



**NORTHERN  
MINERALS**

Powering Technology.



**Dysprosium** > Permanent Magnets > Electric Motors > Electric Cars

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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  $\text{Sm}_2\text{O}_3$ ,  $\text{Eu}_2\text{O}_3$ ,  $\text{Gd}_2\text{O}_3$ ,  $\text{Tb}_4\text{O}_7$ ,  $\text{Dy}_2\text{O}_3$ ,  $\text{Ho}_2\text{O}_3$ ,  $\text{Er}_2\text{O}_3$ ,  $\text{Tm}_2\text{O}_3$ ,  $\text{Yb}_2\text{O}_3$ ,  $\text{Lu}_2\text{O}_3$ ,  $\text{Y}_2\text{O}_3$



# Four stage approach to full value capture

## Stage 1

### TEST PILOT PLANT

- 10% of full scale capacity
- Production – July 2018
- Develop, mining, processing & offtake experience
- 573tpa contained TREO
- 72ktpa capacity beneficiation plant
- 3,840tpa capacity hydrometallurgical plant

**NEAR COMPLETION**

## Stage 2

### REFINE PROJECT

- Reduce mining cost - modify mining method
- Boost production – increase head grade
- Develop premium product – yttrium rejection
- Funding plan for progressing initiatives

## 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

## Stage 4

### DOWNSTREAM

- Downstream separation of heavy rare earth elements
- Production of dysprosium oxide and terbium oxide
- Wider potential customer base
- Additional value capture
- Funded plan to investigate downstream opportunities

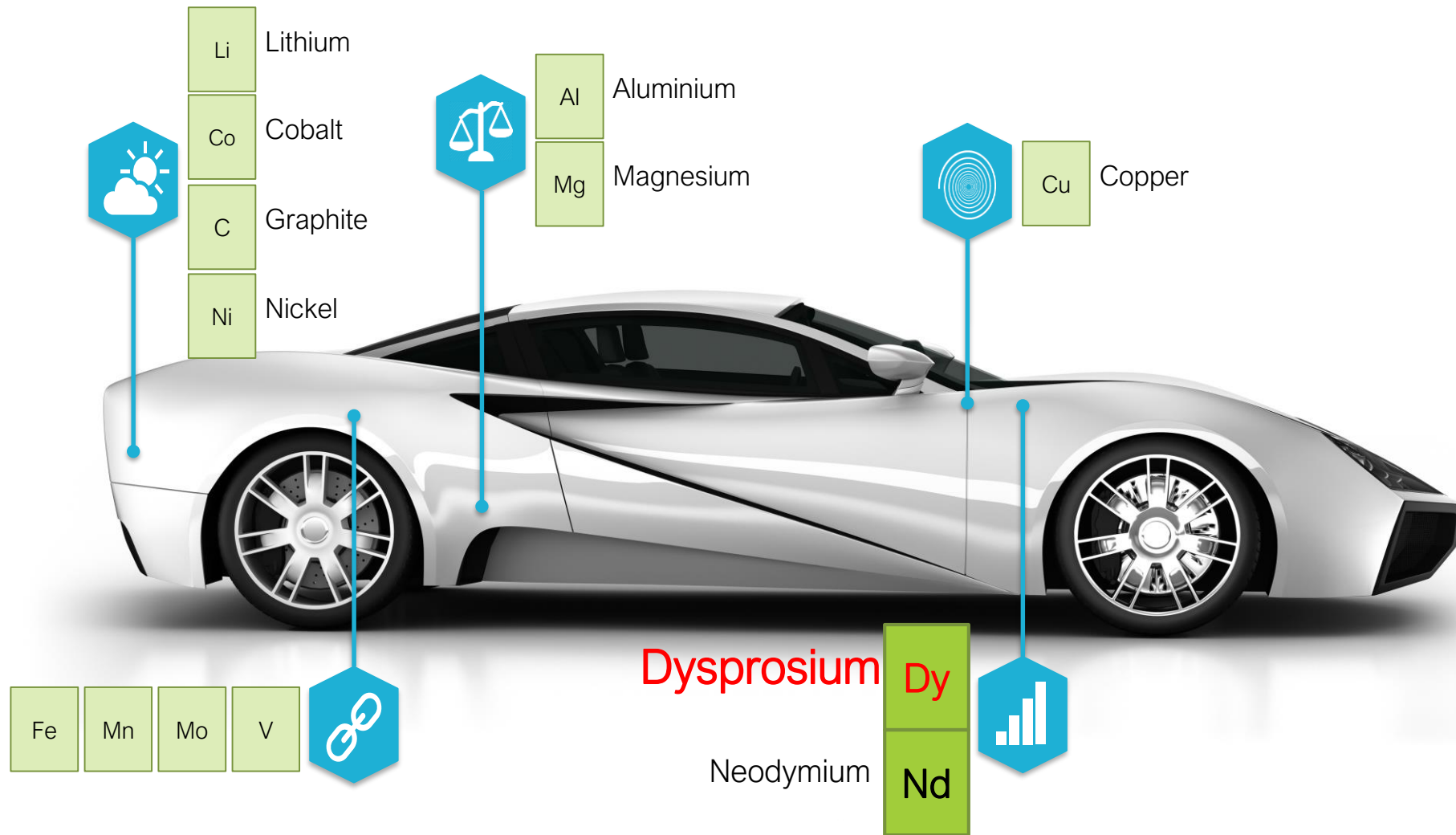
## MINERAL RESOURCES

Extend existing resources at Browns Range  
Explore opportunities at Boulder Ridge and John Galt  
Looking for new LRE projects

