

A large background image showing a field of wind turbines silhouetted against a vibrant sunset sky. The sky transitions from a deep orange near the horizon to a pale, hazy blue at the top. The water in the foreground is dark and reflects the silhouettes of the turbines.

**Sustainably Sourcing Magnet and Heavy  
Rare Earths for the New Economy**

**Africa Down Under Conference, Perth**

# Cautionary Statement

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This presentation should be considered in its entirety. If you do not understand the material contained in this presentation, you should consult your professional advisors. The sole purpose of this presentation is to provide shareholders with an update on current activities of the Company and the current state of exploration at the Makuutu Rare Earths Project in the Uganda.

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### Competent Person Statement

Information in this report that relates to previously reported Exploration Targets and Exploration Results has been cross-referenced in this report to the date that it was originally reported to ASX. Ionic Rare Earths Limited confirms that it is not aware of any new information or data that materially affects information included in the relevant market announcements.

The information in this report that relates to Mineral Resources for the Makuutu Rare Earths deposit was first released to the ASX on 3 May 2022 and is available to view on [www.asx.com.au](http://www.asx.com.au). Ionic Rare Earths Limited confirms that it is not aware of any new information or data that materially affects information included in the relevant market announcement, and that all material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

The information in this report that relates to Ore Reserves for the Makuutu Rare Earths deposit was first released to the ASX on 20 March 2023 and is available to view on [www.asx.com.au](http://www.asx.com.au). Ionic Rare Earths Limited confirms that it is not aware of any new information or data that materially affects information included in the relevant market announcement, and that all material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

The information in this report that relates to Production Targets or forecast financial information derived from production the production target for the Makuutu Rare Earths deposit was first released to the ASX on 20 March 2023 and is available to view on [www.asx.com.au](http://www.asx.com.au). Ionic Rare Earths Limited confirms that all material assumptions and technical parameters underpinning the Production Targets or forecast financial estimates in the announcement continue to apply and have not materially changed.

# Securing Critical Elements for the New Economy

HARNESSING OUR TECHNOLOGY TO ACCELERATE MINING, REFINING AND RECYCLING OF MAGNET AND HEAVY RARE EARTHS CRITICAL FOR ENERGY TRANSITION, ADVANCED MANUFACTURING, AND DEFENCE



**Mining**  
Rare Earths



**Refining**  
Rare Earths



**Recycling**  
Rare Earths

# Geo-Political Tensions – Driving Demand for Alternative, Resilient Supply

## UGANDA & THE MAKUUTU HEAVY RARE EARTHS PROJECT WILL PLAY A VITAL ROLE IN THE CRITICAL MINERALS SUPPLY CHAIN

### The scramble for rare earths carries big geopolitical risks

But without these metals there are limited solutions to our planetary problems

MISHA GLENNY + Add to myFT

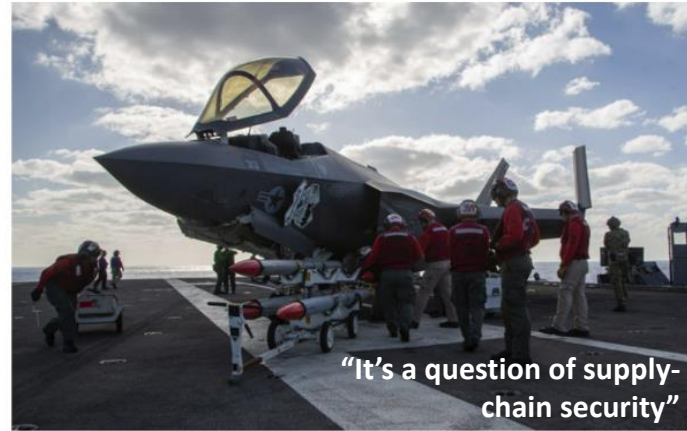


A worker blasts the ground with water at a rare earth metals mine in Nancheng county, Jiangxi province. China dominates the production and supply of rare earth metals © Reuters

DEFENSE

### Pentagon suspends F-35 deliveries after discovering materials from China

The issue does not affect flight operations of F-35s already in service.



“It’s a question of supply-chain security”

**“DOE, DOD, and the Department of State signed a memorandum of agreement (MOA) to better coordinate stockpiling activities to support the U.S. transition to clean energy and national security needs.”**

White House Briefing, 22 February 2022

**“Lithium and rare earths will soon be more important than oil and gas. Our demand for rare earths alone will increase fivefold by 2030. [...] We must avoid becoming dependent again, as we did with oil and gas. [...] We will identify strategic projects all along the supply chain, from extraction to refining, from processing to recycling. And we will build up strategic reserves where supply is at risk. This is why today I am announcing a European Critical Raw Materials Act.”**

**“We have to build a more resilient supply chain, supporting projects and attracting more private investment from mining to refining, processing and recycling.”**

European Commission President von der Leyen recalled some hard facts: **without secure and sustainable access to the necessary raw materials, our ambition to become the first climate neutral continent is at risk.**

