



Delivering critical technology  
metals to the EV revolution

New York / Munich / Zurich

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## Compliance Statement

The information in this presentation that relates to the Mineral Resource Estimates of the Wolverine deposit is extracted from the report entitled "Increased Mineral Resource delivers more good news" dated 23 February 2015 and is available to view on the Company's website ([www.northernminerals.com.au](http://www.northernminerals.com.au)). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

The information in the announcement that relates to the Mineral Resource Estimates of the Cyclops and Banshee deposits is extracted from the report entitled "Further Increase in Brown Range Mineral Resource" dated 15 October 2014 and is available to view on the Company's website ([www.northernminerals.com.au](http://www.northernminerals.com.au)). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

The information in the announcement that relates to the Mineral Resource Estimates of the Gambit, Gambit West and Area 5 deposits is extracted from the report entitled "Wolverine Total Resource Doubled in a Major Upgrade of Browns Range HRE Mineral Resource Estimate" dated 26 February 2014 and is available to view on the Company's website ([www.northernminerals.com.au](http://www.northernminerals.com.au)). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

The information in the announcement that relates to Ore Reserves is extracted from the report entitled Increased Ore Reserve for Browns Range created on 2 March 2015 and is available to view on the Company's website ([northernminerals.com.au](http://northernminerals.com.au)). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement.

The information in this report that relates to Exploration Results or Exploration Targets is based on information compiled by Mr Robin Wilson, a full-time employee of Northern Minerals, a Competent Person, who is a member of the Australasian Institute of Mining and Metallurgy. Robin Wilson 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". Mr Wilson consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The potential quantity and grade of the Exploration Target is conceptual in nature. There has been insufficient exploration completed in the areas of the Exploration Target and it is uncertain if further exploration will result in the estimation of a Mineral Resource.

The information in the announcement that relates to production targets is extracted from the report entitled "DFS positions Browns Range Project as next dysprosium supplier" dated 2 March 2015 and is available to view on the Company's website ([northernminerals.com.au](http://northernminerals.com.au)). The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and that all material assumptions and technical parameters underpinning the production targets in the relevant market announcement continue to apply and have not materially changed.

TREO = Total Rare Earth Oxides –  $\text{La}_2\text{O}_3$ ,  $\text{CeO}_2$ ,  $\text{Pr}_6\text{O}_{11}$ ,  $\text{Nd}_2\text{O}_3$ ,  $\text{Sm}_2\text{O}_3$ ,  $\text{Eu}_2\text{O}_3$ ,  $\text{Gd}_2\text{O}_3$ ,  $\text{Tb}_4\text{O}_7$ ,  $\text{Dy}_2\text{O}_3$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{Er}_2\text{O}_3$ ,  $\text{Tm}_2\text{O}_3$ ,  $\text{Yb}_2\text{O}_3$ ,  $\text{Lu}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$

HREO = Heavy Rare Earth Oxides – Total of  $\text{Sm}_2\text{O}_3$ ,  $\text{Eu}_2\text{O}_3$ ,  $\text{Gd}_2\text{O}_3$ ,  $\text{Tb}_4\text{O}_7$ ,  $\text{Dy}_2\text{O}_3$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{Er}_2\text{O}_3$ ,  $\text{Tm}_2\text{O}_3$ ,  $\text{Yb}_2\text{O}_3$ ,  $\text{Lu}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$







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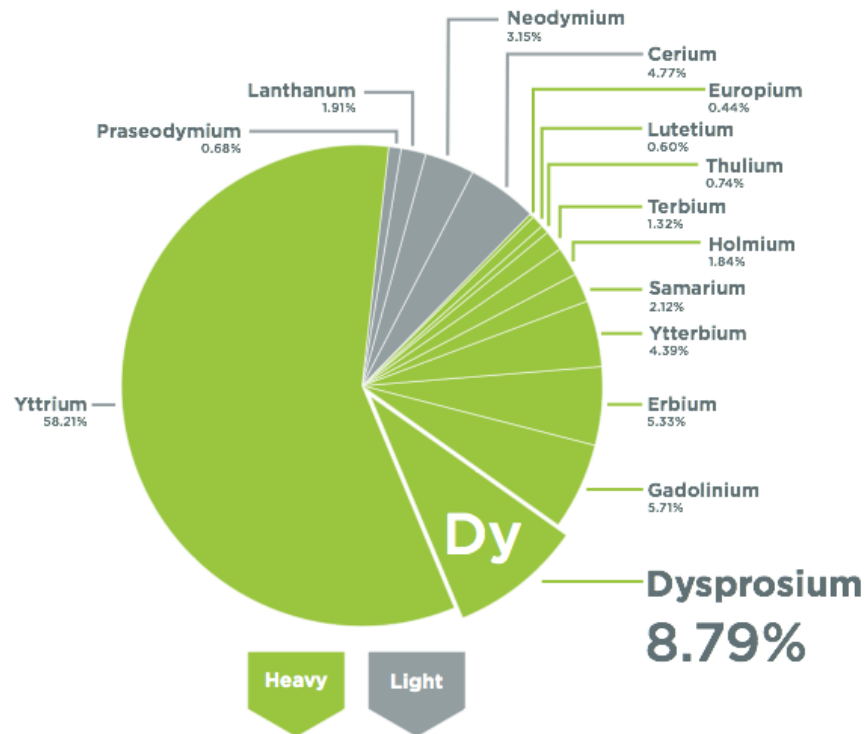
**In July 2017, Northern  
Minerals delivered first ore  
to the ROM Pad**