measured . sustainable . achievable



# Electric Vehicles – Not just a lithium story!

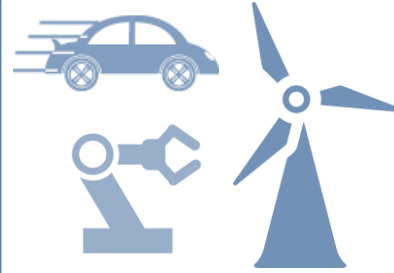


# Dysprosium

66  
**Dy**  
162.5

**99%**

Production from  
China



**Lighter &  
More Efficient**

**20m**

Forecast EV  
sales by 2025

**100g**

Dysprosium per  
electric vehicle

**2,000tpa**

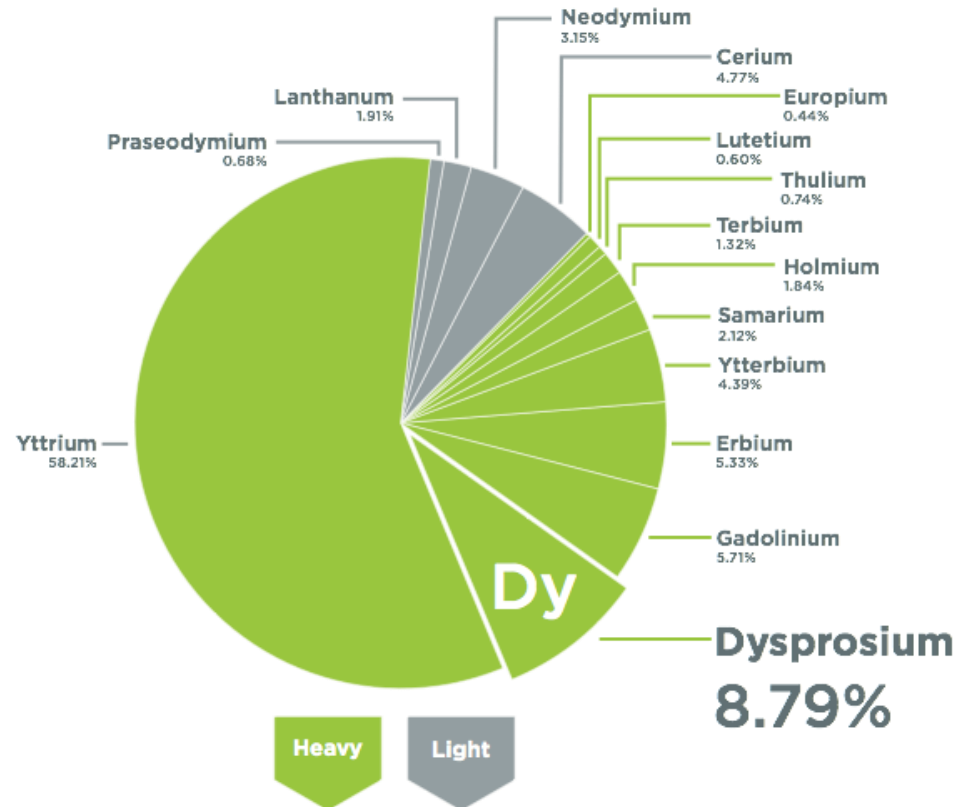
EV demand for  
Dy by 2025



**Government  
mandated change**

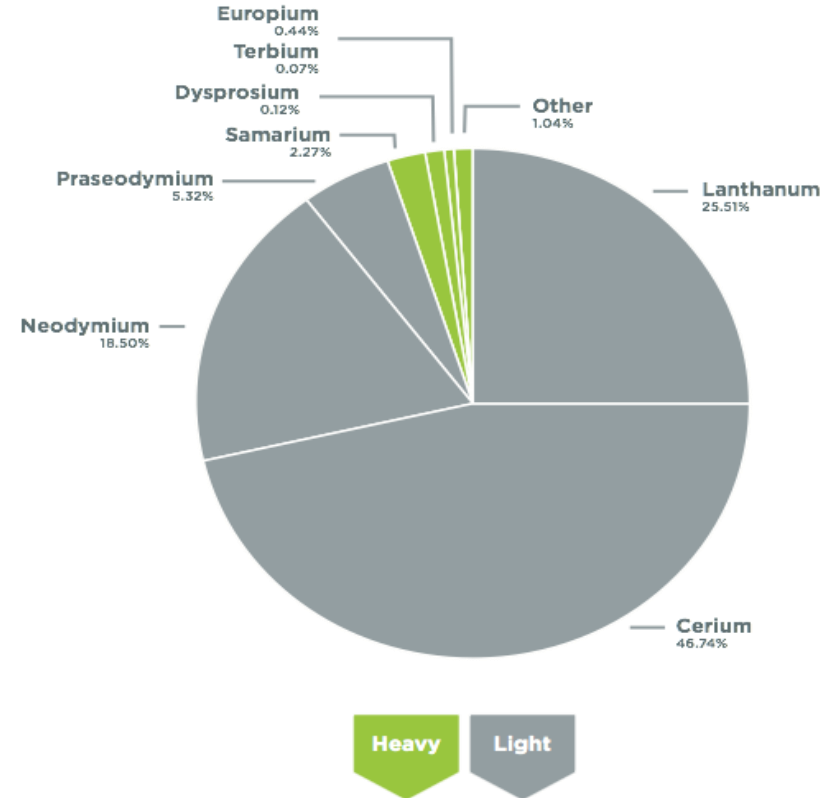
# Northern Minerals Browns Range

Rare earth distribution <sup>1</sup>



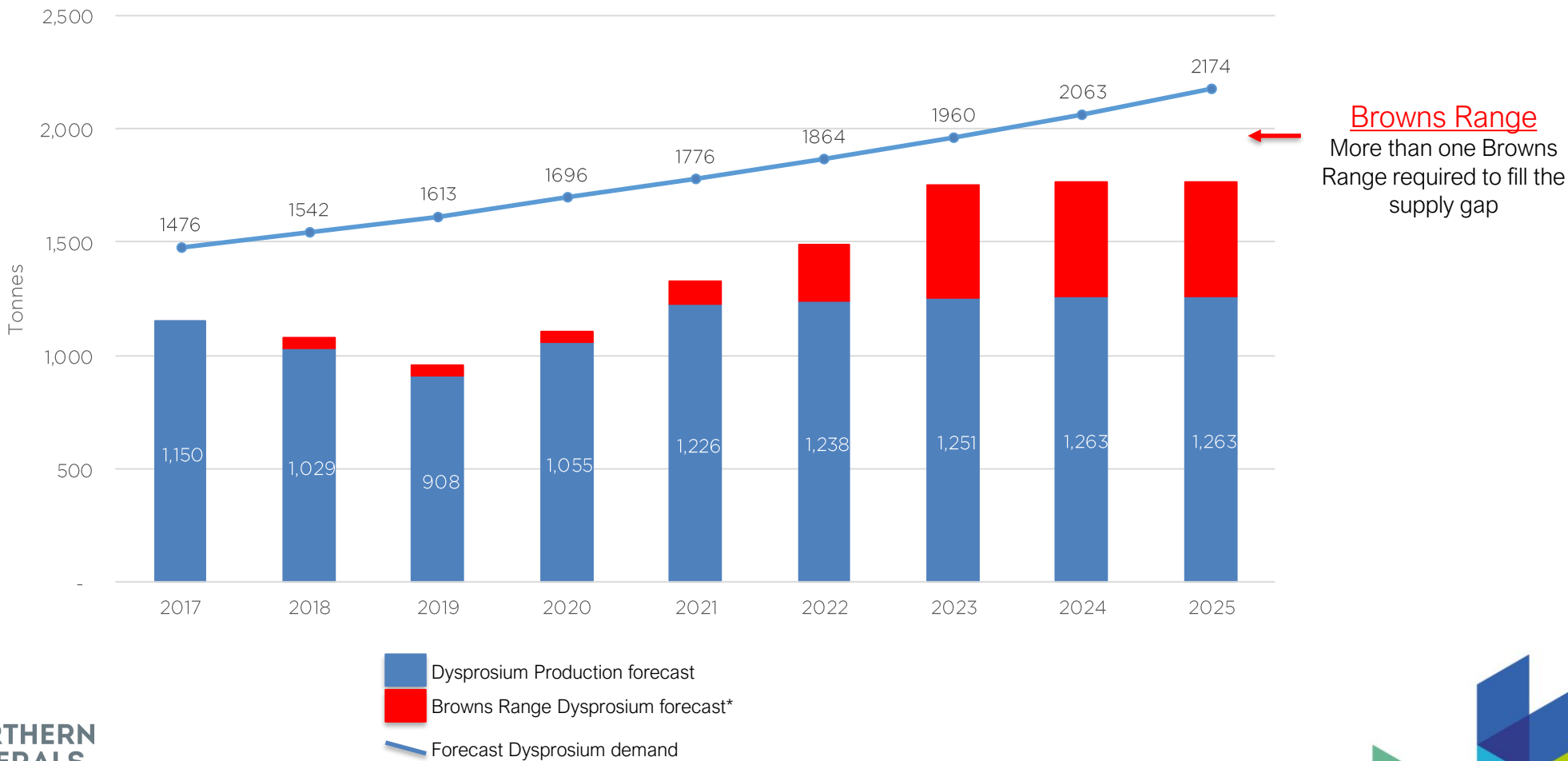
# Lynas Mt Weld

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

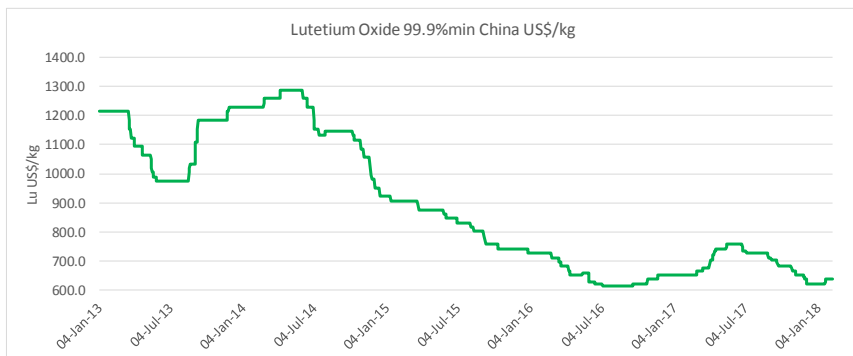
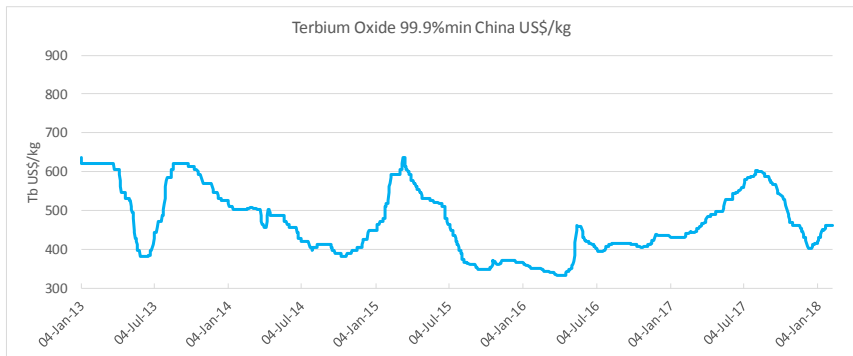
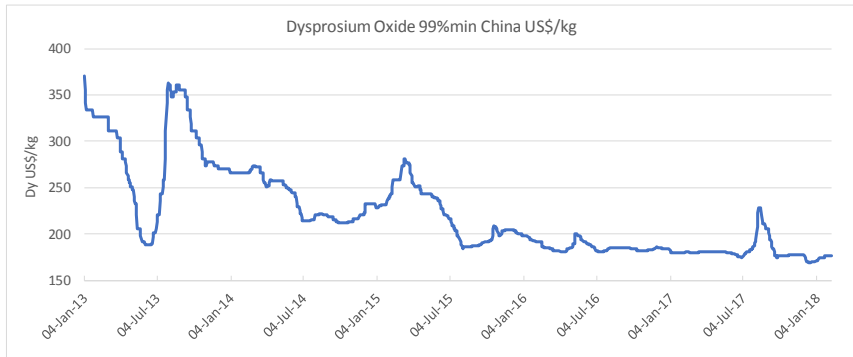


<sup>1</sup> Based on Wolverine Mineral Resource  