14 September 2022



# European Critical Raw Materials Act – “The Race is On!”

EUROPEAN COMMISSION’S CRITICAL RAW MATERIAL ACT TO UTILISE GLOBAL GATEWAY INSTRUMENT, A €300 BILLION INITIATIVE AIMED AT COUNTERING THE CHINESE BELT AND ROAD INITIATIVE

- The Act identifies a list of **strategic raw materials** crucial to Europe’s green and digital ambitions and for defence and space applications – while being subject to potential supply risks in the future.
- The Regulation sets clear benchmarks for domestic capacities along the **strategic raw material supply chain** and to diversify EU supply by 2030:



At least **10%** of the EU's annual consumption for extraction



At least **40%** of the EU's annual consumption for processing



At least **15%** of the EU's annual consumption for recycling

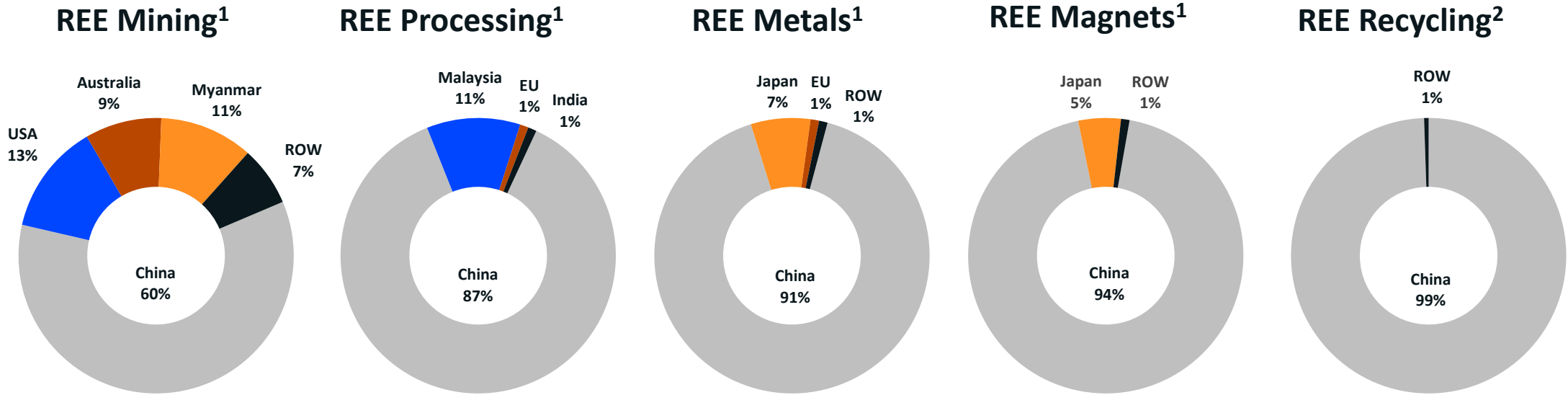


Not more than **65%** of the Union's annual consumption of each strategic raw material at any relevant stage of processing from a single third country

- Products containing permanent magnets will need to meet circularity requirements and provide information on the recyclability and recycled content.

# Rare Earth Supply Chain – Alternate Capacity Requires Investment

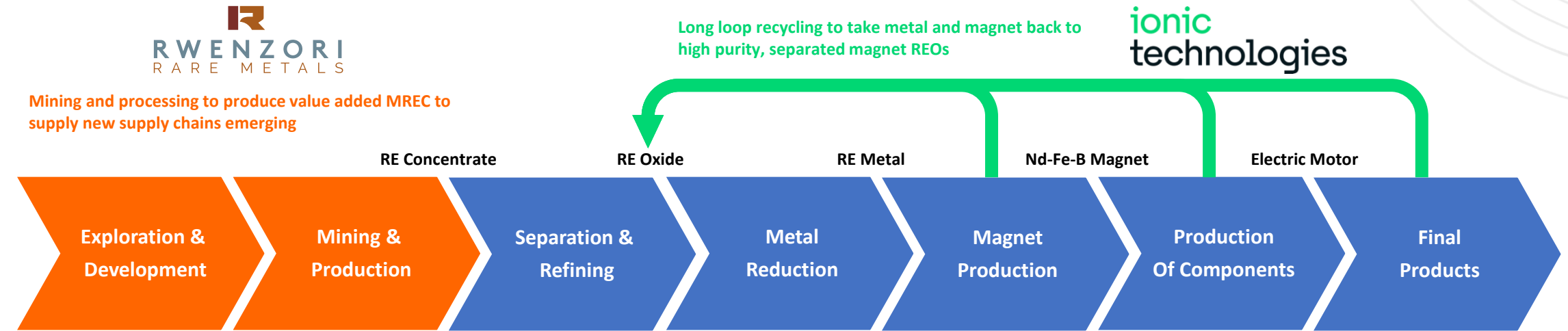
SUSTAINABLY SOURCING THE MOLECULES WILL REQUIRE DEVELOPING ALTERNATIVE CAPACITY GLOBALLY



