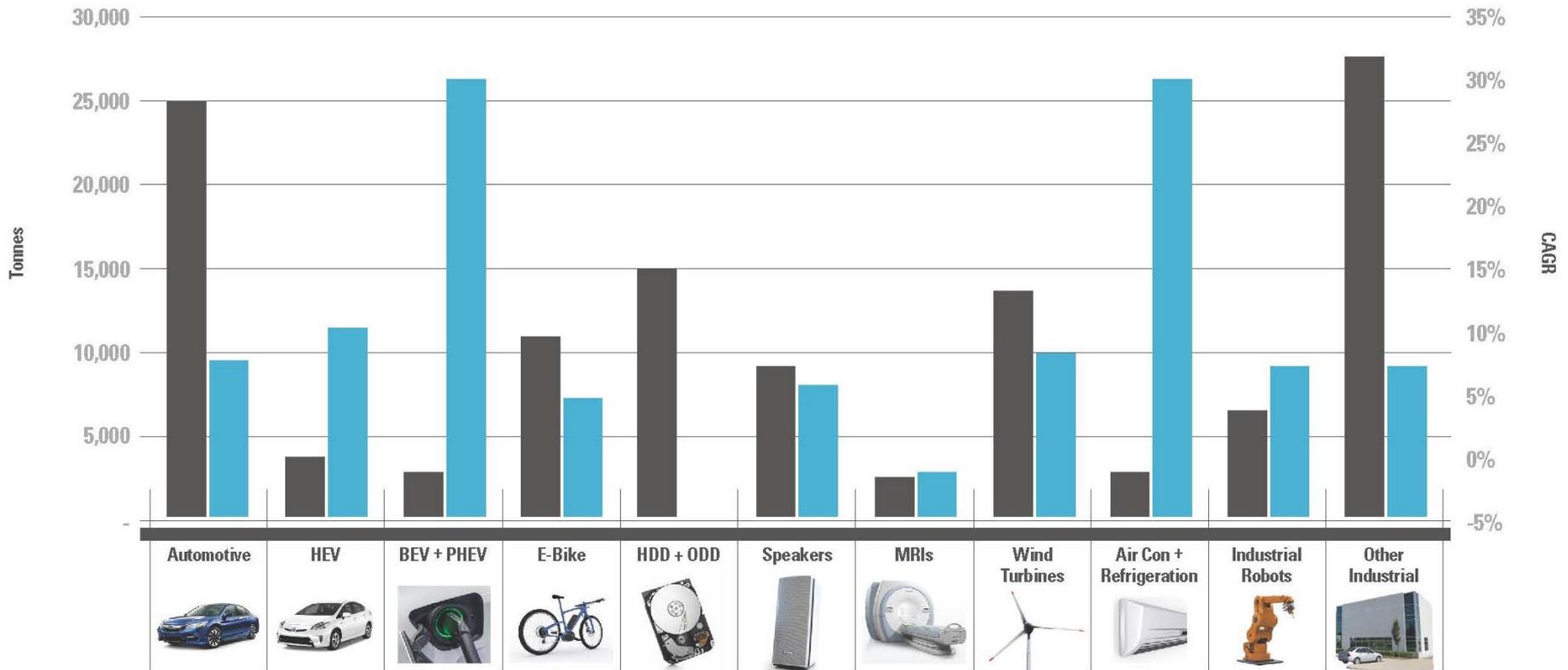


- **Low resource risk** via extensive drilling and detailed material type studies
- Mineralization **at surface** and **open at depth**, below 215m
- 90,000 metres of drilling
- Amenable to **low-cost open cut** mining and standard beneficiation techniques
- Apatite is the most abundant REE-bearing mineral

# Appendix B: Established Markets & Growing Applications

## NdPr Magnet Volume & Forecast Growth

NdPr Magnet Tonnes 2016  
 Forecast CAGR% 2025



Source: Adamas Intelligence, Arnold Magnetic Technologies, Japanese industry participants, Roskill