<sup>2</sup> Source: Lynas Corporation website

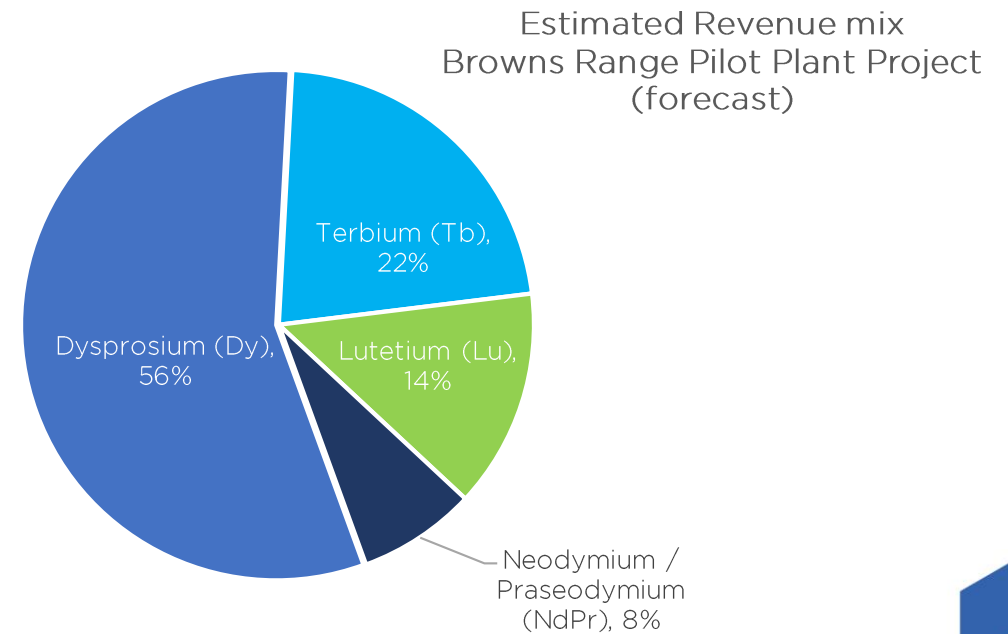
# Browns Range - Filling the Dysprosium supply gap



# HRE – sustainable pricing



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





# Constructing a new industry





In 2017, Northern Minerals completed stacking of raw product ready for processing



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



# Enhancement projects underway



Mining

Processing Plant

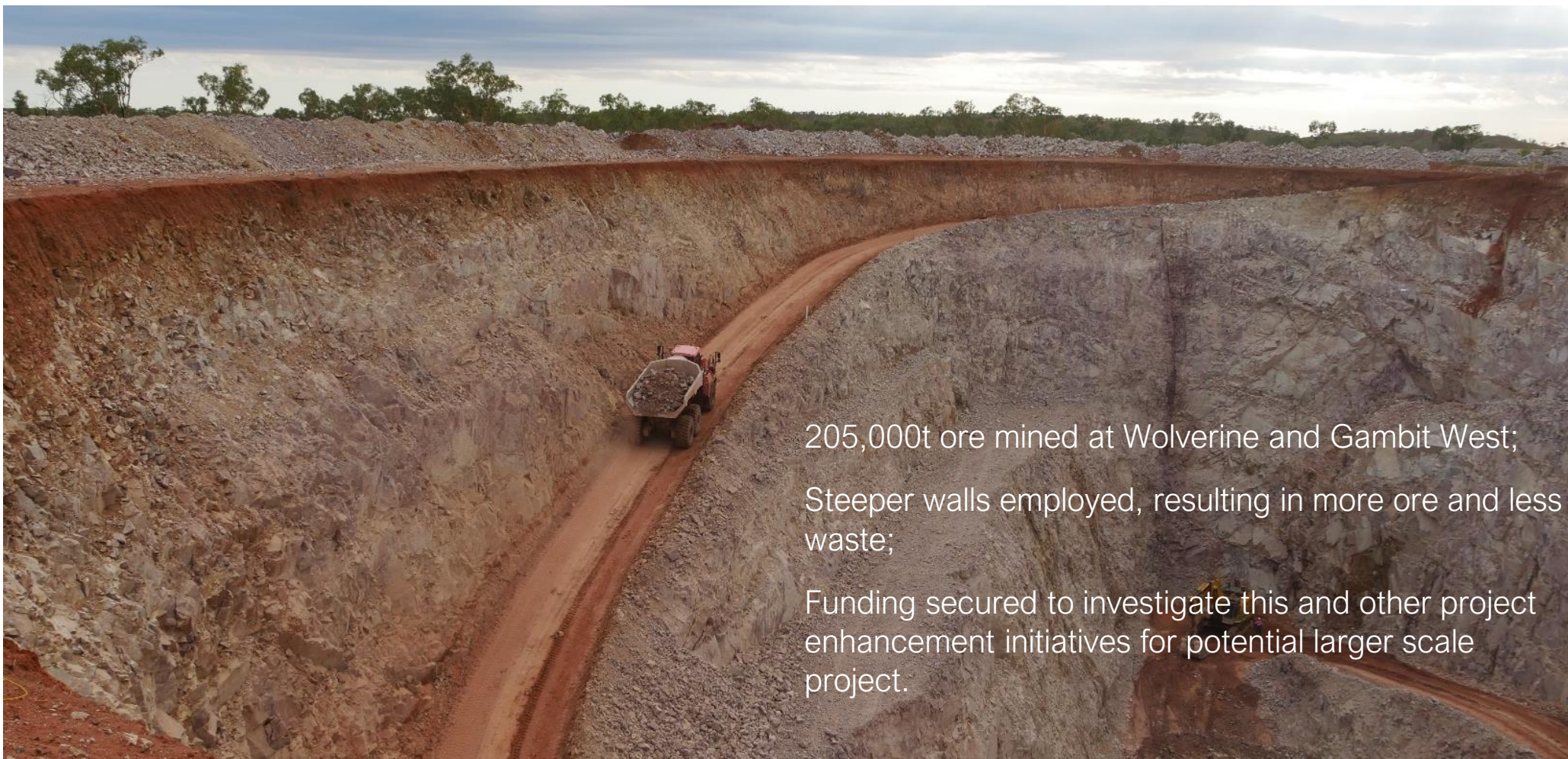
Schedule

Financing

Sales Agreement

Community

Feasibility



205,000t ore mined at Wolverine and Gambit West;

Steeper walls employed, resulting in more ore and less waste;

Funding secured to investigate this and other project enhancement initiatives for potential larger scale project.