Rare earths are amongst the most resource-critical raw materials: they are of highest economic importance and at the same time feature a high supply risk – supply chain dominated by China

# REE Supply Chain and IonicRE Integration

IONICRE ADDING PRIMARY AND SECONDARY SOURCED CAPACITY TO BECOME INTEGRATED IN FUTURE RARE EARTH SUPPLY CHAINS



## Makuutu Rare Earths Project (60% IonicRE)

- Low capital, modular development IAC enables IonicRE to bring on highly sought-after, value added MREC basket of magnet and heavy REEs
- MLA for RL1693 submitted
- Demonstration Plant in construction now, with immediate demand for product
- Expandable asset through free cash flow and growing market demand

## IonicRE Refinery

- Evaluation progressing towards completion for strategic discussions
- Targeting separation of MREC from Makuutu to produce refined REOs
- Potential to receive MREC feed or HREO products from other producers
- Flowsheet trade-offs dependent upon selected locations – competitive landscape to host refinery to support advanced manufacturing industry

## Magnet Recycling (100% IonicRE)

- Low capital development to recycle spent magnets and swarf to produce separated and refined 99.9%+ REOs
- Magnet REO production now (Nd, Pr, Dy and Tb)
- Addressing domestic supply chain / sovereign capability need with global opportunities
- Likely first to revenue, supply independent of permitting



## **Makuutu Rare Earths Project – Stage 1 DFS**

*Low Capital, Modular, Ionic Adsorption Clay Project*

Makuutu received Flagship Project status in October 2022 due to its significance to the Uganda's development



# Makuutu Stage 1 DFS Results

## BASE CASE LAYS FOUNDATION, EXTENSION OF LIFE POTENTIAL REMAINS

- The Mining Licence Application (MLA) (\*\*Pending) over Retention Licence 1693 (Application TN03834) focuses on the Stage 1 DFS and provides for a **35-Year mine life**;
- Stage 1 DFS delivers:
  - an EBITDA of A\$2.29 billion (**US\$1.60 billion**);
  - Post-Tax Free Cash Flow total ~ A\$1.46 billion (**US\$1.02 billion**);
  - Net Present Value (NPV8) (Pre-tax) of A\$580 million (**US\$406 million**); and an
  - Internal Rate of Return (IRR) of **32.7%**;
- Stage 1 production of a value-added mixed rare earth carbonate (MREC) product (including Scandium), via a modular heap desorption processing plant, amounts to a total Capital Expenditure (CAPEX) of **US\$121 million**;
- Stage 1 plant capacity is **5.0 million tonnes per annum** (Mtpa) Run of Mine (ROM) throughput;
- Stage 1 TREO production basket of **71% magnet plus heavy REO content**;
- **Maiden Ore Reserve** for the Makuutu Stage 1 over RL 1693 classified as a **Probable 172.9 Mt at 848 ppm TREO, or 584 ppm TREO – CeO<sub>2</sub>, and 30 ppm Sc<sub>2</sub>O<sub>3</sub>**;
- Uniquely positioned to be a long-term sustainable magnet and heavy REO producer, with **first MREC production targeted for 2025**; and
- **Further staged development** at Makuutu with additional tenements.

## BASE CASE RL 1693 only

Stage 1 Life

**35 Years**

EBITDA

**US\$1.60 billion**

Post-Tax Free Cash Flow

**US\$1.02 billion**

Pre-Tax Net Present Value (8)

**US\$406 million**

IRR (Post-Tax)