**In 2018, we will  
commence a new  
supply of heavy rare  
earths to the global  
market**

## Northern Minerals Browns Range

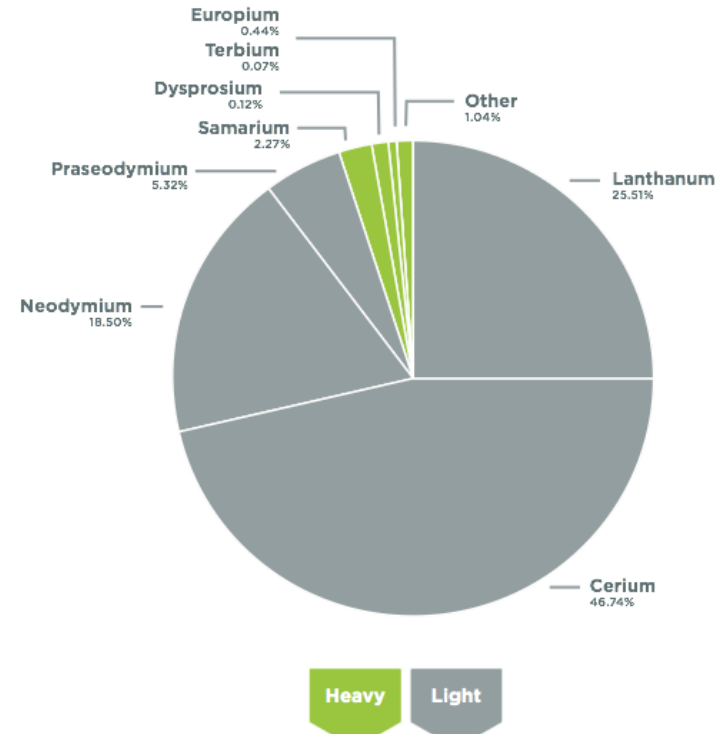
Rare earth distribution <sup>1</sup>



<sup>1</sup> Based on Wolverine Mineral Resource

## Lynas Mt Weld

Rare earth oxide composition <sup>2</sup>



<sup>2</sup> Source: Lynas Corporation website



# Browns Range underway



Wolverine: Pit development work in action





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MINERALS**

11 May 2017

# **Browns Range underway**

**Gambit West:  
Drilling west end;  
mining ore east end**







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# Browns Range underway



Browns Range airstrip under construction



# Browns Range underway



Browns Range  
49 person village



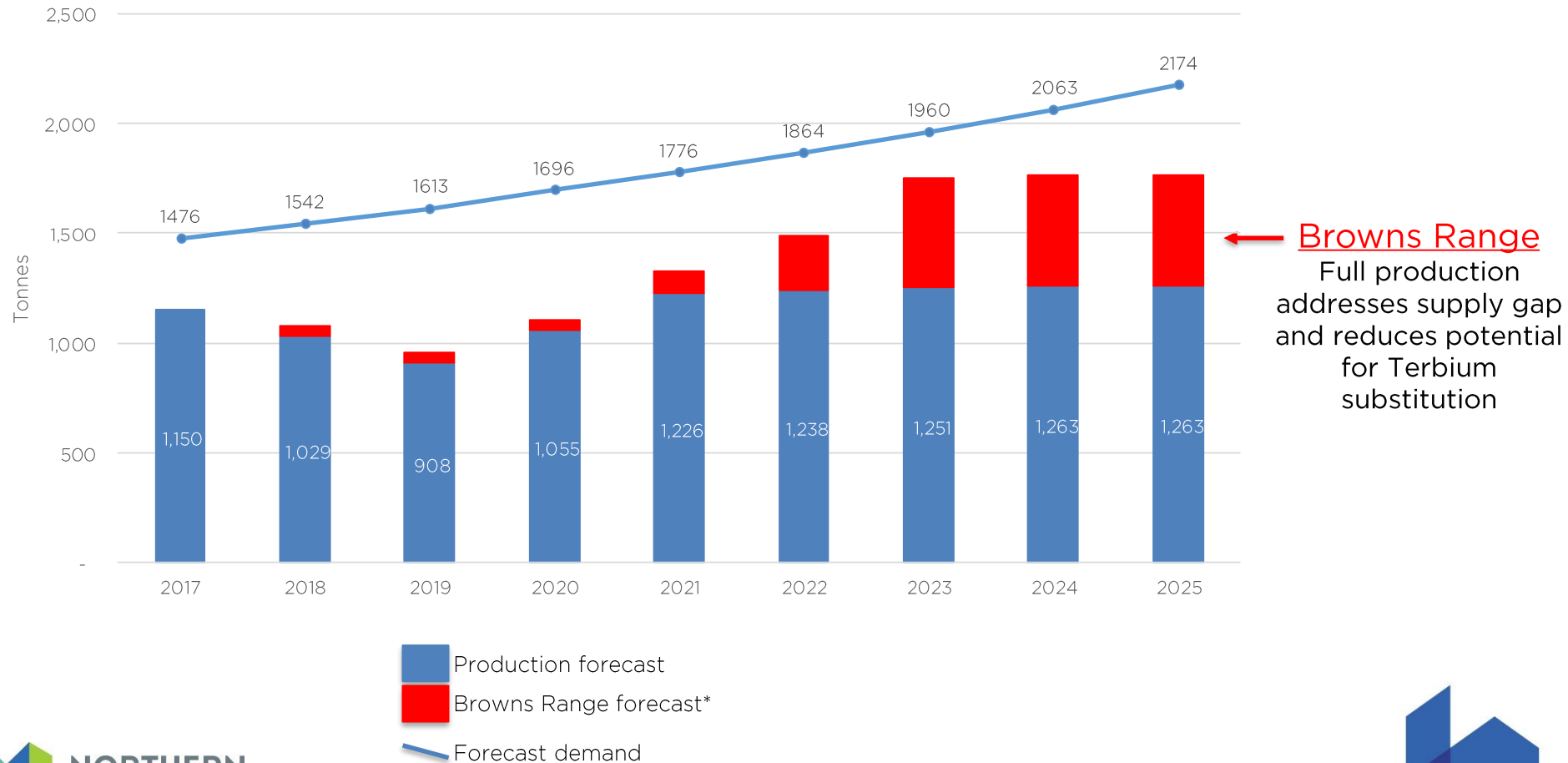
# Heavy rare earths crucial to growth of electric vehicle sector



- NdDyFeB permanent magnets used by major electric vehicle (EV) manufacturers require Dysprosium and Terbium as key additives for high performance
- Changing policy settings by European governments and future development plans by global carmakers have resulted in demand for EVs reaching an inflection point
- Permanent magnets account for 25% of rare earth demand in tonnes and 80% in value and the increasing rate of market acceptance has translated into significantly higher prices for heavy rare earth elements specifically
- UBS has increased forecasts on EV production as a consequence of earlier than expected EV cost parity, with EV sales expected to grow from 1.2 million in 2015 to >20 million by 2020