# Appendix C: Peer Comparison

## Notes and assumptions used in the preparation of the Peer Comparison

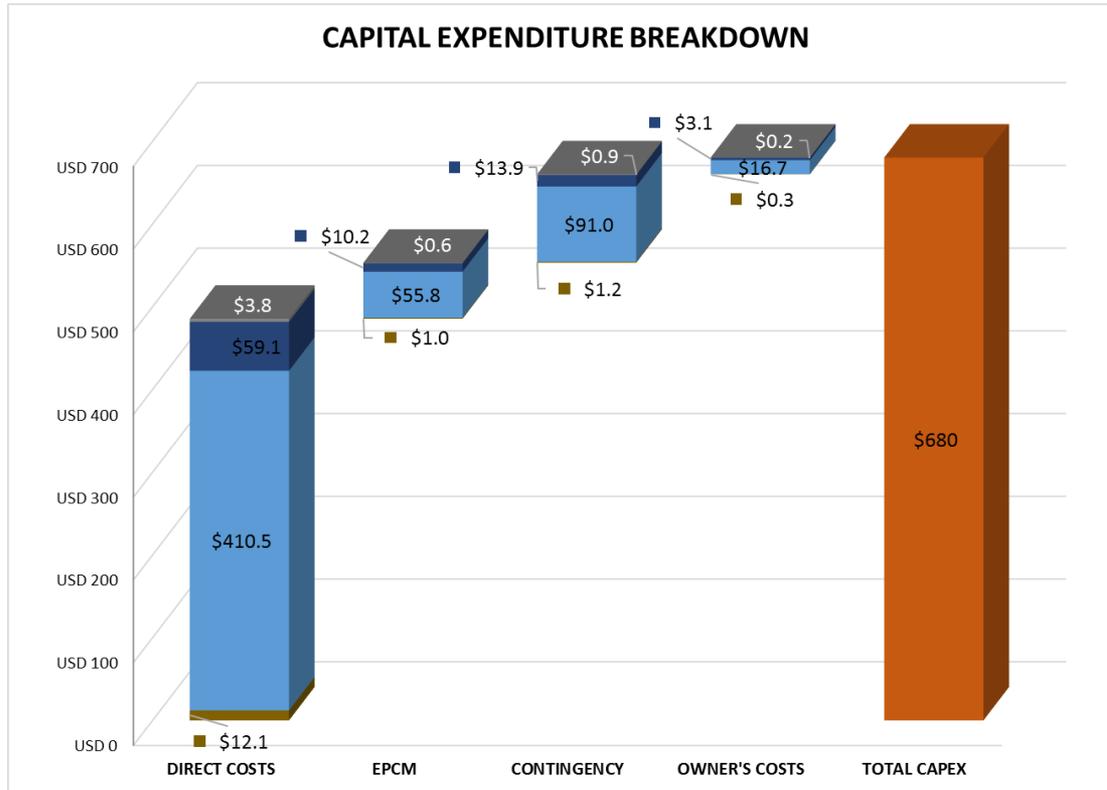
- Exchange rate of AUD1 = USD 0.79.
- Forecast operating data for development projects based on published company reports and project updates. ARU operating expense includes provision for staff and administration costs.
- NdPr “enrichment” (%) is based on published company reports and project updates for rare earth element distribution for mineral resources or reserves where applicable.
- Contained NdPr (kt) is based on Ore Reserves or Measured and Indicated mineral resources where no reserves quoted.
- Contained NdPr (kt) and Annual NdPr Production (kt) is presented on a project basis. NdPr production has not been adjusted to reflect the relevant underlying project interest for PEK (75%) and HAS (91%).
- LYC Annual NdPr Production (kt) is based on total reported “ready for sale production volumes” for the four quarters up to and including the September 2017 quarter. Operating costs are based on total operating and staff costs (excluding administration) reported for the same period. Operating costs have been converted at an average exchange rate of AUD1= USD 0.755 for that year.

## ASX-Listed Peer Group Companies

Code	Company Name	Project	Location	Project Interest
ARU	Arafura Resources Ltd	Nolans	NT	100%
LYC	Lynas Corporation Ltd	Mt Weld/LAMP	WA & Malaysia	100%
HAS	Hastings Technology Metals Ltd	Yangibana	WA	91%
PEK	Peak Resources Ltd	Ngualla	Tanzania	75%
GGG	Greenland Minerals and Energy Ltd	Kvanefjeld	Greenland	100%

Source: Resource Capital Research Pty Ltd (AFSL 325340) report dated 19 October 2017

# Appendix D: Capital Costs



Transport & Logistics	1%
Separation	13%
Beneficiation & Extraction	84%
Mining	2%

Project Costs	AUD	USD
Total EPCM \$m	97	68
Owners Costs \$m	29	20
Contingency \$m	153	107
Total Indirect Costs \$m	278	195
Total Direct Costs \$m	693	485
<b>Total Project Cost \$m</b>	<b>971</b>	<b>680</b>

# Appendix E: Board



**IAN KOWALICK**  
NON-EXECUTIVE CHAIRMAN

Ian Kowalick has qualifications in science, engineering, economics, and finance. From 1995 to 2000, he held the most senior management position in the South Australian public sector, and is currently the Chairman of the South Australian Forestry Corporation Board. Ian is a board member of the Northern Territory Power and Water Corporation.