**32.7%**

Pre-Production CAPEX

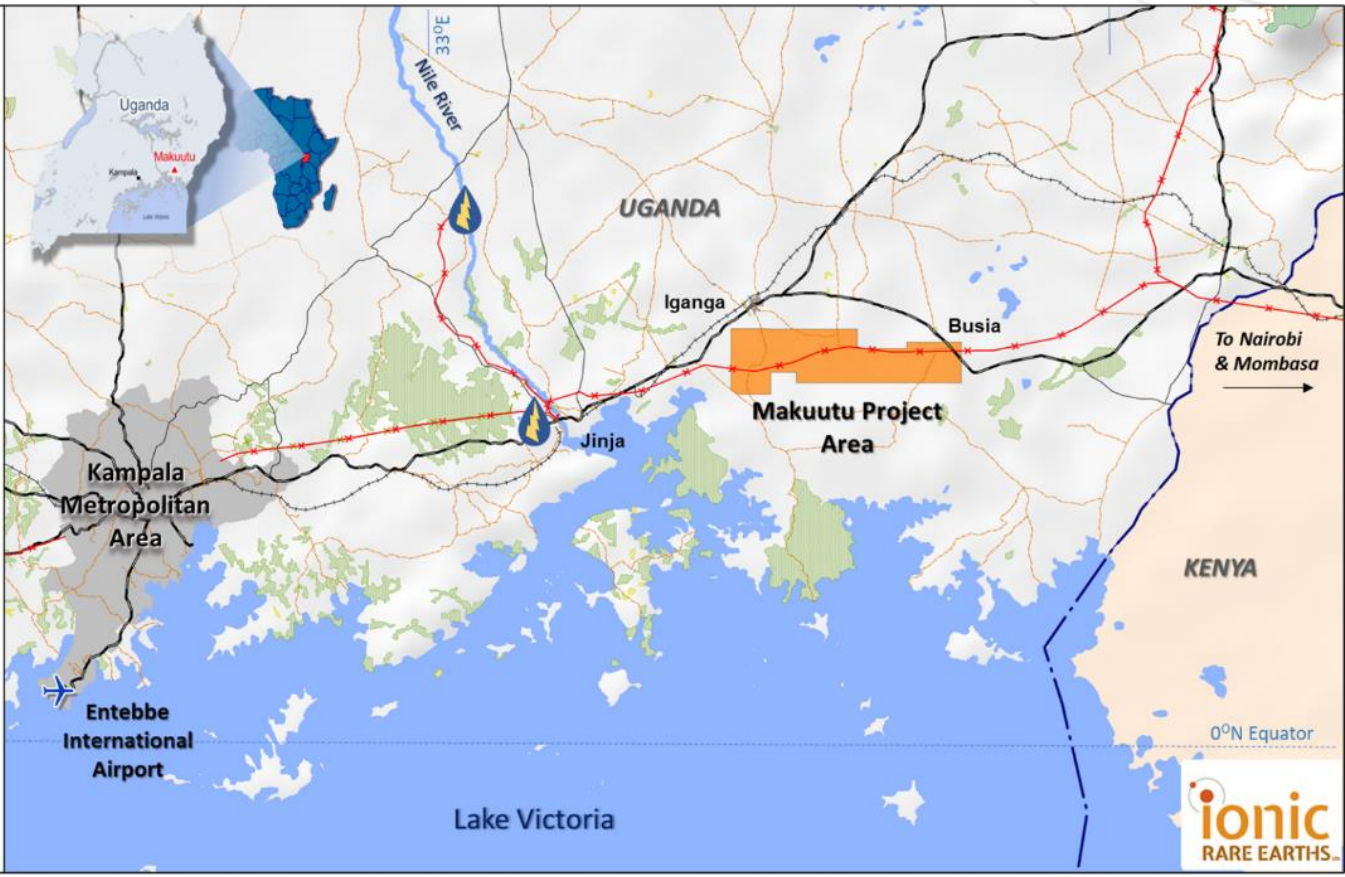
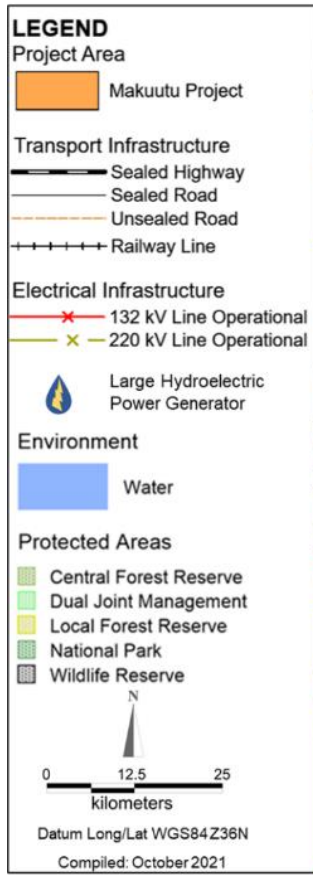
**US\$120.8 million**

Product Basket (magnet + heavy REE)

**71%**

# Tier-One Infrastructure already there – supports low CAPEX Development

## EXCELLENT LOCAL INFRASTRUCTURE SUPPORTS LOW CAPEX DEVELOPMENT



# Makuutu Mineral Resource Estimate → Stage 1 ML Pending

**MAKUUTU MRE CURRENTLY >500 MILLION TONNES, FOCUS FOR MLA ON MAKUUTU CENTRAL ZONE (RL 1693 → Application TN03834)**

JORC Makuutu MRE<sup>1</sup> of 532 million tonnes @ 640 ppm Total Rare Earths Oxide (TREO), at a cut-off grade of 200 ppm TREO-CeO<sub>2</sub>

76% of Makuutu MRE now converted to Indicated Resource, at 404 million tonnes at 670 ppm TREO

