



**RAINBOW RARE EARTHS**

**UNLOCKING SECONDARY SOURCES  
OF CRITICAL RARE EARTHS**

**PHALABORWA PRELIMINARY ECONOMIC  
ASSESSMENT**

**3 OCTOBER 2022**

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# PRELIMINARY ECONOMIC ASSESSMENT

## BREAKTHROUGH STEP IN THE DEVELOPMENT OF PHALABORWA



### BREAKTHROUGH STEP IN THE DEVELOPMENT OF PHALABORWA

- Strong returns in a market underpinned by strong demand growth for separated magnet rare earth oxides
  - Base case model delivers robust economic returns
  - Significant upside demonstrated by 2022 YTD average rare earth prices
  - Long-term forecast prices provide an NPV of c.US\$1 billion, with a 2.4-year payback
- Capex of US\$295.5 million significantly below that of a traditional hard rock rare earth mining project
- Average operating costs of US\$33.86/kg separated magnet rare earth oxides expected to be the lowest of all Western rare earth projects
- Insensitive to increases in costs due to strong margins
- Underscores broader potential to use unique IP and technology to extract magnet rare earth oxides from other phosphogypsum sources, supported by recently announced agreements with OCP in Morocco and a South African diversified chemicals group

### BASE CASE<sup>1</sup>

NPV<sup>3</sup>  
US\$627m

IRR  
40%

Margin<sup>4</sup>  
75%

Payback  
2 years

### YTD AVERAGE PRICES<sup>2</sup>

NPV  
US\$934m

IRR  
51%

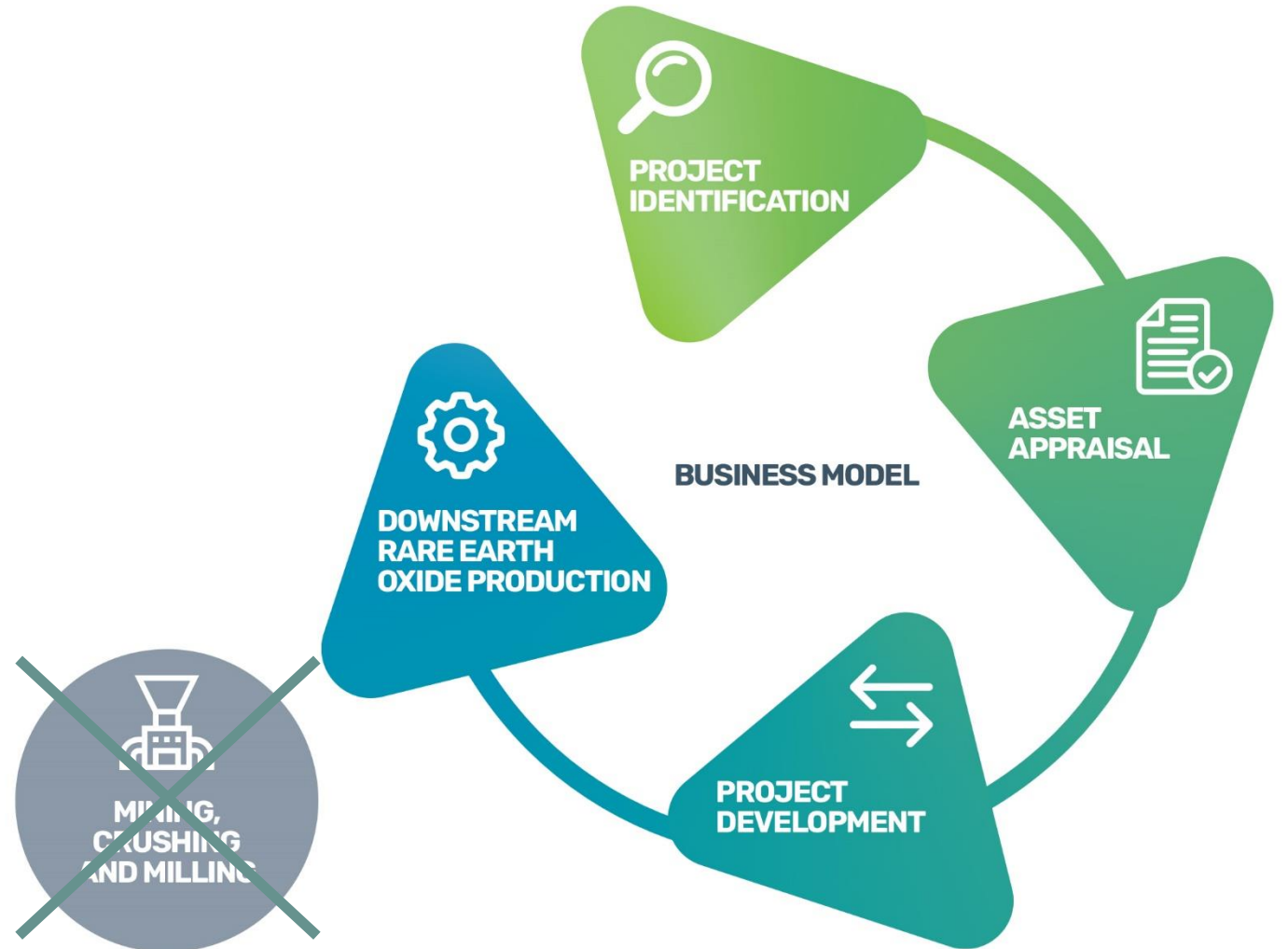
Margin  
81%

Payback  
1.7 years

1. The base case uses the projected rare earth oxides price for 2023, lower than the average price for 2022 to date or long-term forecast prices received from Argus Media Group as set out in the PEA