# Pilot Plant Flowsheet

Mining

Processing Plant

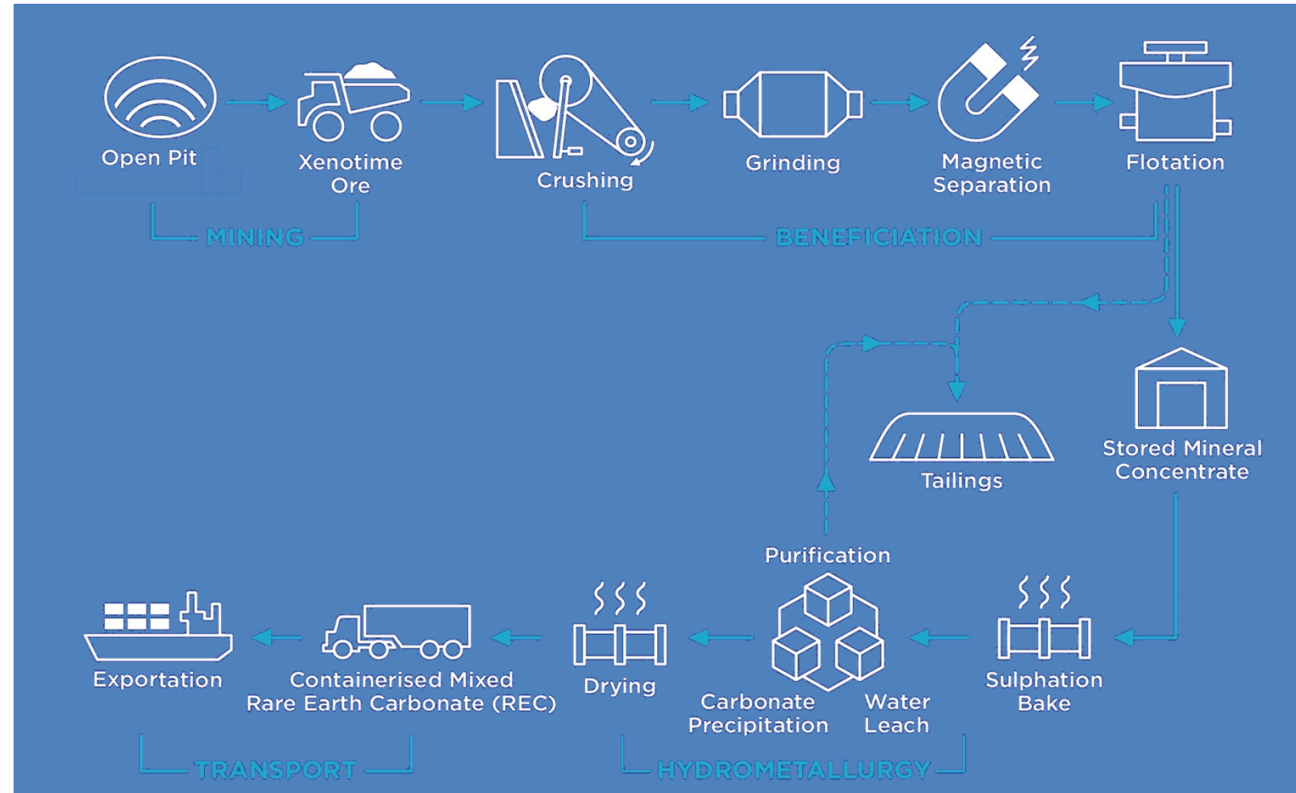
Schedule

Financing

Sales Agreement

Community

Feasibility



**Project Component:**  
Modular processing plant

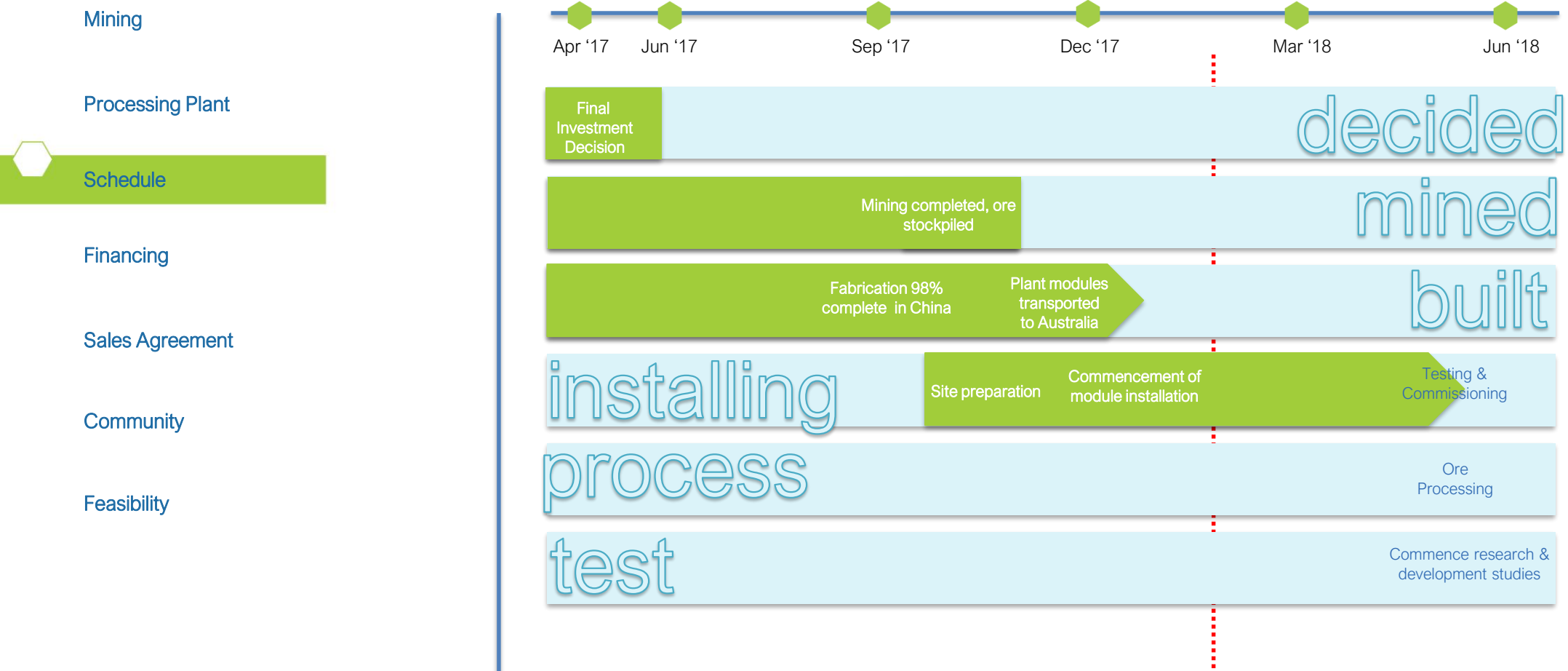
**Contractor:**  
Sinosteel MECC

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

**Capital Cost:**  
A\$39 million

**Status:**  
98% completed in China  
& delivered to site

# Project development schedule





# Financing

Mining

Processing Plant

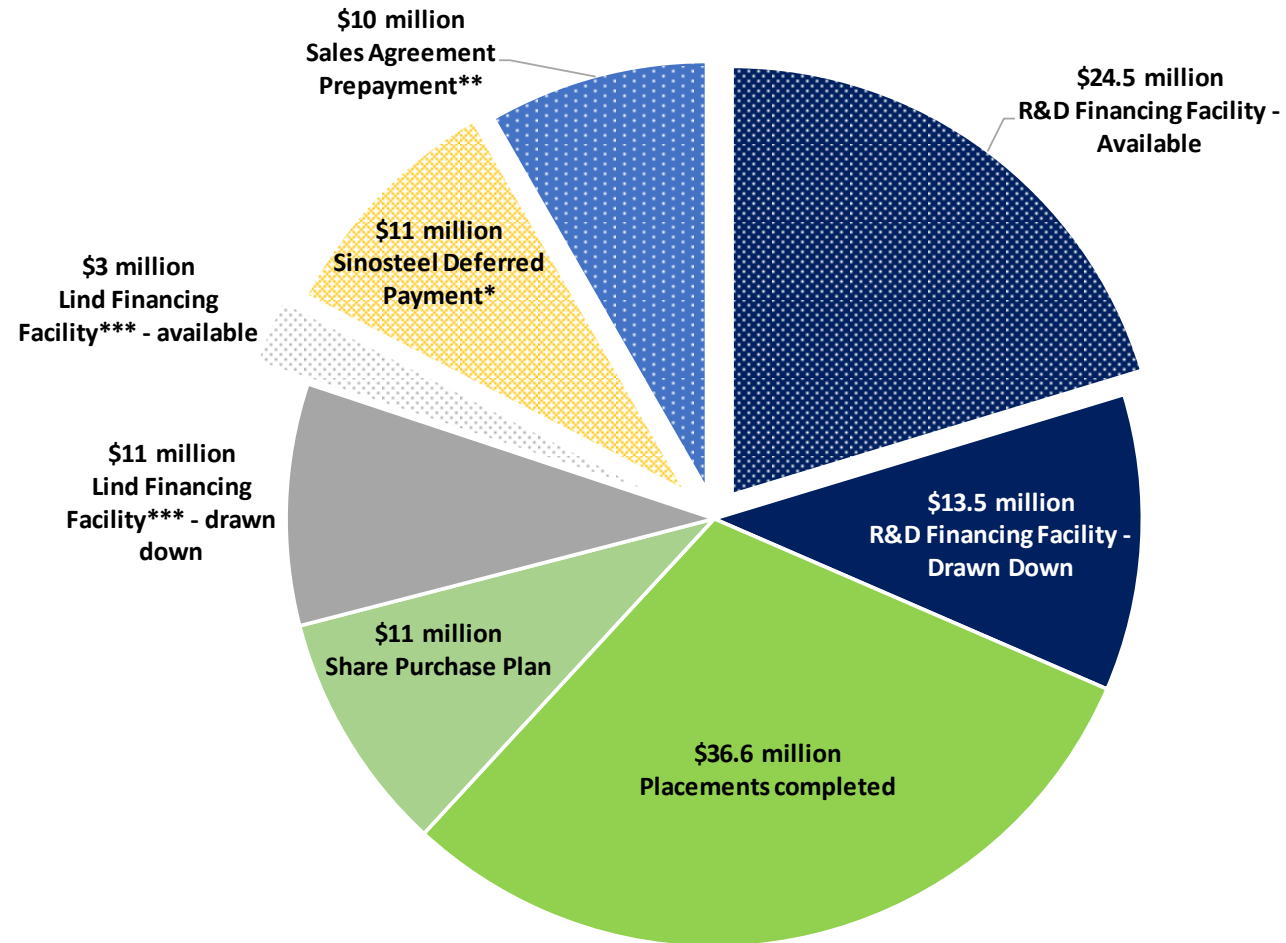
Schedule

Financing

Sales Agreement

Community

Feasibility



\* Sinosteel MECC has agreed to defer 20% of its contract amount for 24 months, with the ability to convert into Northern