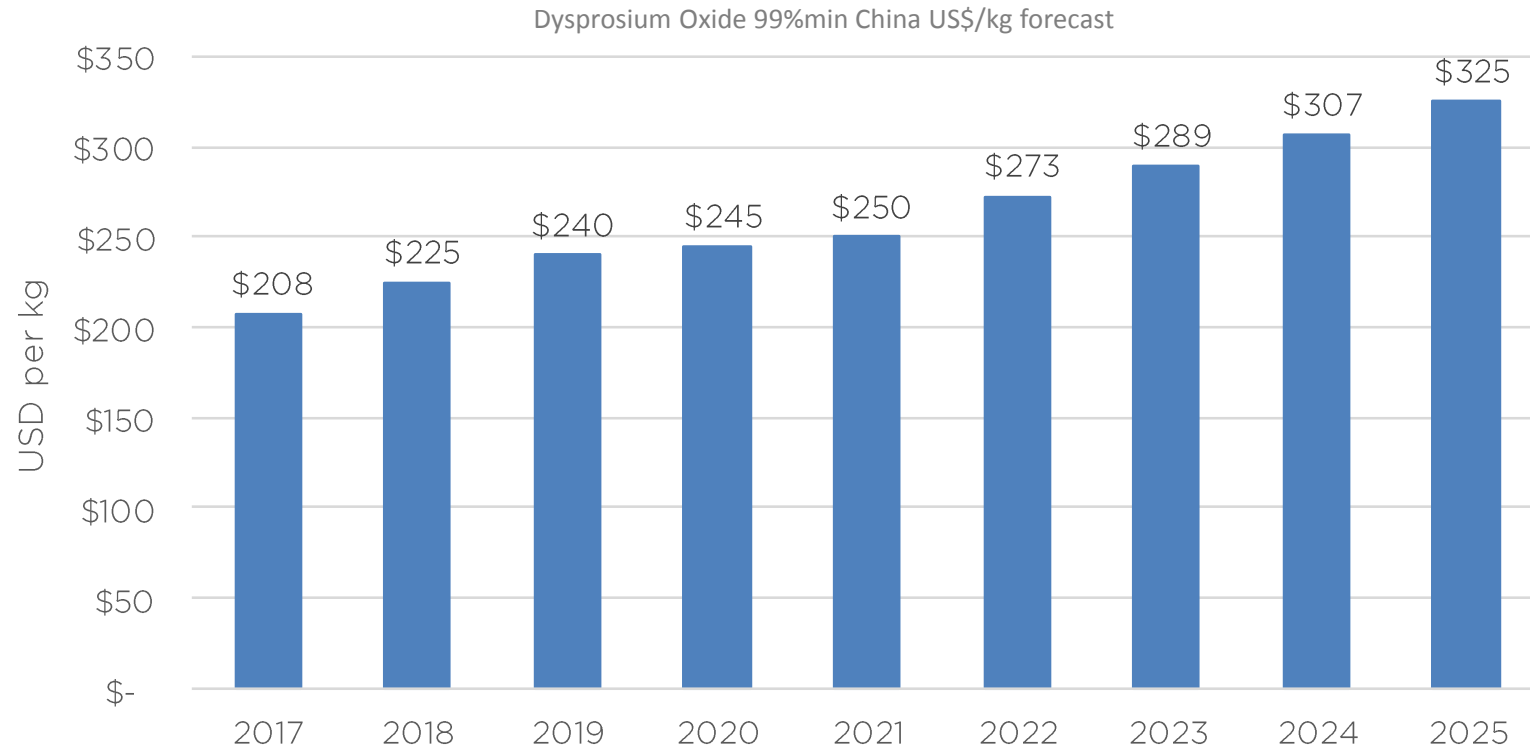


# Browns Range supply reduces substitution risk

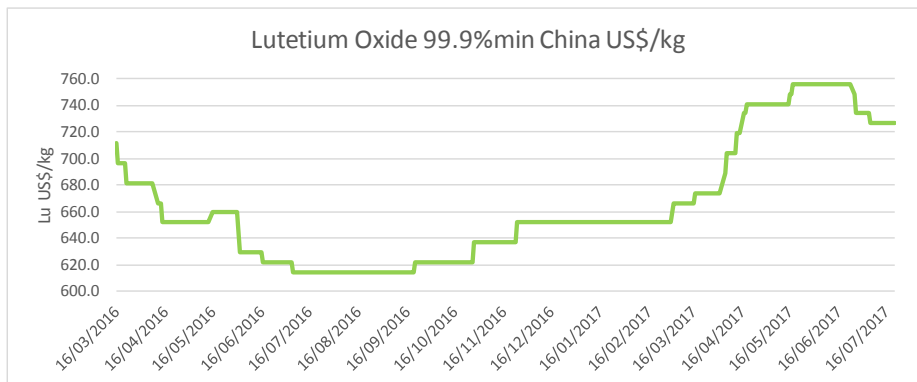
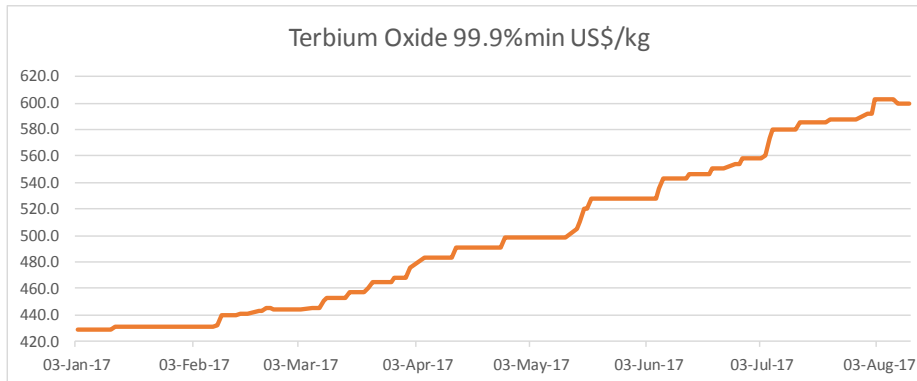




# Dysprosium demand driving price trend



# HRE – sustainable pricing



Increased demand from new EV sales coupled with crackdown on illegal mining in China is positively impacting prices





# Three stage approach to full scale production

## Stage 1

### TEST PILOT PLANT

- 10% of full scale capacity
- Production – July 2018
- Develop, mining, processing & offtake experience
- 573tpa contained TREO
- 72k tpa throughput beneficiation plant

**COMMENCED**

## Stage 2

### REFINE PROJECT

- Reduce mining cost - modify mining method
- Boost production - increase head grade
- Develop premium product - yttrium rejection
- Increase reserve - drilling

## Stage 3

### BUILD FULL SCALE

- 585,000tpa operation
- 1,500,000kg TREO in a premium product
- Significant dysprosium supplier
- Initial 11 year life with significant upside

measured . sustainable . achievable



# Why a continuous pilot plant?



# Pilot Plant financing

## Financing

Sales Agreement

Processing Plant

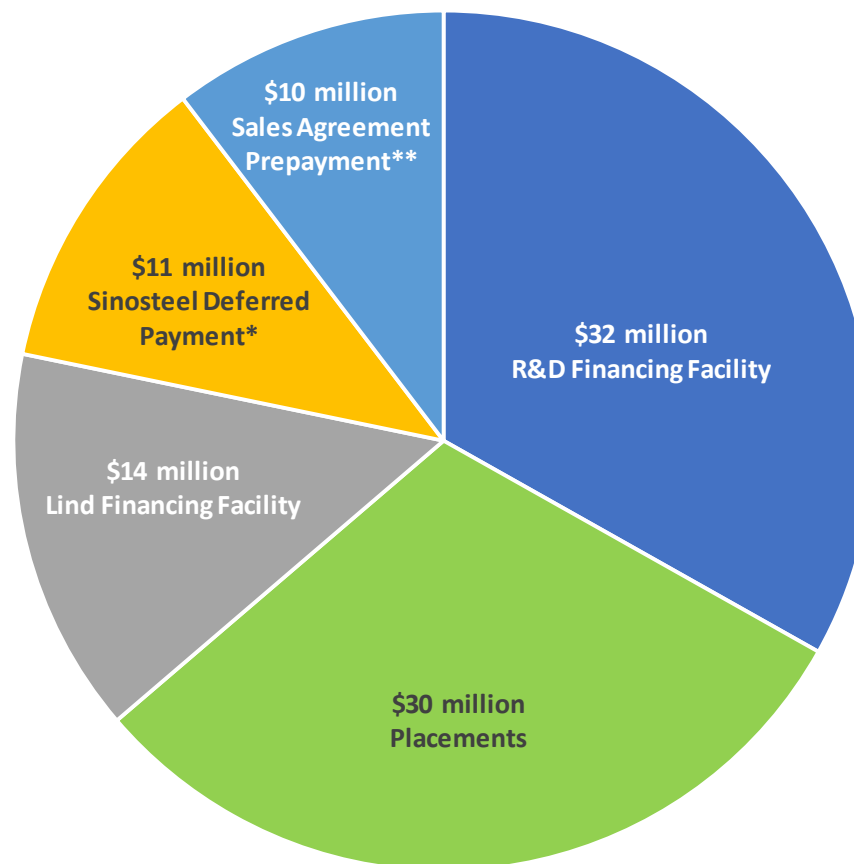
Open Pit Mining

Office & Camp

Tailings Dam

Schedule

Feasibility



\* Sinosteel MECC has agreed to defer 20% of its contract amount for 24 months, with the ability to convert into Northern Minerals' shares

\*\* JFMAG has agreed to prepay \$10m, with the ability to convert into Northern Minerals' shares