2. Based on prices derived from weekly data collated by Rainbow from price reporting agencies up to 23 September 2022
3. Net present value using a 10% forward discount rate
4. EBITDA operating margin

# UNIQUELY POSITIONED TO UNLOCK NEAR-TERM RARE EARTHS PRODUCTION

- Strategic focus on recovering rare earth oxides from secondary sources to support global decarbonisation
- IP and expertise in recovering rare earths from phosphogypsum
- Strong progress demonstrated by publication of robust PEA; rigorous approach to project assessment
- Management team with notable experience throughout the asset lifecycle; through development to plant construction and commissioning
- Developing a portfolio of phosphogypsum processing opportunities without the energy intensive costs usually associated with hard rock mining, crushing and milling

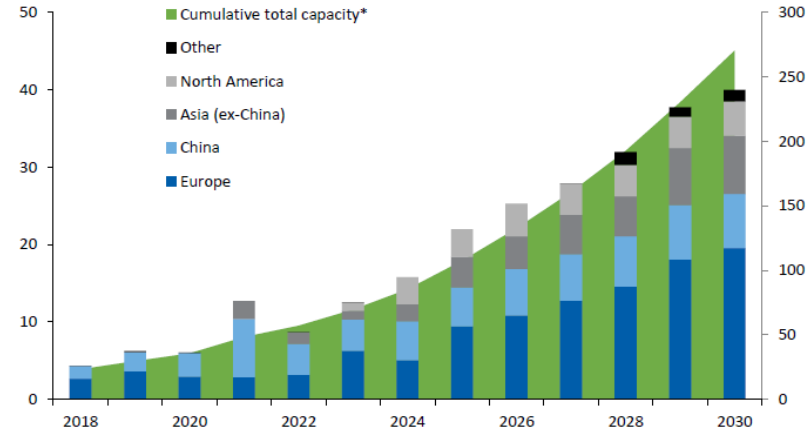


# ACCELERATING GLOBAL DEMAND FOR RARE EARTHS UNDERPINNED BY MOUNTING PRESSURE TO DECARBONISE

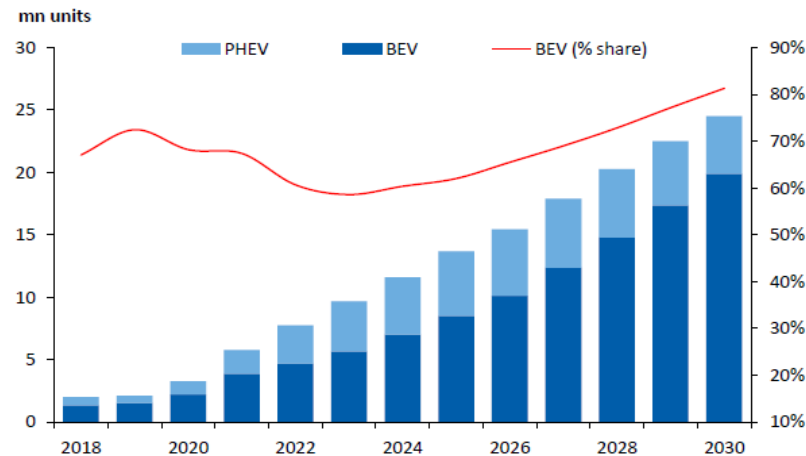
## ROBUST SUPPLY/DEMAND FUNDAMENTALS

- Magnet rare earth elements are critical building blocks for the global green revolution
- Demand is forecast to grow strongly, driven by increased adoption of electric vehicles and off-shore wind power generation
- Demand accelerated by evolving global emissions legislation and government policy
- Global rare earth supply unlikely to match growing demand
- China dominates rare earth elements production, producing c. 90% of all global refined rare earth products