Minerals' shares at a conversion price of the lessor of \$0.15 per share or 20 day VWAP prior to conversion notice

\*\* JFMAG has agreed to prepay \$10m (expected payment Q1 2018). JFMAG will be issued 40m unlisted options upon receipt of the loan advance with a \$0.25 exercise price.

\*\*\* Northern Minerals has drawn down \$11m of a \$14m financing facility.

# Secure sales agreement



Mining

Processing Plant

Schedule

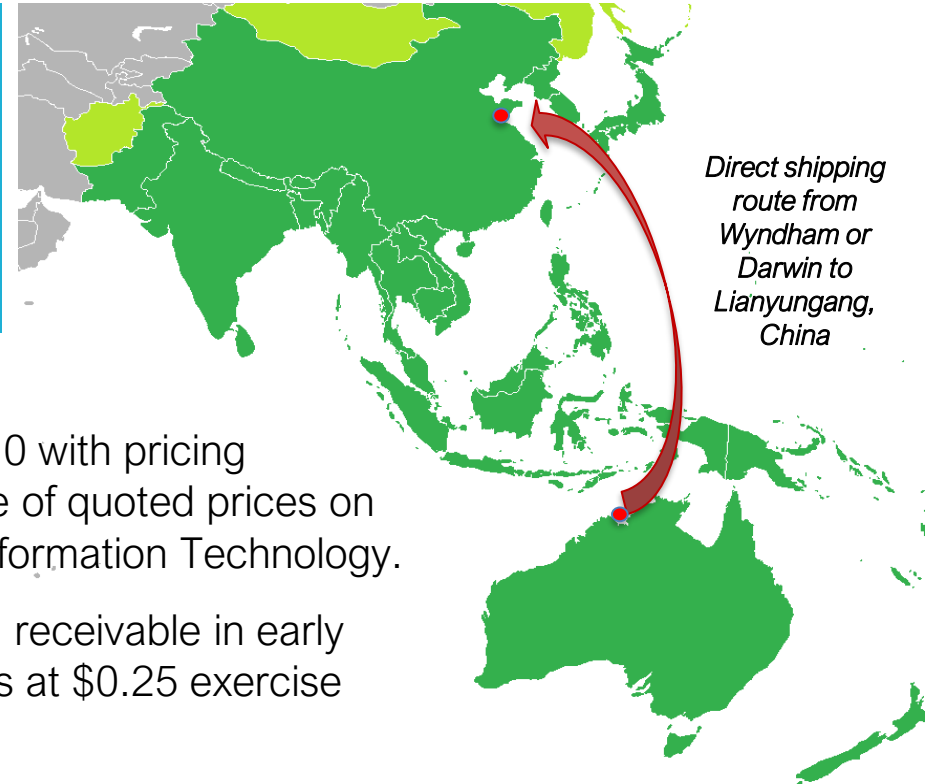
Financing

Sales Agreement

Community

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.

# Training-to-Work Facility

Mining

Processing Plant

Schedule

Financing

Sales Agreement

Community

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.