# Sales agreements secured



Financing

Sales Agreement

Processing Plant

Open Pit Mining

Office & Camp

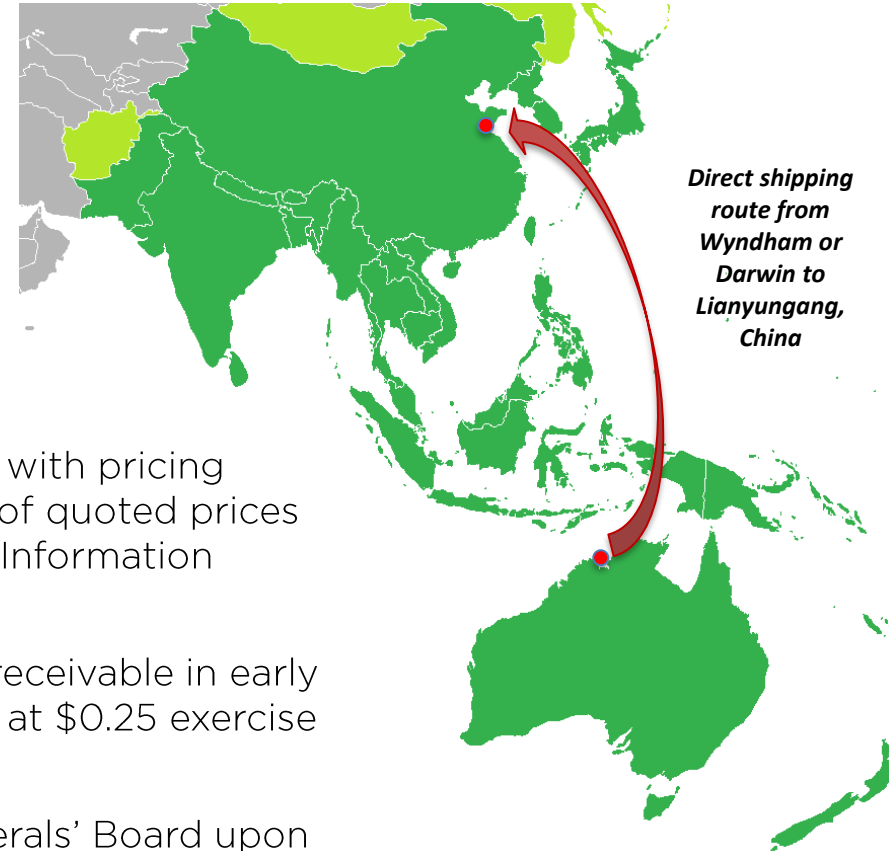
Tailings Dam

Schedule

Feasibility

100% of Browns Range Pilot Plant production to be purchased by Lianyungang Zeyu New Materials Sales Co Ltd (JFMAG), a 51% owned subsidiary of Guangdong Rare Earths Group.

- Terms based off CIF Incoterms 2010 with pricing referenced from a 2-month average of quoted prices on Asian Metals and Beijing Ruidow Information Technology.
- Includes A\$10 million pre-payment, receivable in early 2018 and 40 million unlisted options at \$0.25 exercise price.
- Representative to join Northern Minerals' Board upon receipt of funds



# Pilot Plant Processing Plant



Financing

Sales Agreement

Processing Plant

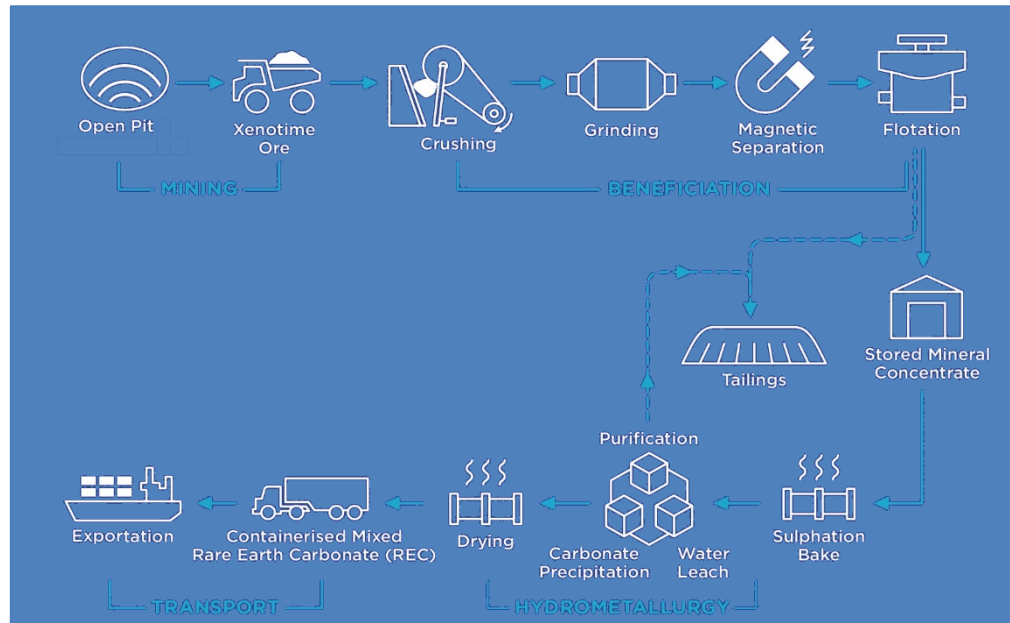
Open Pit Mining

Office & Camp

Tailings Dam

Schedule

Feasibility



Project Component:  
Modular processing plant

Contractor:  
Sinosteel MECC

Annual Production:  
60,000tpa (based on 10 operating months per year)

Capital Cost:  
A\$39 million

Status:  
Under construction in China

# Pilot Plant Processing Plant

Financing

Sales Agreement

 Processing Plant

Open Pit Mining

Office & Camp

Tailings Dam

Schedule

Feasibility



Fabrication works underway in China



# Open Pit Mining

Financing

Sales Agreement

Processing Plant

Open Pit Mining

Office & Camp

Tailings Dam

Schedule

Feasibility



**Project Component:**

Open Pit Mining

**Scale:**

180,000t ore mined

**Contractor:**

MACA Limited

**Total Cost:**

A\$6 million

**Status:**

Mining commenced June 2017

Entire mining project to be completed in November 2017



# Office and camp infrastructure

Financing

Sales Agreement

Processing Plant

Open Pit Mining

Office & Camp

Tailings Dam

Schedule

Feasibility



## Details:

Camp increased to 49 personnel

Additional temporary accommodation to be installed

New office and workshop facilities

## Status:

Camp extension installed and small modifications to complete

## Capital Cost:

A\$1 million



Financing

Sales Agreement

Processing Plant

Open Pit Mining

Office & Camp

Tailings Dam

Schedule

Feasibility



- Northern Minerals has partnered with The Wunan Foundation for the establishment of an \$8.1 million indigenous training-to-work facility at Browns Range.
- The Federal Government, under the Building Better Regions Fund (BBRF) has provided funding of \$4.8 million towards the programme.
- Construction of the facility will commence soon.