## OFFSHORE WIND POWER CAPACITY ADDITIONS (GW)



## RISING EV SALES FORECASTS



Market

# PHALABORWA: EXCITING, NEAR-TERM GROWTH OPPORTUNITY

## DELIVERY OF SEPARATED MAGNET RARE EARTH OXIDES ON SITE



### RARE EARTHS FROM SECONDARY SOURCE: 30.7MT OF GYPSUM IN TWO STACKS FROM 50+ YEARS PHOSPHATE HARD ROCK MINING

- 0.43% TREO
- 29.1% high value NdPr
- Economic dysprosium and terbium credits
- Project is largely permitted and positioned in an established mining town, with:
  - associated skilled labour availability
  - existing infrastructure, which can be updated
  - supporting industry (i.e. local production of sulphuric acid, a key reagent in the processing circuit)

### JORC COMPLIANT INFERRED MINERAL RESOURCE ESTIMATE

|              | Tonnes Mt   | TREO %      | Contribution of TREO by oxide |            |            |            |             | Grade       |            |
|--------------|-------------|-------------|-------------------------------|------------|------------|------------|-------------|-------------|------------|
|              |             |             | Nd %                          | Pr %       | Dy %       | Tb %       | Other %     | Th ppm      | U ppm      |
| Stack A      | 21.9        | 0.42        | 23.3                          | 5.7        | 1.0        | 0.4        | 69.6        | 49.0        | 1.8        |
| Stack B      | 8.7         | 0.46        | 23.6                          | 5.7        | 1.0        | 0.3        | 69.4        | 44.1        | 2.0        |
| <b>TOTAL</b> | <b>30.7</b> | <b>0.43</b> | <b>23.4</b>                   | <b>5.7</b> | <b>1.0</b> | <b>0.3</b> | <b>69.6</b> | <b>47.6</b> | <b>1.8</b> |

1. The Inferred Mineral Resource Estimate is reported above a cut-off grade of 0.2% TREO.
2. No constraining pit shell is required for the Inferred Mineral Resource Estimate due to the gypsum stacks being entirely above ground level.
3. Mineral resources are not mineral reserves and do not have demonstrated economic viability.



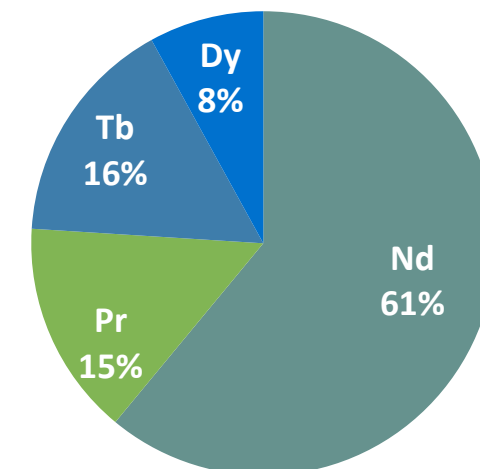
# ASSAY RESULTS CONFIRM HIGH VALUE PROJECT

## MUCH HIGHER GRADE THAN TYPICAL IONIC CLAY RARE EARTH PROJECTS



| Project                   | Style         | Owner                   | TREO <sup>3</sup><br>% | NdPr <sup>4</sup><br>ppm | Uranium <sup>5</sup><br>ppm | Thorium <sup>6</sup><br>ppm |
|---------------------------|---------------|-------------------------|------------------------|--------------------------|-----------------------------|-----------------------------|
| Phalaborwa <sup>1</sup>   | Gypsum stacks | Rainbow Rare Earths     | 0.431%                 | 1,257                    | 2                           | 48                          |
| Round Top <sup>2</sup>    | Ionic Clay    | US Rare Earths/TMRC     | 0.063%                 | 39                       | 45                          | 179                         |
| La Paz <sup>2</sup>       | Ionic Clay    | American rare Earths    | 0.04%                  | 80                       | 1                           | 7                           |
| Makuutu <sup>2</sup>      | Ionic Clay    | Ionic Rare Earths       | 0.08%                  | 232                      | 10                          | 30                          |
| Mount Weld <sup>2</sup>   | Hard rock     | Lynas Rare Earths       | 7.90%                  | 18,833                   | 30                          | 750                         |
| Bear Lodge <sup>2</sup>   | Hard rock     | Rare Element Resources  | 3.08%                  | 7,059                    | 113                         | 472                         |
| Longonjo <sup>2</sup>     | Hard rock     | Pensana plc             | 1.43%                  | 3,170                    | 29                          | 967                         |
| Nolan's Bore <sup>2</sup> | Hard rock     | Arafura Resources       | 2.60%                  | 6,859                    | 191                         | 2,700                       |
| Norra Karr <sup>2</sup>   | Hard rock     | Leading Edge Materials  | 0.55%                  | 758                      | 15                          | 8                           |
| Lofdal <sup>2</sup>       | Hard rock     | Namibia Critical Metals | 0.32%                  | 181                      | 18                          | 350                         |