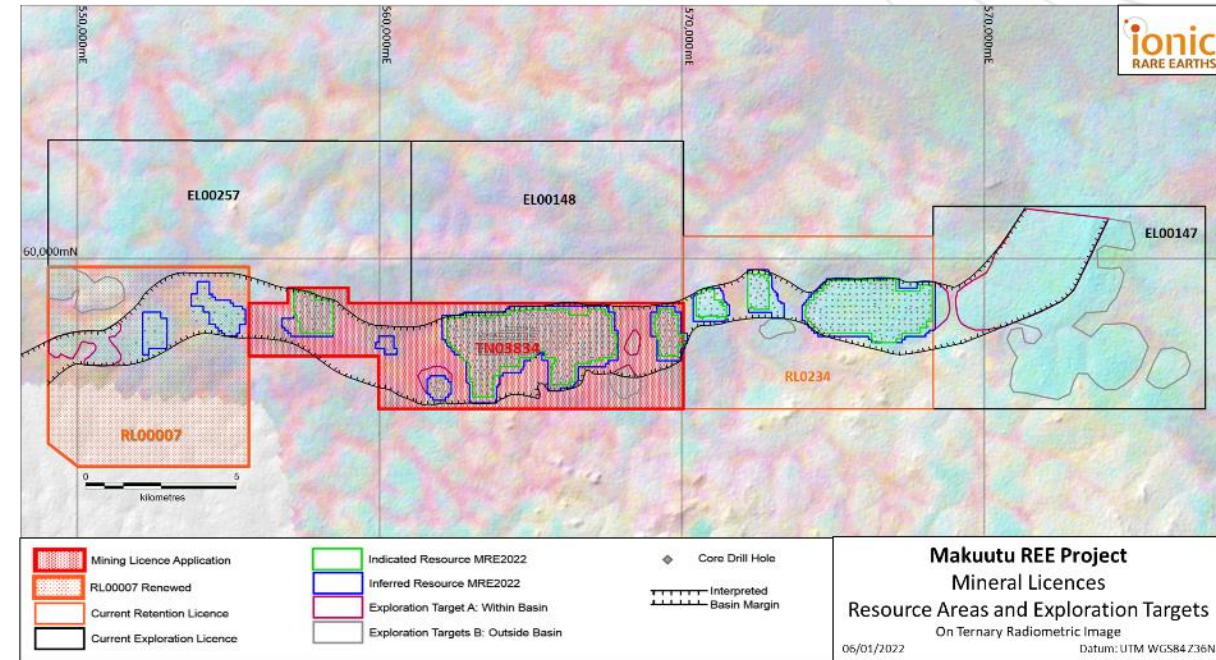
MRE on RL 1693 contains an **Indicated Resource of 259 million tonnes at 740 ppm TREO**

**Makuutu Central Zone (MCZ)**, provides a continuous resource area over **5.5km long and 3km wide for a combined 234 million tonnes** or 44% of the total resource and 52% of the total Indicated Resource

**Shallow, near surface IAC mineralisation**, with clay layer averaging 5 to 12m thick under cover approximately 3m deep. Average hole depth ~18m, **maximum clay thickness ~29m**

**Low strip ratio ~0.5 identified across RL 1693**

**Additional resource growth identified** from previous and current RAB drill programs defining significant potential on **EL00147** and **highly prospective EL00257** where maiden drill program completed and results pending



Category	Estimation Domain	Tonnes (Mt)	TREO (ppm)	TREO no CeO <sub>2</sub> (ppm)	LREO (ppm)	HREO (ppm)	CREO (ppm)	Sc <sub>2</sub> O <sub>3</sub> (ppm)
Indicated	Clay	404	670	450	500	170	230	30
Inferred	Clay	127	540	360	400	140	180	30
<b>Total Resource</b>	<b>Clay</b>	<b>532</b>	<b>640</b>	<b>430</b>	<b>480</b>	<b>160</b>	<b>220</b>	<b>30</b>

# Phase 5 Drill Program – Progressing Growth at Makuutu

Phase 5 RAB drilling on EL00147, EL00257 and RL00007 completed. Core drilling on RL00007 progressing with 79 holes (1,618 metres) drill so far

RAB drilling on EL00147 reported 43 of 45 holes validating 2021 RAB drilling – now 66 of 70 holes on this target reported REE bearing clay mineralisation above MRE cut-off grade