# Tailings dam construction

Financing

Sales Agreement

Processing Plant

Open Pit Mining

Office & Camp

 Tailings Dam

Schedule

Feasibility



## Details:

Construction of tailings storage facility

## Status:

Commenced June 2017 using waste material from open pit mining

## Contractor:

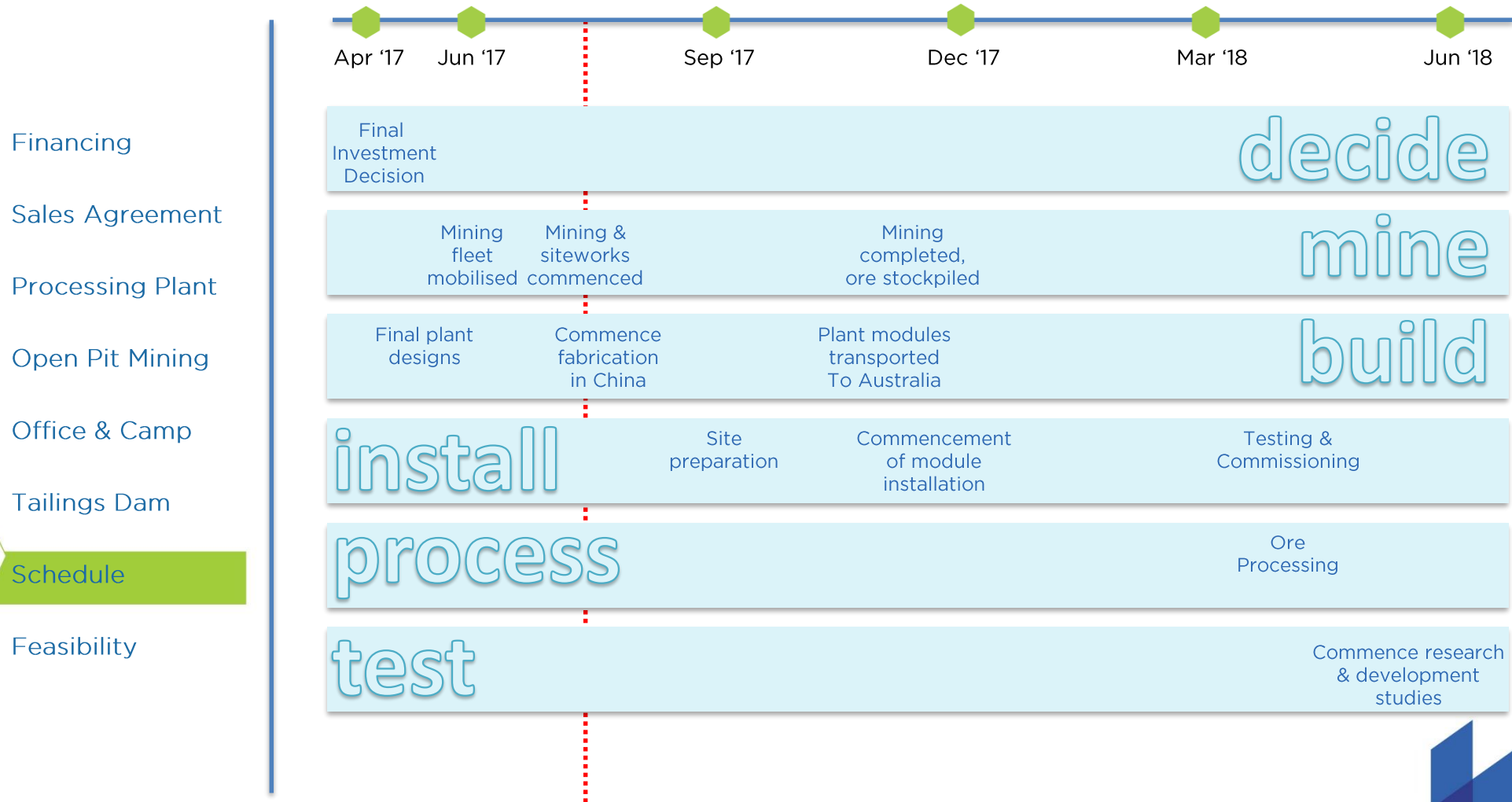
MACA Limited

## Capital Cost:

A\$1.2 million



# Project development schedule





# Pilot Plant feasibility

Financing

Sales Agreement

Processing Plant

Open Pit Mining

Office & Camp

Tailings Dam

Schedule

Feasibility

- The three-year pilot project has been designed to assess the technical and economic feasibility of the proposed full-scale development.
- Key aspects of assessment during the Pilot Plant phase:
  - Mining and ore variability;
  - Flowsheet and recovery optimisation;
  - Water and environmental considerations;
  - Transport and shipping logistics;
  - End user product specifications; and
  - Long term dysprosium market dynamics.
- These determining factors will be incorporated into an updated feasibility study for the proposed full-scale operation.

# Key Personnel and Partners

## Key Site Personnel:

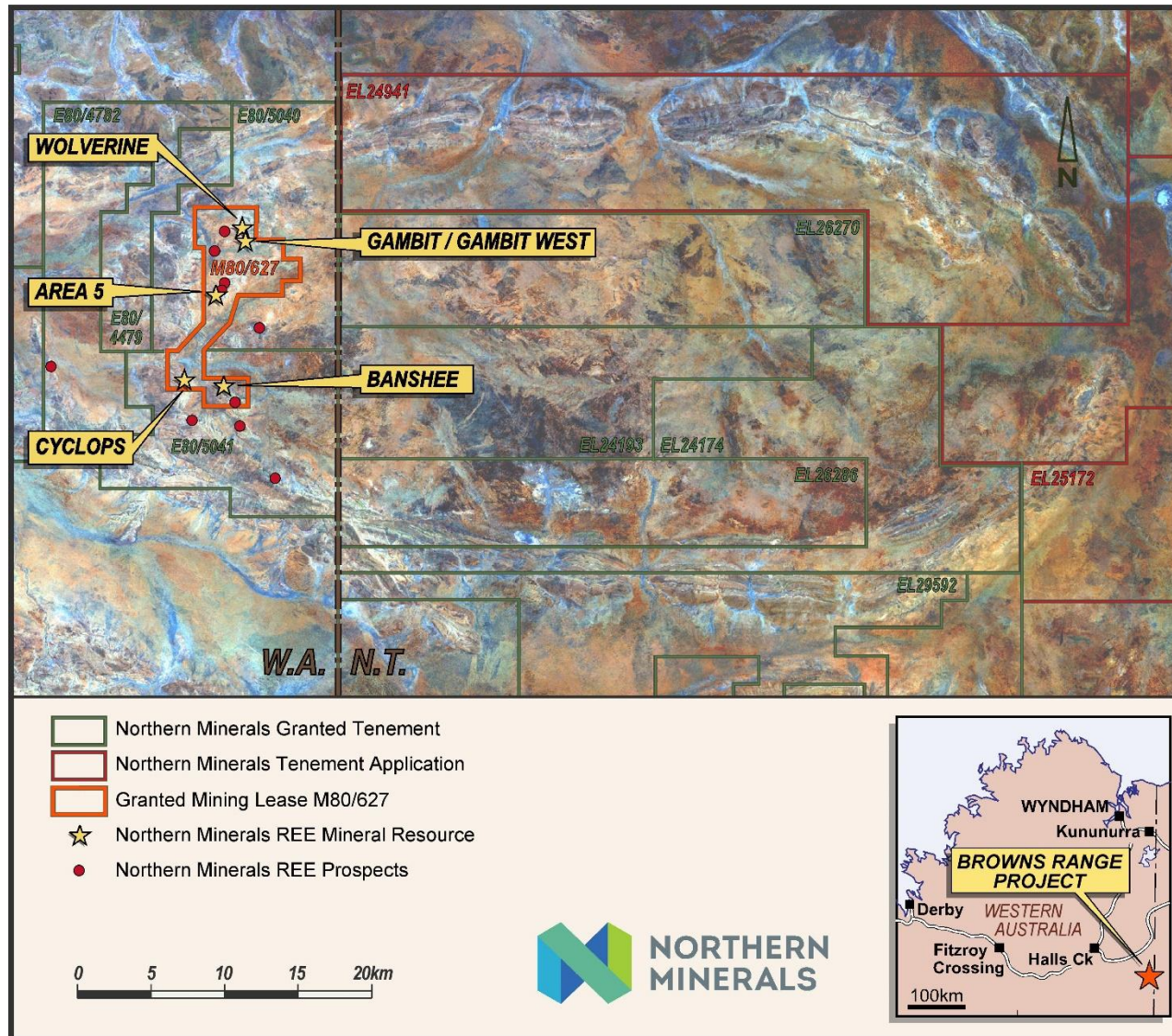
Chris Lee – Resident Manager  
Eben Van Rooyen – Project Manager  
Louis de Klerk – R&D Manager



Powering Technology.