**TERRY GROSE**  
NON-EXECUTIVE DIRECTOR

Terry Grose has a strong commercial background gained over 30 years as a senior business executive, consultant, and director, in Australia and internationally. Terry worked in Hong Kong for over a decade in a senior financial role before establishing his own business, Grose International, a commercial and financial consultancy with clients throughout Asia.



**GAVIN LOCKYER**  
MANAGING DIRECTOR

Gavin Lockyer's diverse, global experience has provided management and leadership opportunities in a range of disciplines including; Accounting, Financial & Investment Banking, Major Resource Development & Operations, and Global Bank Treasuries. Over the past 20 years his career has exposed him to business practices in North America, Europe, and Australasia.



**QUANSHENG ZHANG**  
NON-EXECUTIVE DIRECTOR

Quansheng Zhang holds a Doctoral degree in Engineering and a Masters degree in Geophysical Prospecting. He is based in Nanjing in the Peoples Republic of China and is the General Manager of Hong Kong East China Non-Ferrous Mineral Resources Co Ltd (HKECE). Quansheng has over 30 years of mineral prospecting and exploration experience, and expertise in mineral resource surveys and geophysics.



**CHRIS TONKIN**  
NON-EXECUTIVE DIRECTOR

Chris Tonkin has over 35 years' experience as a senior business executive with a broad industry background in business generation, management, and strategy development. He is a member of Arafura Resources' Remuneration and Nomination and Audit and Risk Committees and is also Chairman of Lakes Oil NL.



**MARK SOUTHEY**  
NON-EXECUTIVE DIRECTOR

Mark Southey has previously held senior executive positions with Honeywell and ABB both in Australia and internationally, and more recently was part of the global executive leadership team within WorleyParsons, where he held the position of Group Managing Director for the Minerals, Metals and Chemicals Sector.

# Appendix F: Management



**RICHARD BRESCIANINI**  
GENERAL MANAGER EXPLORATION &  
DEVELOPMENT

Richard has over 30 years' experience in the minerals industry. He worked with BHP Minerals on base and precious metals exploration programs throughout Australasia and North America, contributing to significant economic discoveries at Eloise (copper-gold) and Cannington (silver-lead-zinc). Thereafter he led the Northern Territory Government's Geological Survey as its Director from 2003 to 2007 before joining Arafura.



**LLOYD KAISER**  
ENGINEERING & MARKETING  
MANAGER

Lloyd has more than 10 years' experience in the sales and marketing of industrial minerals into high value sector markets including the nuclear, automotive, and advanced ceramics sectors. Prior to joining Arafura, he held several senior positions in account management, business development and marketing across a diverse range of commodities and chemicals including alumina, coal, industrial minerals, refractories, and ceramics.



**PETER SHERRINGTON**  
CHIEF FINANCIAL OFFICER & COMPANY  
SECRETARY

He commenced employment with Arafura in 2008 as Commercial Manager and was appointed Chief Financial Officer in July 2013. He has more than 20 years' experience in professional and corporate roles in Perth. Prior to working with Arafura, he held senior finance and commercial positions with several ASX and public unlisted entities. He has also worked in public practice for 10 years in the areas of business services and corporate advisory.



**BRIAN FOWLER**  
GENERAL MANAGER NT & SUSTAINABILITY

Brian has worked for over 40 years in private sector mineral companies developing a range of commodities, including rare earths, base metals, and gold. Brian is a member of the Northern Territory Mining Board, Management Board of the Northern Territory Minerals Council of Australia, and a member of Work Health & Safety Advisory Council of the Northern Territory.



**STEWART WATKINS**  
PROJECT MANAGER – NOLANS PROJECT

Stewart Watkins has 25 years' experience in many facets of the mining industry including operations, engineering consulting, project development and management. Stewart is a Fellow of the AusIMM.