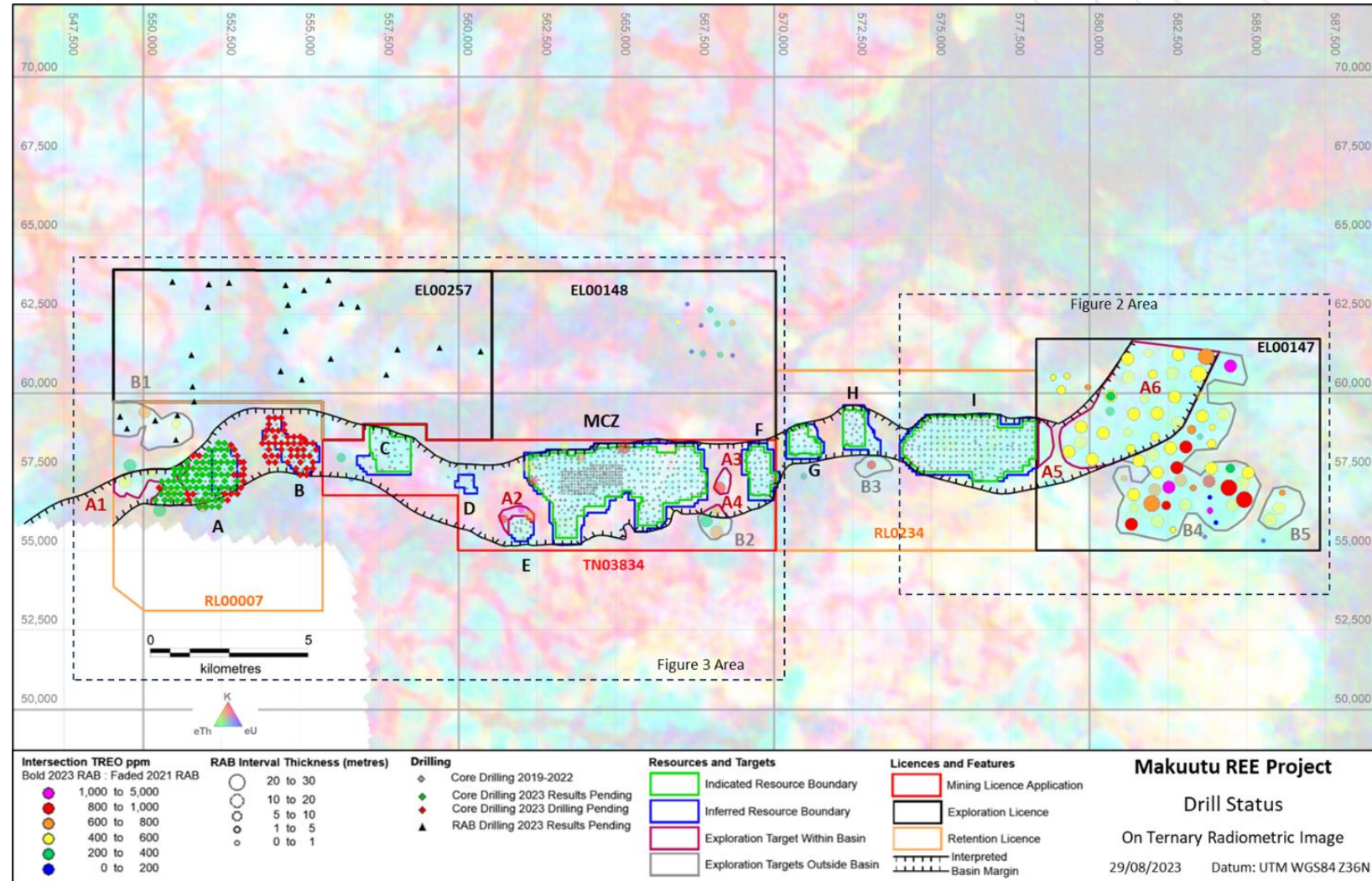
RAB drilling on EL00257 results pending on untested tenement representing potential for further Exploration Target growth

Core drilling on RL00007 required to increase MRE confidence on this tenement from Inferred to Indicated and support future MLA