# Blue Sky potential

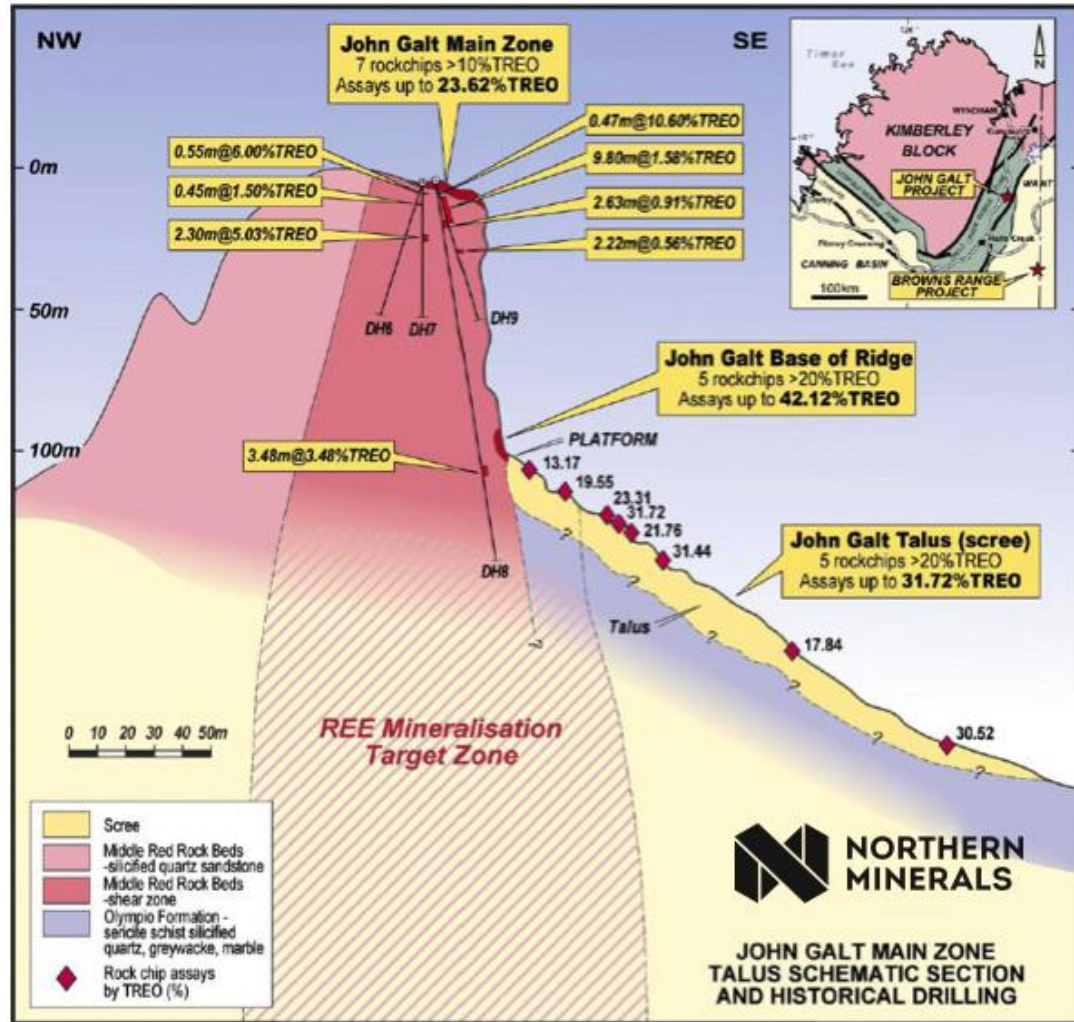


The Browns Range dome is a massive geological feature covering 1,500km<sup>2</sup> and stretching 60km x 30km most of which hasn't been effectively explored

- JORC Resource supporting an 11 year full scale operation
- Conservative exploration target to add additional 9 years of JORC Resources
- 170 defined targets yet to be drilled



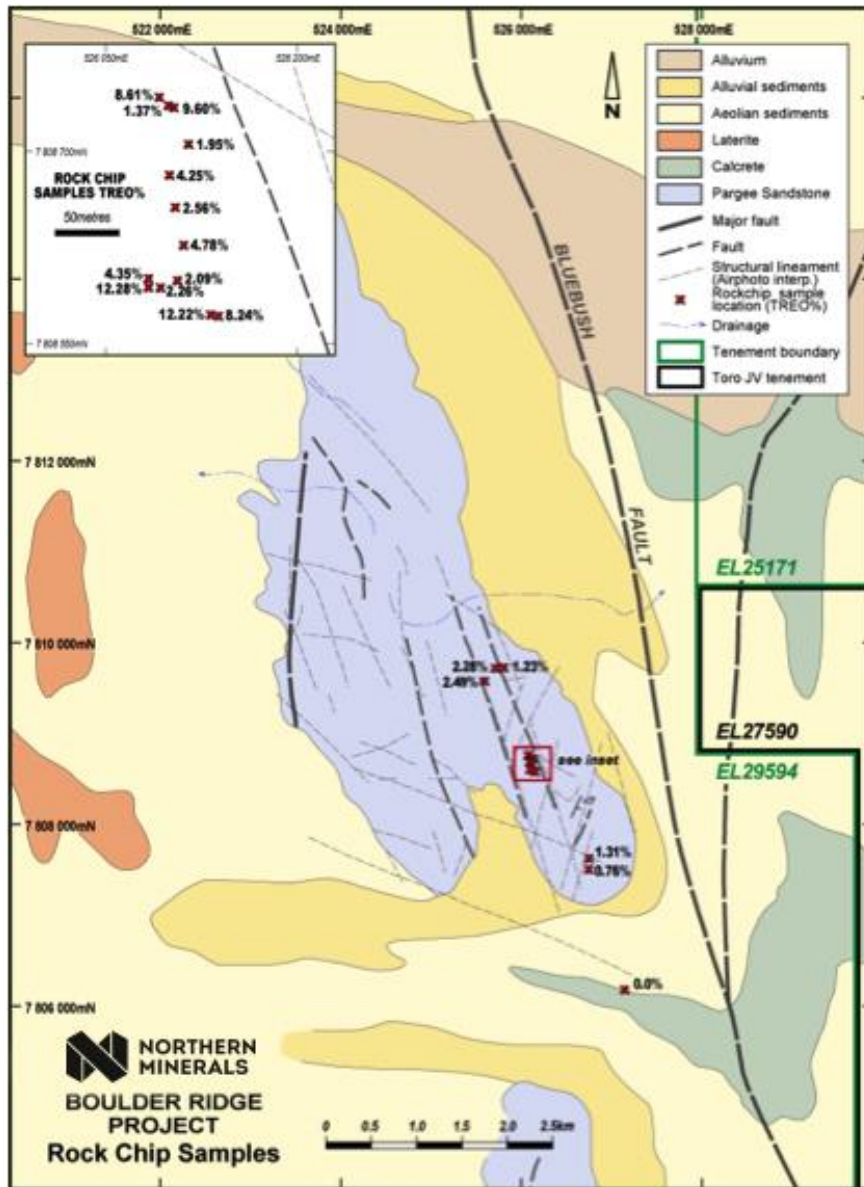
# Beyond Browns Range: John Galt



- Rock chip samples up to 42% TREO with approximately 95% Heavy REO
- Preliminary metallurgical tests indicate excellent recovery rates (>90%)
- Potential for concentrate grades >40%
- High grade mineralisation in talus (scree) material
- Hard-rock source of scree is the primary target



# Beyond Browns Range: Boulder Ridge



- Rock chip samples from the Boulder Ridge project confirm high-grade Heavy Rare Earths (HRE)
- Best results exceed 12% TREO, including up to 1.15% Dysprosium, with a dominance of HRE – up to 99%.
- Reinforces significant growth potential in Browns Range and Tanami regions.