### PHALABORWA IN-SITU METAL VALUE: US\$/t Gypsum<sup>1</sup>



Base case value:  
US\$137.92/t of gypsum<sup>1</sup>

### PHALABORWA BENEFITS FROM:

- 5 – 10x higher grade than a typical low-cost ionic clay rare earth project with higher NdPr – closer to grade of hard rock style deposits, which typically have a much higher cost base for mining, crushing/grinding and metallurgical recovery
- Considerable high-value Dy and Tb credits
- Low levels of radioactive elements: typical rare earth development projects require complex processing to remove these

## PEA DEMONSTRATES ROBUST ECONOMIC VIABILITY IN ALL PRICING SCENARIOS



|   |         |        |
|---|---------|--------|
| Life of operation                                       | Years   | 14.2   |
| Phosphogypsum processing                                | Mtpa    | 2.2    |
| Production of separated rare earths oxides              | t       | 26,208 |
| Capital costs   | US\$m   | 295.5  |
| Average operating costs for separated rare earth oxides | US\$/kg | 33.86  |

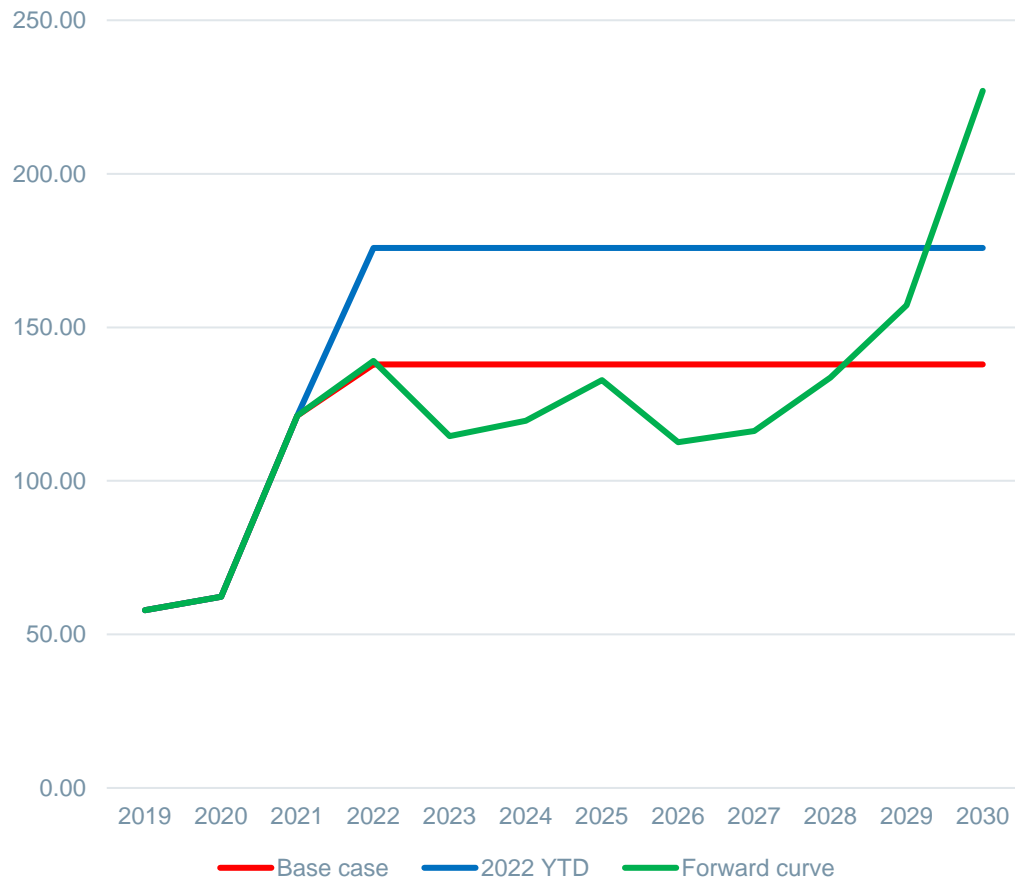
| Rare earths pricing sensitivities |                | Base case     | YTD           | Forecast      |
|-----------------------------------|----------------|---------------|---------------|---------------|
| <i>Basket price</i>               | <i>US\$/kg</i> | <i>137.92</i> | <i>175.89</i> | <i>199.30</i> |
| Average EBITDA operating margin   | %              | 75            | 81            | 83            |
| Post-tax NPV <sub>10</sub>        | US\$m          | 627.0         | 933.7         | 1,027.6       |
| Post-tax IRR                      | %              | 40            | 51            | 44            |
| Payback period                    | Years          | 2.0           | 1.7           | 2.4           |