# Full scale feasibility

Mining

Processing Plant

Schedule

Financing

Sales Agreement

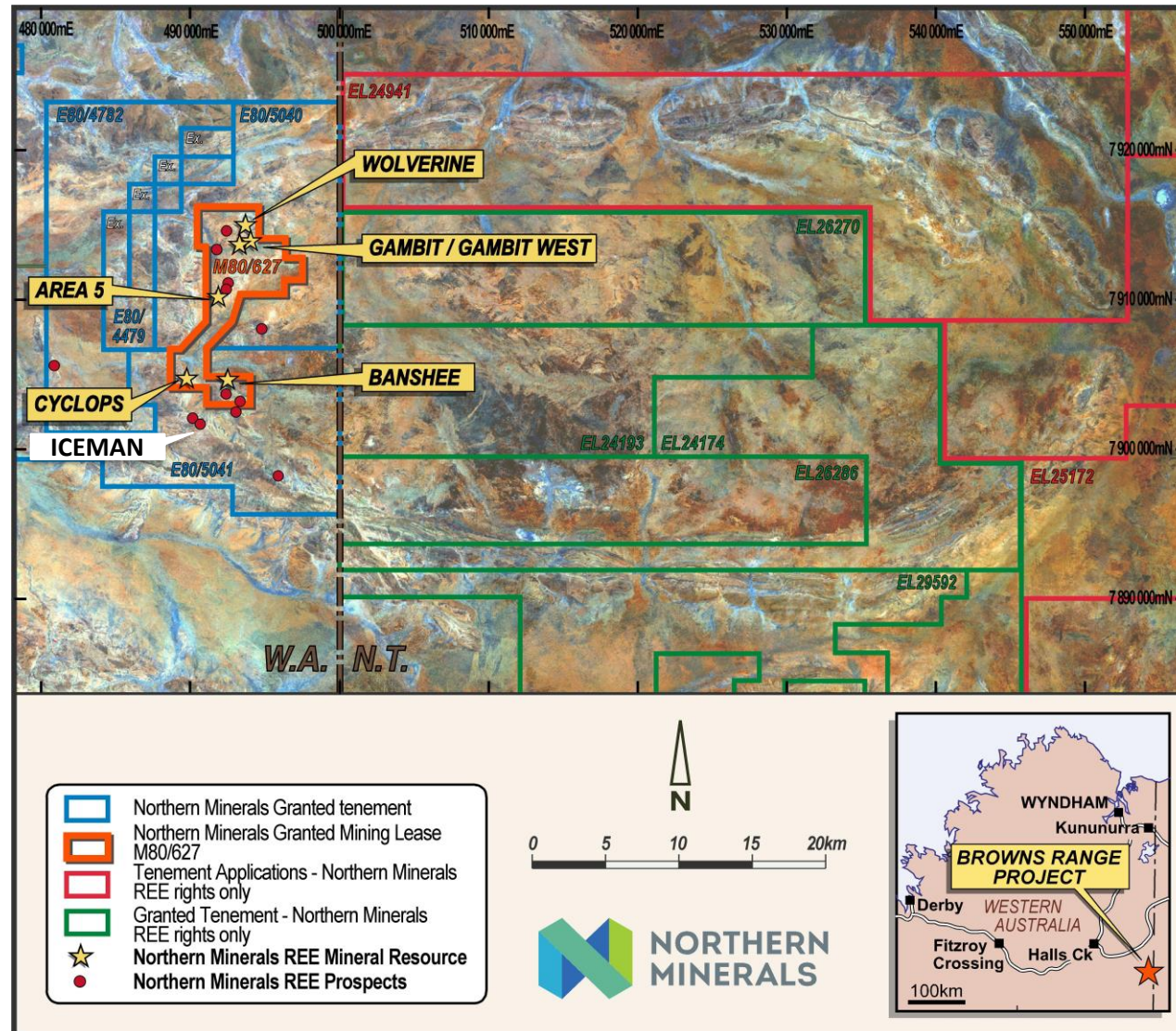
Community

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.
- Funded development plan of project enhancement initiatives, including downstream processing, mining optimisation and exploration.



# Blue Sky potential

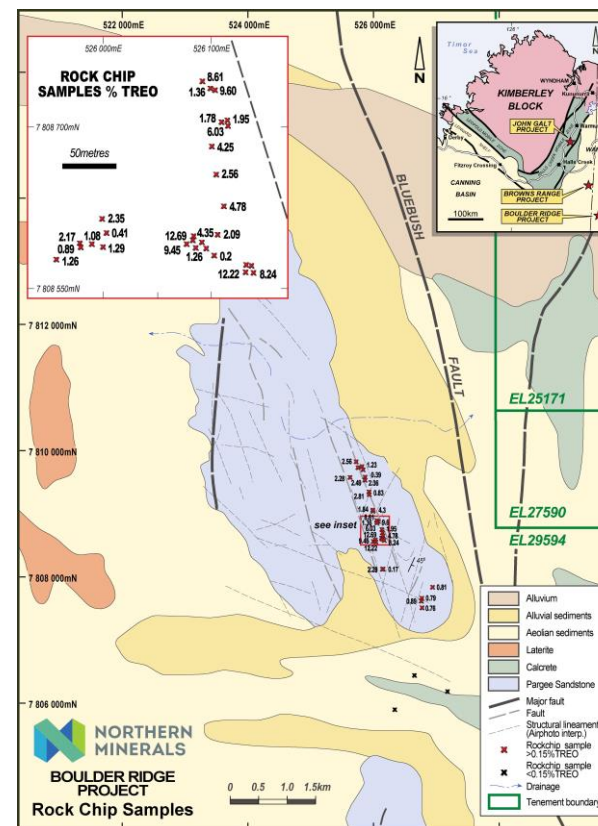
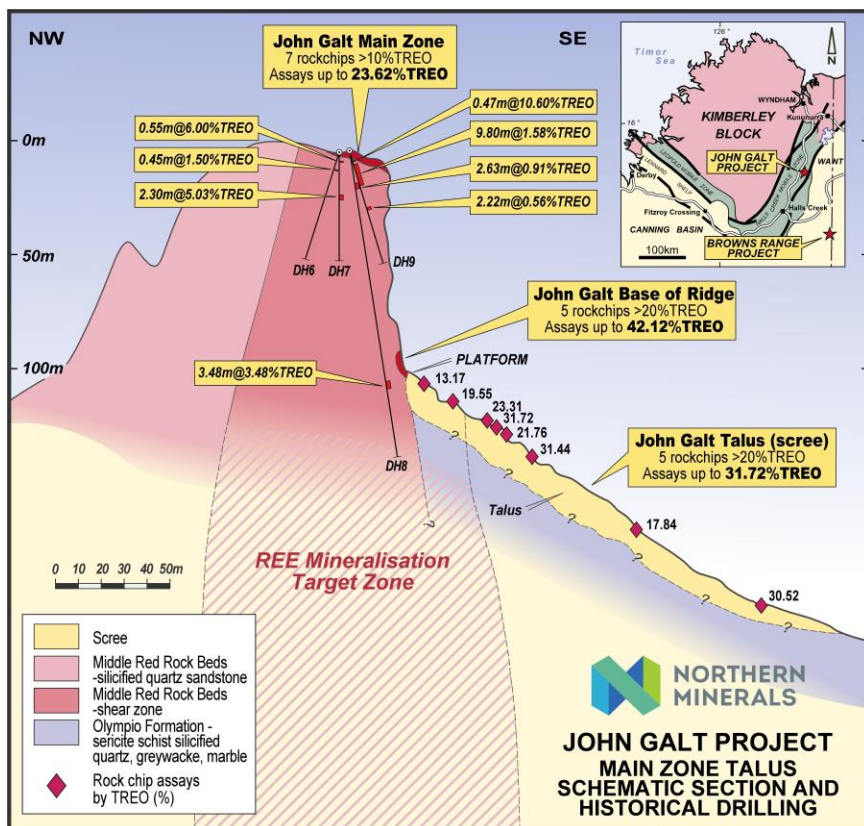


The Browns Range dome is a massive geological feature covering 1,500km<sup>2</sup> and stretching 60km x 30km most of which hasn't been effectively explored

- ◆ JORC Resource supporting an 11 year full scale operation
- ◆ Exploration target to add additional 9 years of JORC Resources (under review)
- ◆ 170 defined targets yet to be drilled
- ◆ High priority target at Iceman
- ◆ John Galt and Boulder Ridge – Additional HRE projects with upside potential
- ◆ Funding in place - exploration ramp up in June quarter



# Beyond Browns Range



- 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

- 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.