# Off and racing in 2017

- Innovative multi-faceted project financing secured:
  - \$32m R&D financing facility
  - \$30m Placements at premium
  - \$14m Lind financing facility signed
  - \$11m Sinosteel MECC deferred payments
  - \$10m JFMAG sales agreement prepayment
- Design completed
- Pilot Plant Project approved by Board
- Mining and bulk earthworks commenced
- Fabrication under way in China and procurement orders placed





# Corporate Overview



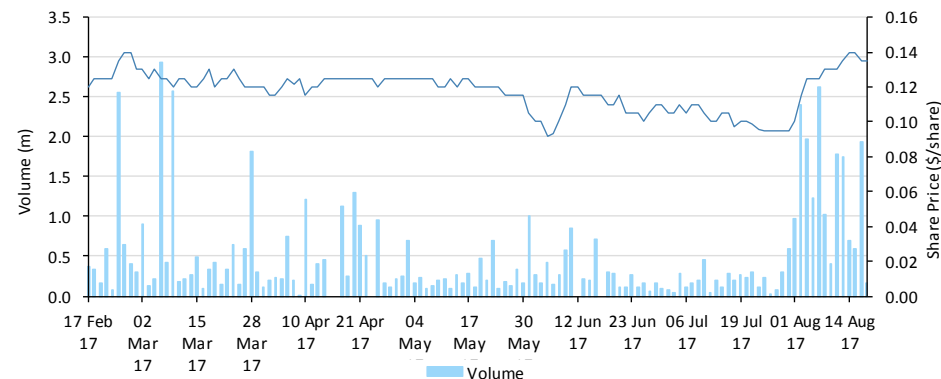
Major shareholders	18 August 2017
ACIIG	26.3%
Huatai Mining	21.5%
Jien Mining	3.5%
Board & Management	2.4%
Remaining Top 20	21.3%
Other	25.0%

## Market capitalisation \$98M

(at 18 August 2017 @ \$0.13)

Ordinary Shares	754M
Options and Performance Rights	72M
Cash (30 June 2017)	\$8.5M

Northern Minerals Limited Share Price Performance





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# Northern Minerals: Building an Australian greenfields discovery

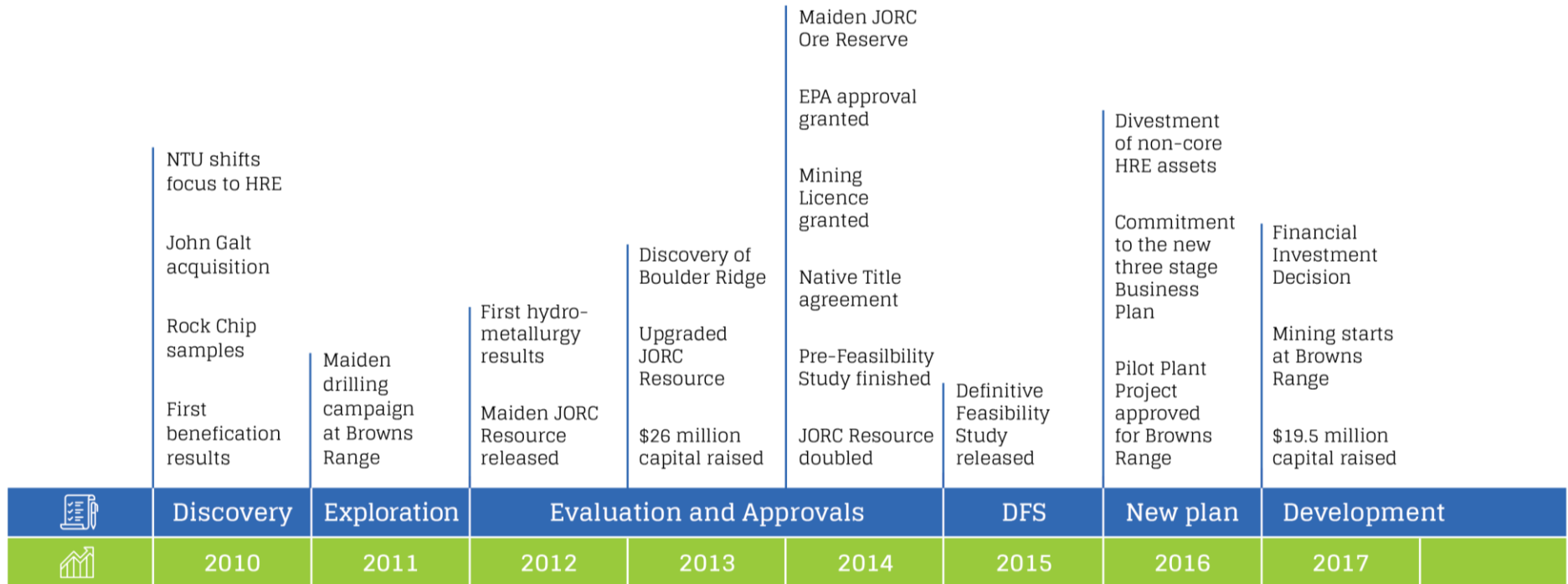




# Appendices



# Browns Range – A Seven Year Journey





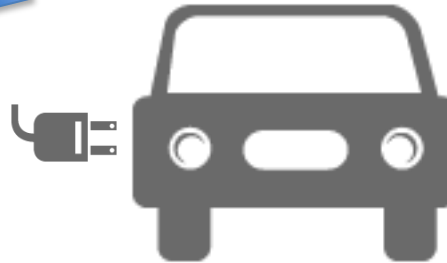
# Global EV growth drivers



Battery technology  
eliminating range technology



Regulatory support  
for lower emission  
vehicles

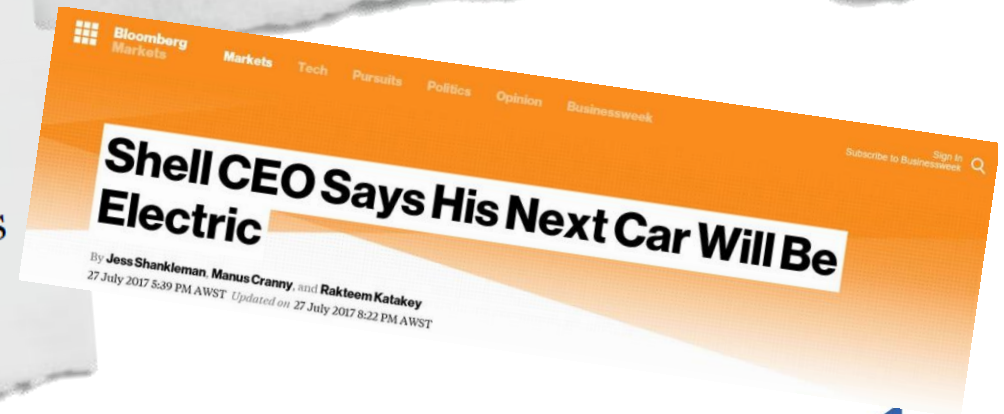


Consumer demand  
reaches inflection  
point



EVs approaching price  
parity with combustion  
vehicles

# EV acceptance reaches inflection point in 2017



Powering Technology.





# Chinese carmakers to dominate EV production



Powering Technology.