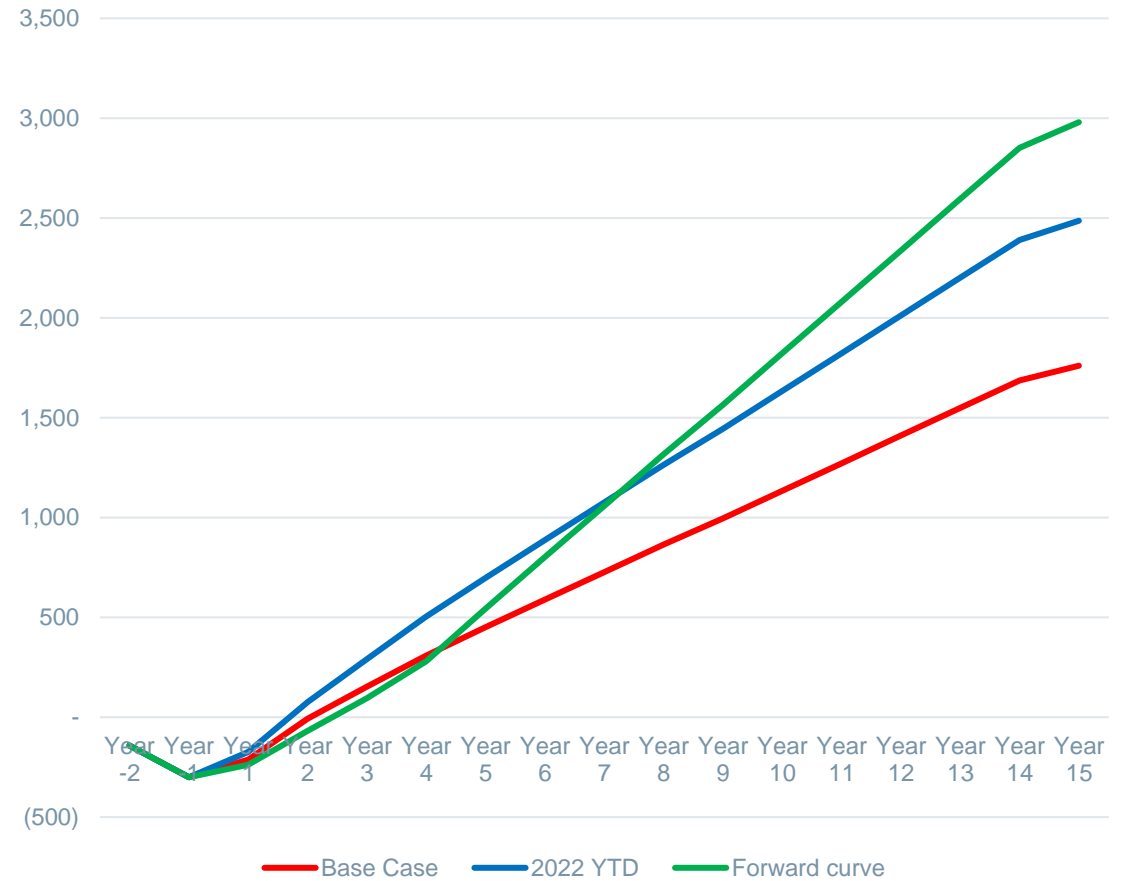
# FORECAST PHALABORWA CASHFLOWS FOR MAIN PRICE SCENARIOS



## FORECAST PHALABORWA BASKET PRICE (US\$/KG REO)



## PHALABORWA CUMULATIVE CASHFLOW (US\$M) <sup>1</sup>

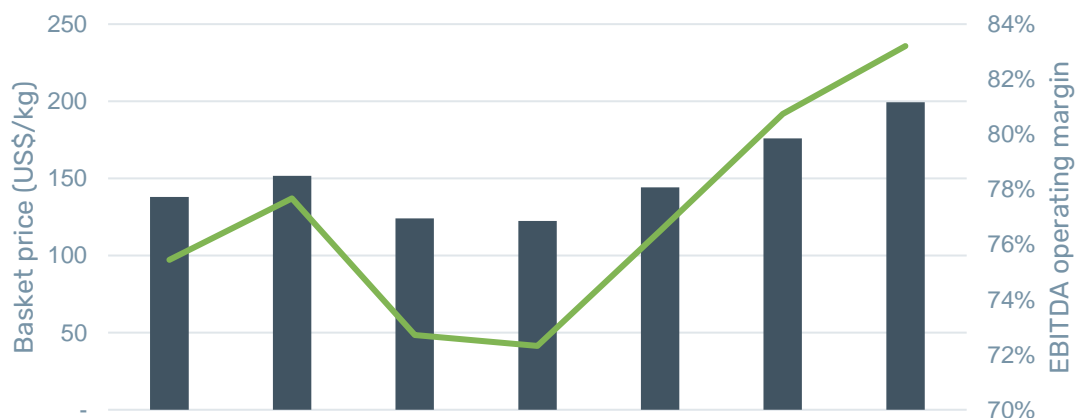


# STRONG RETURNS WITH LOW SENSITIVITY TO COSTS IN ANY FORESEEABLE PRICING ENVIRONMENT

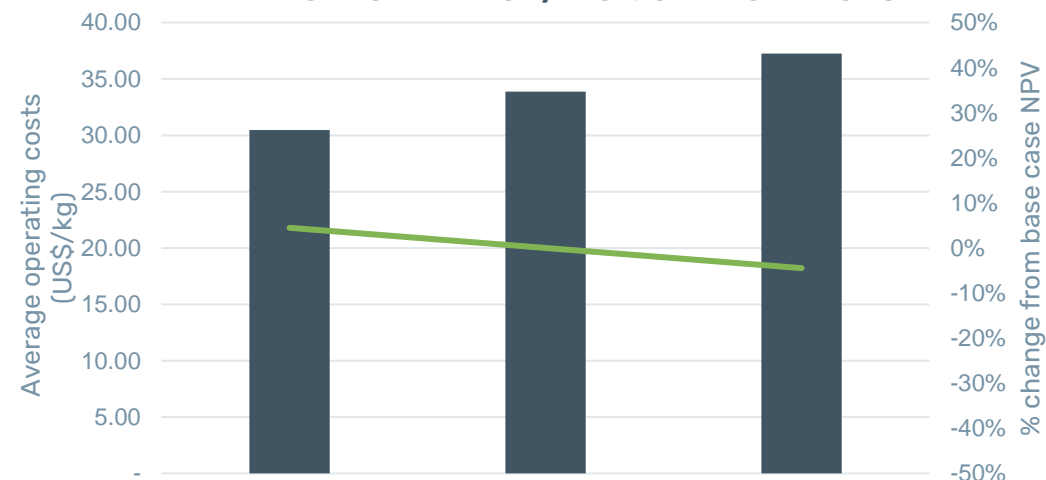
- Sensitivity analyses demonstrate robust EBITDA operating margins in all pricing sensitivity scenarios
- Strong supply / demand fundamentals support long-term increase in magnet rare earths prices

- NPV insensitive to changes in operating costs; beneficial in inflationary environment
- Opex, capex and forex analyses demonstrate strong NPVs in all scenarios:
  - opex +10%: US\$599m
  - capex +10%: US\$610m
  - US\$1:ZAR17.5: US\$652m