# Key Personnel and Partners



## Key Site Personnel:

Eben Van Rooyen – Resident Manager  
Tony Hadley – General Manager



**Deloitte.**



PRIMEERO

BREVET CAPITAL MANAGEMENT



# Key Highlights

## 2017 HIGHLIGHTS



### MINING COMPLETED

205,000t mining campaign  
completed November 2017

## \$34M

### EQUITY FINANCING

Placements completed at average  
price of 11.8 cents per share

### PILOT PLANT DEVELOPMENT

3 year project to assess  
feasibility of full scale  
operation



## \$52M

### DEBT FACILITIES

\$38m R&D Financing Facility plus  
\$14m Lind Facility

### OFFTAKE AGREEMENT

100% of Pilot Plant production  
contracted to JFMAG



### FABRICATION 98% COMPLETE

Sinosteel MECC  
constructing modular  
plant in China



### INSTALLATION

Primero mobilised and site  
construction underway

# 2018 – Delivering on potential

## 2018 PLANS



**TRAIN & LEARN**  
Implementation of  
Training-to-Work Program

**PRACTICAL COMPLETION**  
Commence research &  
Development studies

**EXPLORE**  
Continue  
exploration on  
multiple HRE  
opportunities

**FIRST PRODUCT  
DELIVERY**  
Mixed rare earth carbonates

**Dy**

**RESEARCH &  
DEVELOPMENT**  
Assess the technical and  
economic feasibility of the  
larger scale operation

**BONUS OPTION ISSUE**  
Planned listed 12c options for all  
shareholders as at Record Date  
in Feb '18

**1-for-5**

**CASHFLOW**  
Commence product sales from  
Browns Range





# Corporate Overview

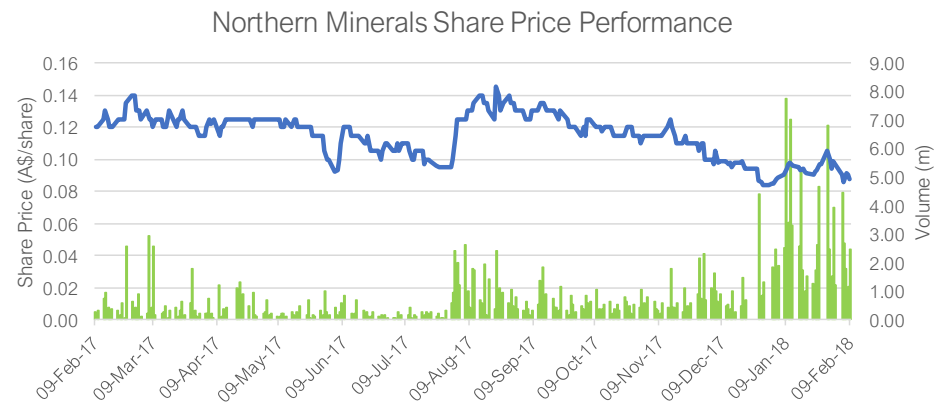


## Market capitalisation \$87M

(at 16 February 2018 @ \$0.081)

Ordinary Shares	1,079M
Options and Performance Rights	103M
Cash (18 February 2018)	\$20.7M
12 month low - high	\$0.081 - \$0.15
Average daily volume (12 month avg)	902,000
Average daily volume (3 month avg)	2,035,000

Major shareholders	18 February 2018
ACIIG	18.5%
Huatai Mining	15.0%
Citicorp Nominees	3.7%
Board & Management	2.2%
Remaining Top 20	18.8%
Other	41.8%







# NORTHERN MINERALS

## Delivering critical technology metals to the EV evolution



# Appendices



Powering Technology.



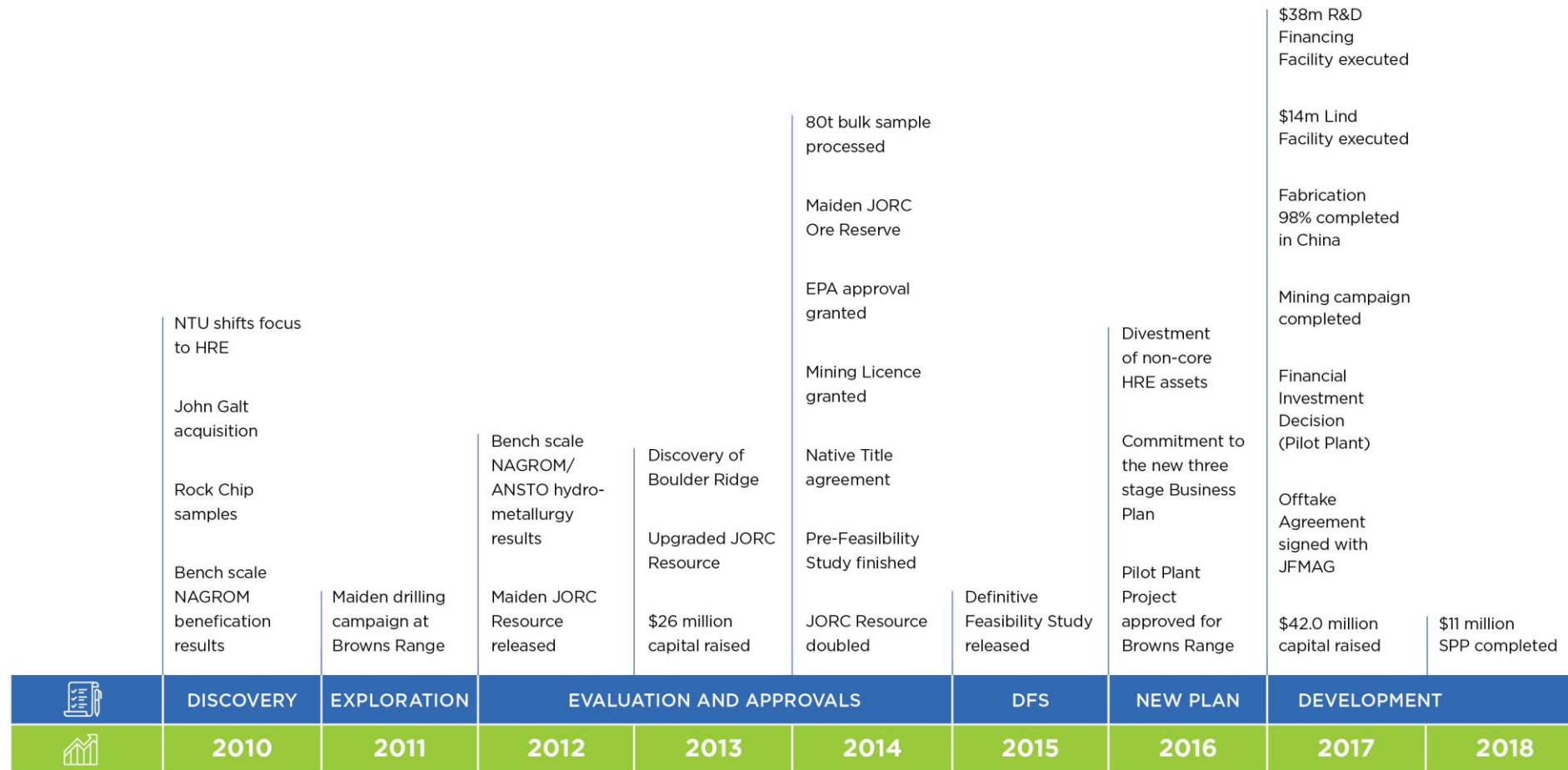
# Heavy rare earths crucial to growth of electric vehicle sector