# Mineral Resources

Deposit	Category	Mt	TREO	Dy <sub>2</sub> O <sub>3</sub>	Y <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	HREO	TREO
			%	Kg/t	Kg/t	Kg/t	%	Kg
<b>Wolverine</b>	Indicated	2.99	0.83	0.73	4.86	0.11	89	24,952,000
	Inferred	1.97	0.89	0.76	5.13	0.11	88	17,609,000
	Total <sup>1</sup>	4.97	0.86	0.74	4.97	0.11	89	42,560,000
<b>Gambit West</b>	Indicated	0.27	1.26	1.07	7.06	0.14	90	3,424,000
	Inferred	0.12	0.64	0.54	3.67	0.07	85	753,000
	Total <sup>1</sup>	0.39	1.07	0.91	6.04	0.12	89	4,177,000
<b>Gambit</b>	Indicated	0.05	1.06	0.92	6.62	0.12	97	533,000
	Inferred	0.06	1.2	1.01	6.8	0.15	95	671,000
	Total <sup>1</sup>	0.11	1.13	0.97	6.72	0.13	96	1,204,000
<b>Area 5</b>	Indicated	1.38	0.29	0.18	1.27	0.03	69	3,953,000
	Inferred	0.14	0.27	0.17	1.17	0.03	70	394,000
	Total <sup>1</sup>	1.52	0.29	0.18	1.26	0.03	69	4,347,000
<b>Cyclops</b>	Indicated	-	-	-	-	-	-	-
	Inferred	0.33	0.27	0.18	1.24	0.03	70	891,000
	Total <sup>1</sup>	0.33	0.27	0.18	1.24	0.03	70	891,000
<b>Banshee</b>	Indicated	-	-	-	-	-	-	-
	Inferred	1.66	0.21	0.16	1.17	0.02	87	3,484,000
	Total <sup>1</sup>	1.66	0.21	0.16	1.17	0.02	87	3,484,000
<b>Total<sup>1</sup></b>	Indicated	4.69	0.70	0.59	3.95	0.09	87	32,862,000
	Inferred	4.28	0.56	0.46	3.15	0.07	87	23,802,000
	Total <sup>1</sup>	<b>8.98</b>	<b>0.63</b>	<b>0.53</b>	<b>3.56</b>	<b>0.08</b>	<b>87</b>	<b>56,663,000</b>

<sup>1</sup> – Rounding may cause some computational discrepancies (TREO (metal) tonnes estimated from Mt x TREO%)



# Ore Reserves

Deposit	Classification	Ore Tonnes	TREO		Dy <sub>2</sub> O <sub>3</sub>		Tb <sub>4</sub> O <sub>7</sub>		Y <sub>2</sub> O <sub>3</sub>	
			kg/t	kg Contained	kg/t	kg Contained	kg/t	kg Contained	kg/t	kg Contained
OPEN PIT										
Wolverine	Probable	833,000	6.15	5,124,000	0.55	460,000	0.08	66,000	3.59	2,989,000
Gambit West	Probable	219,000	10.10	2,212,000	0.83	182,000	0.11	25,000	5.52	1,209,000
Gambit	Probable	37,000	8.05	298,000	0.68	25,000	0.09	3,000	4.74	176,000
Area 5	Probable	467,000	2.24	1,048,000	0.14	65,000	0.02	10,000	0.99	463,000
UNDERGROUND										
Wolverine	Probable	2,104,000	8.00	16,833,000	0.70	1,483,000	0.10	221,000	4.71	9,908,000
Gambit West	Probable	90,000	9.54	860,000	0.88	79,000	0.11	10,000	5.78	521,000
RESERVE										
Total	Probable <sup>1</sup>	3,750,000	7.03	26,375,000	0.61	2,294,000	0.09	335,000	4.07	15,266,000

<sup>1</sup> Rounding may cause some computational discrepancies

# Pilot plant: targeted production

- Mixed RE carbonate (REC) produced
- Product specification available for REC
- REC samples validated by several downstream separators
- REC suitable for solvent extraction separation
- Low thorium and uranium levels

REO contained in mixed RE carbonate	Annual production (000s kgs)
Lanthanum	5.8
Cerium	15.2
Praseodymium	2.8
Neodymium	10.6
Samarium	11.4
Europium	2.4
Gadolinium	34.8
Terbium	6.7
Dysprosium	49.4
Holmium	13.5
Erbium	39.3
Thulium	5.6
Ytterbium	33.1
Lutetium	4.5
Yttrium	337.6
<b>Total TREO produced</b>	<b>573</b>

Figures may not add due to rounding  
 TREO = Total Rare Earth Oxides- Total of Dy<sub>2</sub>O<sub>3</sub>, La<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub>, Pr<sub>6</sub>O<sub>11</sub>, Nd<sub>2</sub>O<sub>3</sub>, Sm<sub>2</sub>O<sub>3</sub>, Eu<sub>2</sub>O<sub>3</sub>, Gd<sub>2</sub>O<sub>3</sub>, Tb<sub>4</sub>O<sub>7</sub>, Ho<sub>2</sub>O<sub>3</sub>, Er<sub>2</sub>O<sub>3</sub>, Tm<sub>2</sub>O<sub>3</sub>, Yb<sub>2</sub>O<sub>3</sub>, Lu<sub>2</sub>O<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>



# NTU Board



## Colin McCavana - Non-executive Chairman

Mr McCavana has more than 35 years of management experience worldwide in the earthworks, construction and mining industries.

## George Bauk - Managing Director / CEO

George is an experienced executive, with over 25 years' experience in the resources industry. Prior to Northern Minerals, George held global operational and corporate roles with WMC Resources, Arafura Resources and Indago Resources.

## Adrian Griffin - Non-executive Director

An Australian trained mining professional with exposure to metal mining and processing throughout the world, Mr Griffin has been involved in the development of extraction technology for platinum group metals and agricultural commodities.

## Nan Yang - Non-executive Director

Mr Yang is an Australian mining engineer with more than 10 years' experience in mine planning, design, and mergers and acquisitions.

## Yanchung Wang - Non-executive Director (not in photo)

Ms Wang acts as a strategic investor for a number of Chinese based companies. Ms Wang is Vice Chairman of Conglin Baoyuan International Investment Group and also a Director of Huachen.

## Bin Cai - Non-executive Director (alternate)

Bin is the MD of Conglin International Investment Group Pty Ltd based in Brisbane. He has a record of successful strategic investments in emerging Australian resources companies.

# Executive Team



**Mark Tory**  
**Chief Financial Officer**

Mark is a Chartered Accountant with 25 years of professional experience in the mining industry and accounting professions. Prior to Northern Minerals, Mark held senior positions at Crescent Gold Limited, Anglo American Exploration and Homestake Gold (now Barrick Gold).



**Robin Jones**  
**Chief Operating Officer**

Robin has more than 20 years experience in the mining industry, the majority of which has been in the assessment and development of resource projects from scoping study level through to operation. Robin has held senior management positions in PGM, nickel, copper, gold and uranium projects in Australia, RSA and China.



**Robin Wilson**  
**Exploration Manager**

Robin has held senior exploration positions in several exploration and mining companies, including Polaris Metals, Tanganyika Gold, Troy Resources and CRA Exploration. In addition, he spent 5 years working in oil and gas exploration for Woodside Energy.



**Christopher Lee**  
**Resident Manager**

Chris is a degree qualified mining engineer with almost 30 years' experience predominately in open cut gold and iron ore mining operations through Western Australia. He has extensive mine design, planning, scheduling and management capabilities and is a key addition to our management team.



**Eben Van Rooyen**  
**Project Manager**

Mr Van Rooyen is a Project Manager with an electrical and mechanical engineering background with more than 35 years experience in the mining industry. Eben has significant gold industry experience in brownfields projects from concept and feasibility through to commissioning.



# The Northern Minerals SPIRIT