**ROBUST EBITDA OPERATING MARGIN IN ALL PRICING SCENARIOS**



**NPV INSENSITIVE TO +/-10% OPEX CHANGES**



# UNIQUE RARE EARTHS PROJECT WITHOUT MANY OF THE USUAL DEVELOPMENT STAGES



## THE STRONG MARGINS GENERATED BY PHALABORWA ARE UNDERPINNED BY A LOW OPERATING AND CAPITAL COST BASE, DUE TO:

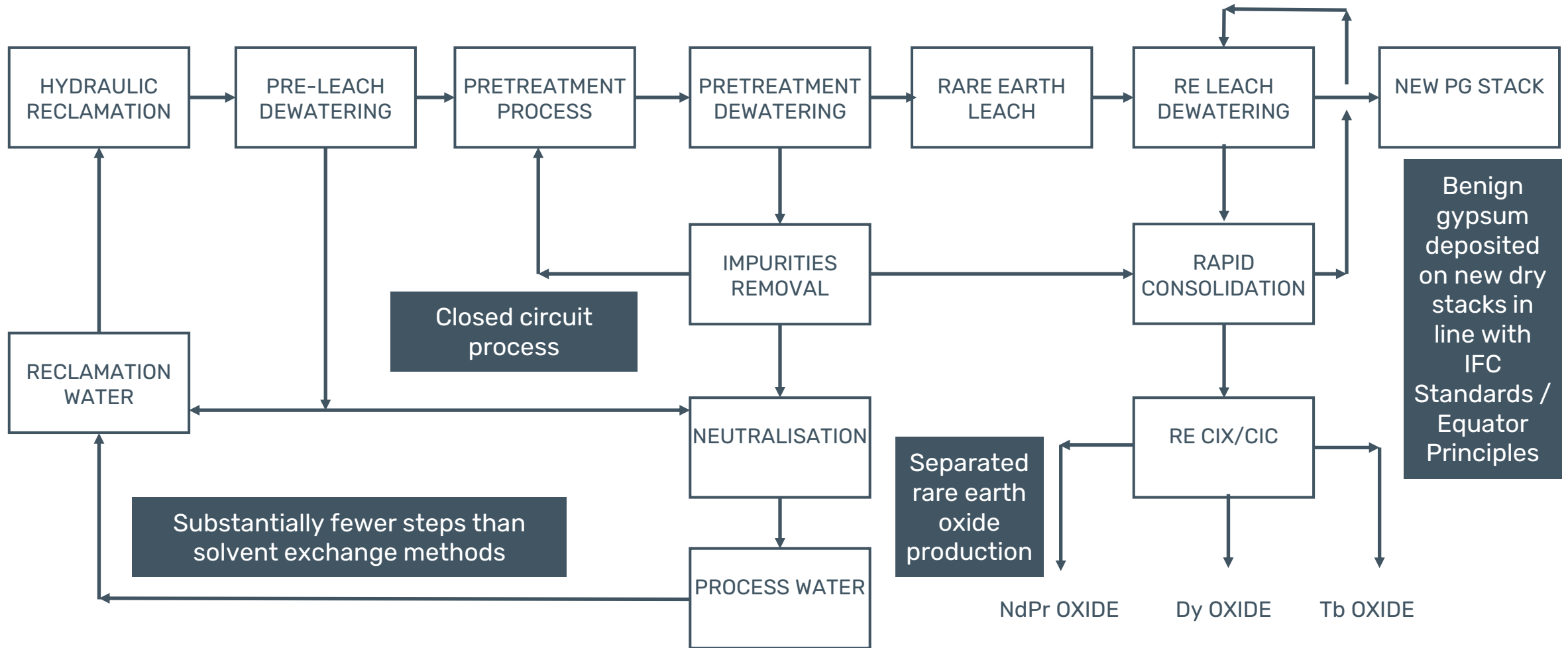
- no requirement for hard rock mining, including waste stripping
- no cost associated with crushing and grinding ore
- rare earths contained in ‘cracked’ chemical form in the gypsum stacks enabling separated rare earth oxides to be produced in a single processing plant rather than requiring separate, capital and operating cost intensive, cracking and separation plants

## TRADITIONAL BARRIERS TO RARE EARTHS DEVELOPMENT

| Typical unit processes                           | Typical rare earths project | Phalaborwa |
|--|-----------------------------|------------|
| Hard rock mining and hauling                     | ✓                           |            |
| Hydraulic transport to plant                     |                             | ✓          |
| ROM stockpile                                    | ✓                           |            |
| Crushing and milling (energy)                    | ✓                           |            |
| Multi-stage flotation (energy and reagents)      | ✓                           |            |
| Concentrate filtration                           | ✓                           |            |
| Gangue acid leaching at some projects (reagents) | ✓                           |            |
| Cracking (energy and reagents)                   | ✓                           |            |
| Rare earth dissolution (leaching)                | ✓                           | ✓          |
| Thorium and uranium removal                      | ✓                           |            |
| Impurity removal and intermediate products       | ✓                           | ✓          |

# BLOCK FLOW DIAGRAM

UNIQUE PROCESS DEVELOPED BY RAINBOW AND K-TECH



Phalaborwa flowsheet

## EFFICIENT AND PATENTED TECHNOLOGY REDUCING CAPITAL AND OPERATING COSTS

### BENEFITS OF K-TECH CIX AND CIC TECHNOLOGY

- Continuous ion exchange (“CIX”) and continuous ion chromatography (“CIC”) are patented and proven processes
- CIX and CIC have been applied commercially at capacities up to 700m<sup>3</sup> per hour (larger than required at Phalaborwa) in a number of:
  - industries (including food, biotech, mining and chemical industries)
  - locations (including South Africa)
- Fast, efficient, and precise extraction of trace quantities of target materials from high volume streams
- Safe, simple to run, and can operate at a range of temperatures
- Single processing plant
- Major reduction in capital and operating costs vs. traditional pyro-metallurgical or chemical digestion/mixer settler solvent extraction technology



Commercial scale CIX unit

## NEXT STEPS

### PHALABORWA DEVELOPMENT SCHEDULE

#### POSITIVE RESULTS OF THE PEA SUPPORT THE CONTINUED DEVELOPMENT OF PHALABORWA - NEXT STEPS:

- Resource update
- Feasibility Study
- Permitting updated
- Further process optimisation
- Extensive process pilot plant operation