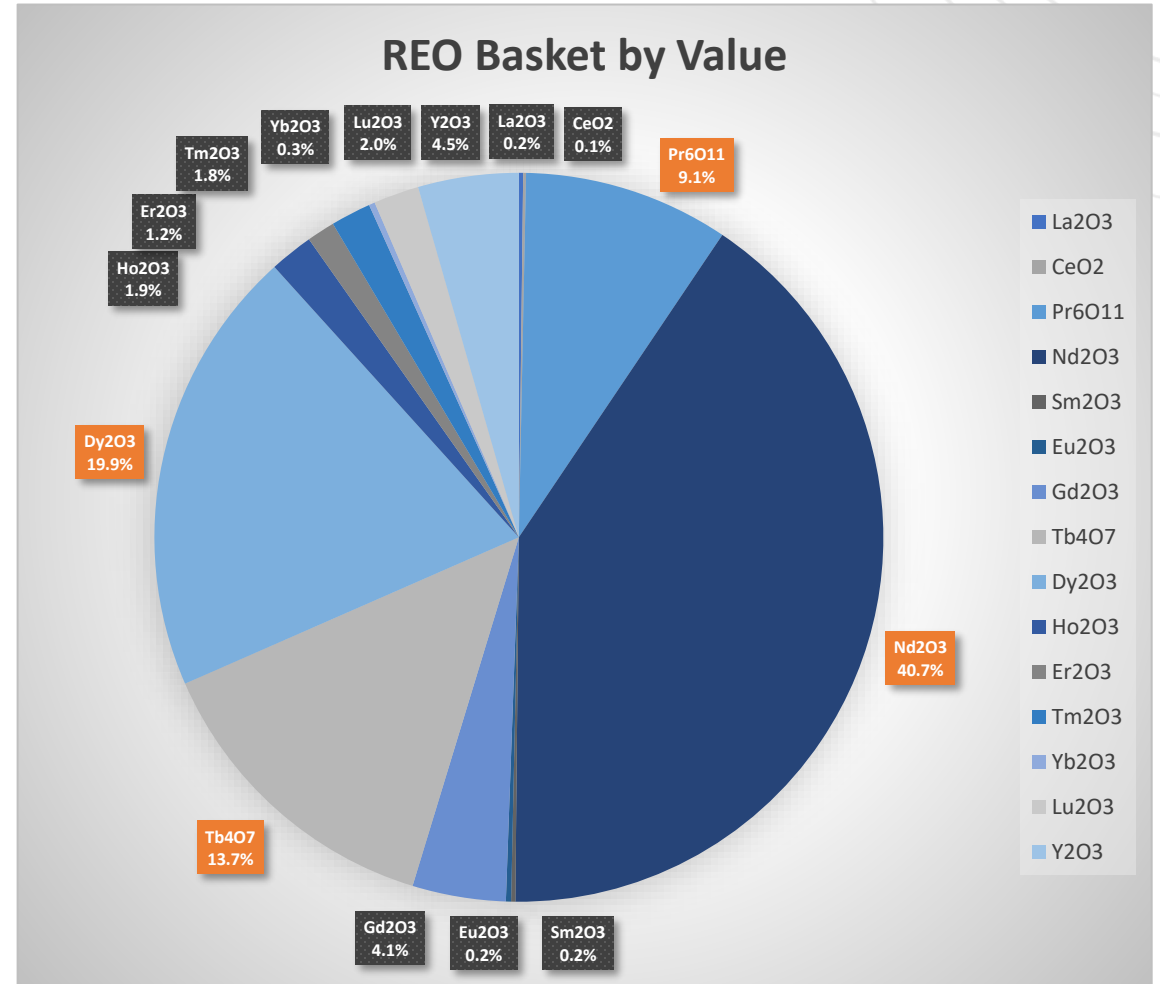
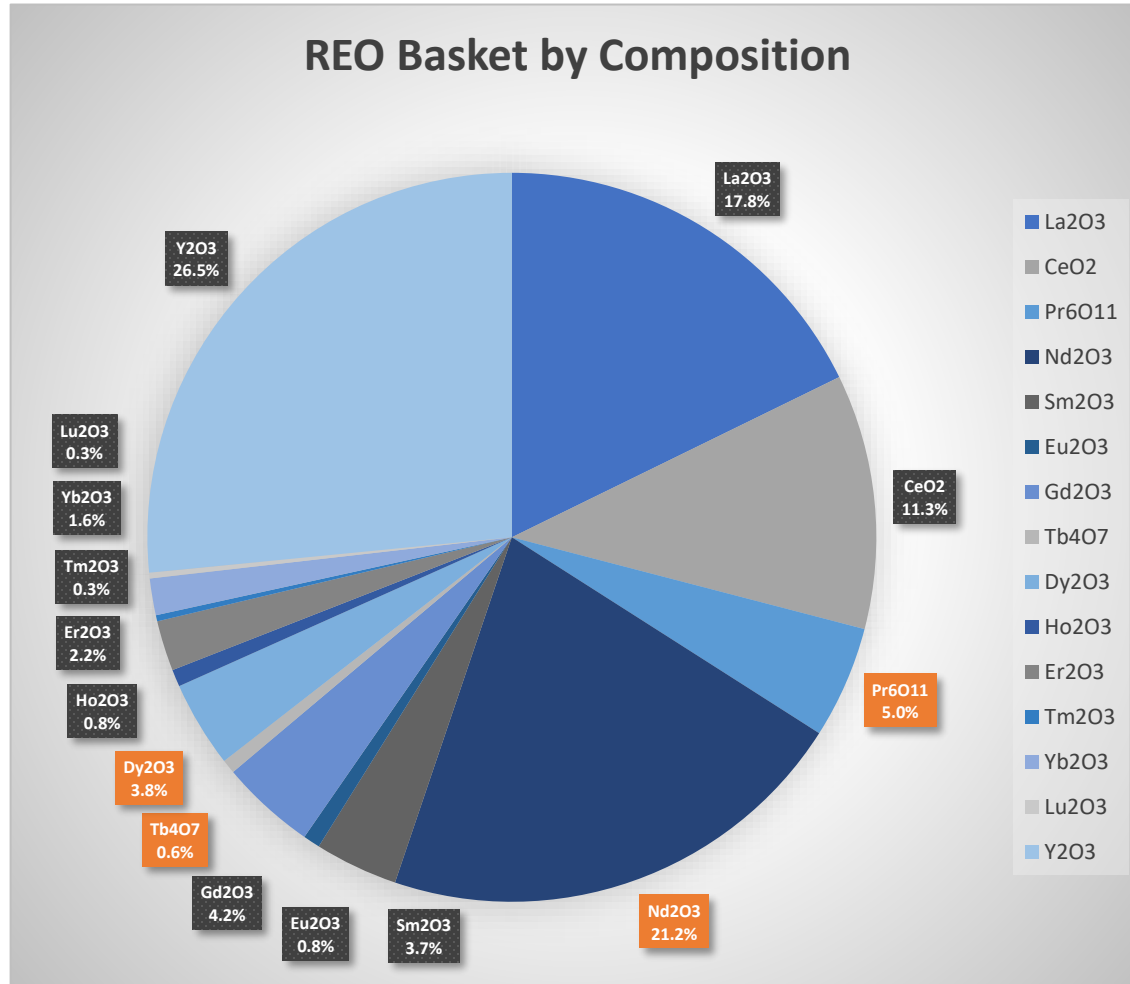
The existing Makuutu Exploration Target<sup>1</sup>, which is additional to the current Makuutu MRE, indicated a range for additional potential mineralisation at Makuutu estimated at;