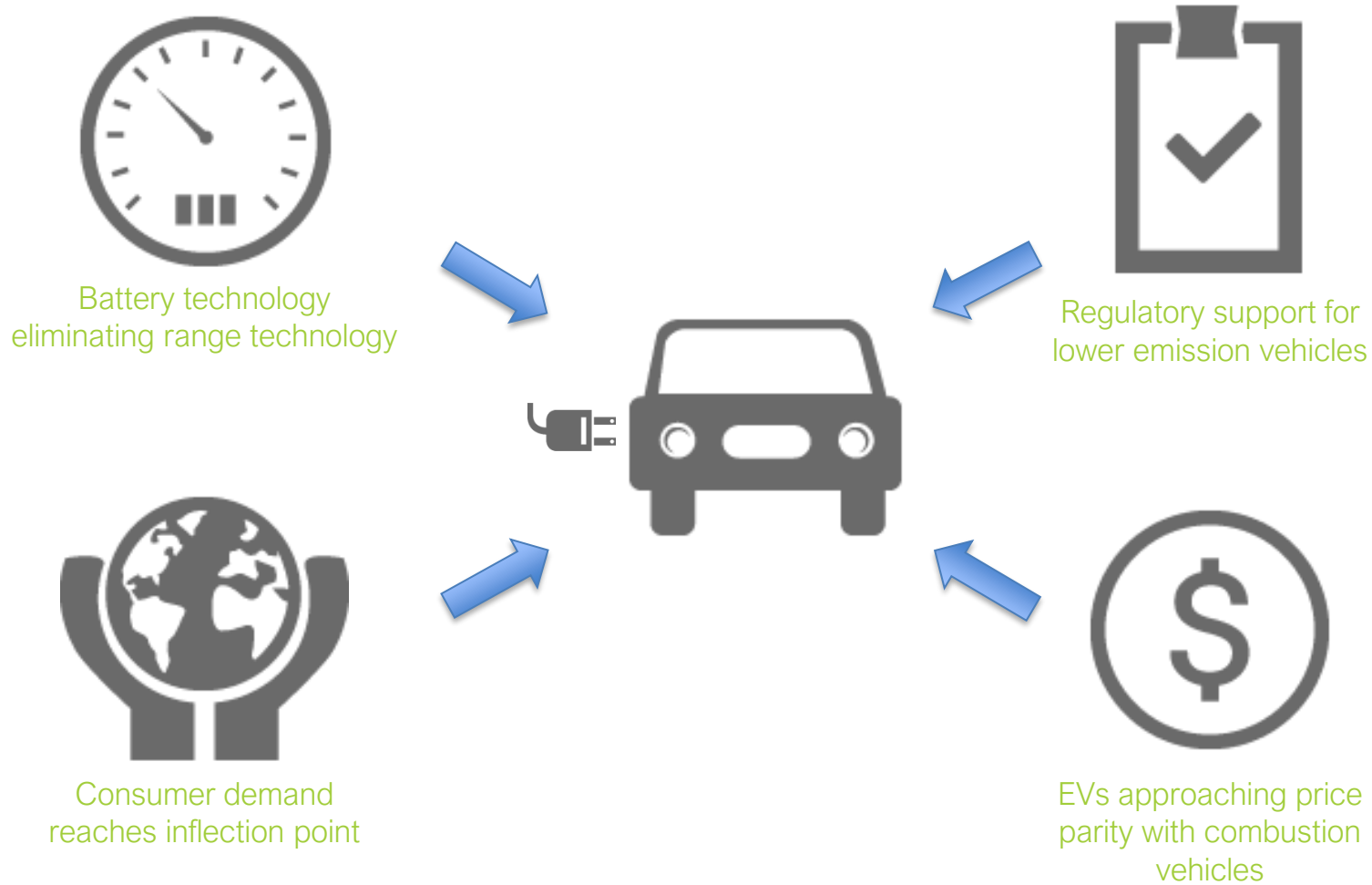
- ◆ NdDyFeB permanent magnets used by major electric vehicle (EV) manufacturers require Dysprosium and Terbium as key additives for high performance
- ◆ Changing policy settings by European governments and future development plans by global carmakers have resulted in demand for EVs reaching an inflection 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 2025
- ◆ Each electric vehicle contains approximately 100g of Dysprosium



# Browns Range – An Eight Year Journey

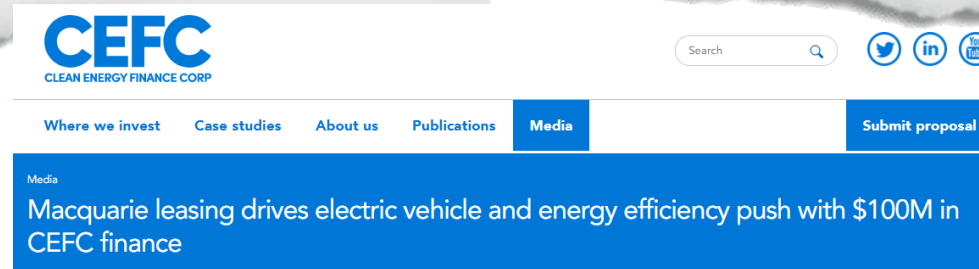


# Global EV growth drivers





# EV acceptance reached inflection point in 2017



# Chinese carmakers to dominate EV production



# 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
	<b>Total<sup>1</sup></b>	<b>4.97</b>	<b>0.86</b>	<b>0.74</b>	<b>4.97</b>	<b>0.11</b>	<b>89</b>	<b>42,560,000</b>
<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
	<b>Total<sup>1</sup></b>	<b>0.39</b>	<b>1.07</b>	<b>0.91</b>	<b>6.04</b>	<b>0.12</b>	<b>89</b>	<b>4,177,000</b>
<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
	<b>Total<sup>1</sup></b>	<b>0.11</b>	<b>1.13</b>	<b>0.97</b>	<b>6.72</b>	<b>0.13</b>	<b>96</b>	<b>1,204,000</b>
<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
	<b>Total<sup>1</sup></b>	<b>1.52</b>	<b>0.29</b>	<b>0.18</b>	<b>1.26</b>	<b>0.03</b>	<b>69</b>	<b>4,347,000</b>
<b>Cyclops</b>	Indicated	-	-	-	-	-	-	-
	Inferred	0.33	0.27	0.18	1.24	0.03	70	891,000
	<b>Total<sup>1</sup></b>	<b>0.33</b>	<b>0.27</b>	<b>0.18</b>	<b>1.24</b>	<b>0.03</b>	<b>70</b>	<b>891,000</b>
<b>Banshee</b>	Indicated	-	-	-	-	-	-	-
	Inferred	1.66	0.21	0.16	1.17	0.02	87	3,484,000
	<b>Total<sup>1</sup></b>	<b>1.66</b>	<b>0.21</b>	<b>0.16</b>	<b>1.17</b>	<b>0.02</b>	<b>87</b>	<b>3,484,000</b>
<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
	<b>Total<sup>1</sup></b>	<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>

# 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

Ore reserves as per NTU announcement 2 March 2015 in relation to increased reserves.

# 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
- First shipment planned for September quarter

REO contained in mixed RE carbonate	Annual production (000s kg)
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>
<b>Total carbonate produced</b>	<b>1,100</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>

Production table from NTU announcements dated 4 February 2016 in relation to new business plan for Browns Range and presentation of the business plan



# NTU Board



Nan  
Yang

Colin  
McCavana

Adrian  
Griffin

George  
Bauk

Bin  
Cai

## **Colin McCavana - Non-executive Chairman (appointed 2006)**

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

## **George Bauk - Managing Director / CEO (appointed 2010)**

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. Mr Bauk is Vice President of the Chamber of Minerals and Energy, WA and Chairman of Lithium Australia.

## **Adrian Griffin - Non-executive Director (appointed 2006)**

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 (appointed 2017)**

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) (appointed 2013)**

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) (appointed 2013)**

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



5 years

**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).



5 years

**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.



12 years

**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.

Robin was instrumental in the discovery of the Browns Range Project, including Wolverine and Gambit West.



1 year

**Eben Van Rooyen**  
**Resident 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.



2 months

**Tony Hadley**  
**General Manager**

Mr Hadley is a metallurgist with 26 years' experience in the management of rare earths, base metals, vanadium and gold projects globally. His experience includes 10 years' with Lynas Corporation, where he was the Operations Manager for the Mount Weld Rare Earth mine and the manager of process flowsheet development.

# The Northern Minerals SPIRIT