K-Tech's facilities in Florida

# RAINBOW RARE EARTHS

## A STRATEGIC SOURCE OF RARE EARTHS FOR A GROWING MARKET



### UNIQUELY POSITIONED TO UNLOCK NEAR-TERM RARE EARTHS PRODUCTION

- ✓ **RIGHT STRATEGY:** focus on recovering rare earth oxides from secondary sources
- ✓ **RIGHT OPPORTUNITIES:** Robust economics of Phalaborwa demonstrated by PEA; applicability to wider phosphogypsum opportunities
- ✓ **RIGHT TECHNOLOGY:** IP and expertise in recovering rare earths from phosphogypsum
- ✓ **RIGHT SKILLS:** Management team with notable experience throughout the asset lifecycle
- ✓ **STRONG INSTITUTIONAL INVESTOR SUPPORT**



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**RAINBOW RARE EARTHS**



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**THANK YOU**

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# EXPERIENCED BOARD AND EXECUTIVE MANAGEMENT



**ADONIS POUROULIS**  
NON-EXECUTIVE CHAIRMAN

- Mining engineer: an entrepreneur whose expertise lies in the discovery, exploration and development of natural resources across Africa including diamonds, precious/base metals, coal and oil and gas.
- Founder of Rainbow and Petra Diamonds (LSE:PDL); Founder and Director of Chariot Oil & Gas (AIM:CHAR) and Founder of Pella Resources Limited



**SHAWN MCCORMICK**  
NON-EXECUTIVE DIRECTOR

- International affairs specialist
- Over 25 years of political and extractive industries sector experience having served in The White House as Director for African Affairs on the National Security Council (Washington)
- Previously Political Affairs Director of BP (London) and VP of TNK-BP (Moscow)



**ALEXANDER LOWRIE**  
NON-EXECUTIVE DIRECTOR

- Investment banker with 13 years' experience and previous director roles at Deutsche Bank and RBS
- Co-founder of Telemark Capital LLP
- Significant market experience: IPOs and primary and secondary equity offerings



**J PETER PHAM**  
NON-EXECUTIVE DIRECTOR

- Scholar and practitioner of International Affairs; >20 years of experience in Africa
- First-ever United States Special Envoy for the Sahel Region until 2021 with the personal rank of Ambassador; previously as US Special Envoy for Great Lakes Region
- Distinguished Fellow at the Atlantic Council
- Member of the Board of the Smithsonian National Museum of African Art in Washington, DC, as well as Non-Executive Director of Africell Global Holdings



**ATUL BALI**  
NON-EXECUTIVE DIRECTOR

- Corporate CEO and board member with extensive experience in tech, government contracting and regulated industries; Chartered Accountant
- Currently advisor to several high-growth technology companies, Chairman of the Football Pools and non-executive director of Everi Holdings Inc (NYSE:EVRI)
- Previously held divisional CEO or President positions with IGT (NYSE), Aristocrat (ASX), and Real Networks (NASDAQ), as well as a venture capital firm



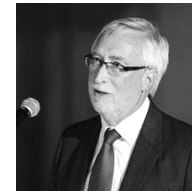
**GEORGE BENNETT**  
CEO

- 25 years in finance and management, including as partner in stockbroking/advisory firms in SA
- Former CEO of Shanta Gold Ltd, successfully listed on LSE in 2005
- CEO and Founder of MDM Engineering, listed on LSE in 2008; responsible for building 22 process plants and completing over 80 feasibility studies. Sold after 8 years to Foster Wheeler for US\$120 million
- Seed-funded and raised initial capital for OreCorp Ltd as non-executive director, now ASX listed



**PETER GARDNER**  
CHIEF FINANCIAL OFFICER

- Qualified Chartered Accountant; 15 years' experience in mining industry leading finance teams across Africa/developing nations
- Former CFO of Amara Mining plc (up to acquisition by Perseus Mining Ltd), Charrat Gold, Piran Resources and Alexander Mining



**DAVE DODD**  
TECHNICAL DIRECTOR

- 45 years of extractive metallurgy experience
- Metallurgical Project Consultant
- BSc (Hons) Chemical Engineering (1974)
- Fellow of Southern Africa Institute of Mining & Metallurgy



**CHARLES GRAHAM**  
PROJECT MANAGER - PHALABORWA

- Mechanical Engineer
- 20 years' experience in project management delivering multidisciplinary mining and infrastructure projects in remote and logistically challenging geographical regions
- Successful completion of multiple feasibility studies across Africa
- Proven track record of increasing project value by reducing capital and operating costs during project life cycle from study to execution



**CHRISTOPHER ATWOOD**  
PROJECT MANAGER - GAKARA

- 25 years' experience in mining and extractive industries.
- Track record of driving expansion and minimising costs
- Associated with startup ventures in remote locations.
- Led operations up to 35Mtpa successfully