**216 – 535 million tonnes grading 400 – 600 ppm TREO\***

\*This Exploration Target is conceptual in nature but is based on reasonable grounds and assumptions. There has been insufficient exploration to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.



# Makuutu Basket – Value Driven by Magnet & Heavy REOs





## Makuutu Demonstration Plant Progressing

- Technical facility erection expected to commence in September
- Phase 1 equipment in transit now from Perth → ETA end of September
- Phase 1 to include 6m columns and cribs, expected to run for remainder of 2023 prior to Phase 2 (trial heaps) in H1 2024



# ESG initiatives advancing at Makuutu



## ESG FRAMEWORK TO BUILD LASTING LEGACY, DEFINING PATH TO NET ZERO CARBON RARE EARTH FOOTPRINT



Environmental and Social Impact Assessment (ESIA) approved in October 2022

Focus on carbon footprint reduction using low-cost renewable (hydro) power

Rehabilitation plans to ensure net positive climate legacy

Water treatment for reagent recovery and rehabilitation strategy



Rehabilitation to consider development of longer-term industrial programs for employment

Aligned with Uganda's 3rd National Development Plan (NDPIII)

- Agricultural Programs to increase productivity
- Aquaculture and fish farming
- Agroforestry



Working together to build a future where everyone has a pathway to health, employment opportunities and improved living standards

Establishment of an Advisory Committee to coordinate community development investment priorities

Key focus being community health and education

A member of the UN Global Compact



Community socio-economic baseline surveys across initial project area completed

Expanding our Ugandan team to drive Project activity in country

Community and Stakeholder engagement a significant focus for Ugandan team

Local support for sub-district health clinics during Covid-19

Land access agreements secured for Demonstration plant at Makuutu

# Makuutu Next Steps & Work Plan for 2023 and 2024

- Ugandan government processing Mining Lease award for RL 1693
- Ongoing Community and Stakeholder engagement activity and expanding work program on Resettlement Action Plan (RAP)
- Capacity building in Uganda – recruitment and training in Uganda (~ 80 staff in Uganda)
- Exploration programs for EL00147 and EL00257 to update Exploration Target (~Q4, 2023) and define future growth potential
- Drilling programs for RL 00007 to increase resource confidence to Indicated classification (~Q1 2024) to support next MLA area (Nov 2024)
- **Demonstration Plant Program in Uganda to de-risk Makuutu ahead of expected Final Investment Decision**
  - Phase 1; Technical facility operational (~ Oct 2023)
    - Further scale up of metallurgical test work to scale up heap desorption conditions from 3m stack height → 6m + (columns, cribs), residue characterisation and production of MREC product for downstream product verification & offtake
  - Phase 2; Trial pit mining and processing (H1 2024)
    - Trial pit grade control and reconciliation of insitu grade to recovered product, material handling and equipment selection verification, operation of heap desorption modules, residue characterisation and production of MREC product for downstream supply chain partners and refinery test work / piloting feed stream
- **Next phase of engineering to support Makuutu execution program**
- **Makuutu offtake commitment**





# A leader in rare earth separation, refining and recycling

Ionic Technologies is our patented magnet recycling technology company based in Belfast UK.

Technology developed within Queens University Belfast (QUB)

Unique recycling technology that can **hydrometallurgically extract, separate and refine** magnet REOs from spent magnets and swarf to **high purity 99.9%+ oxides – Nd<sub>2</sub>O<sub>3</sub>, Pr<sub>6</sub>O<sub>11</sub>, Dy<sub>2</sub>O<sub>3</sub> and Tb<sub>4</sub>O<sub>7</sub>**

Sept 2022 awarded grant of **£1.72 million (~ A\$2.9 million)** from the **UK Government's Innovate UK Automotive Transformation Fund Scale up Readiness Validation (SuRV) programme** to help secure the UK supply of critical rare earth metals for EV manufacturing

**New Belfast Technical Centre now operational**, and Magnet Recycling Demonstration Plant in production, to convert 30 tonnes/annum NdFeB magnets → 10 tonnes/annum magnet REOs

Provide springboard to accelerated rare earth production capacity, with potential to **commence magnet REO production at small scale in 2023** whilst Makuutu is being developed and ramped up and in parallel to the development of the Refinery

Potential to **facilitate collaboration / partnership agreements on downstream supply chain** from REOs, RE metals, RE alloys and NdFeB magnets

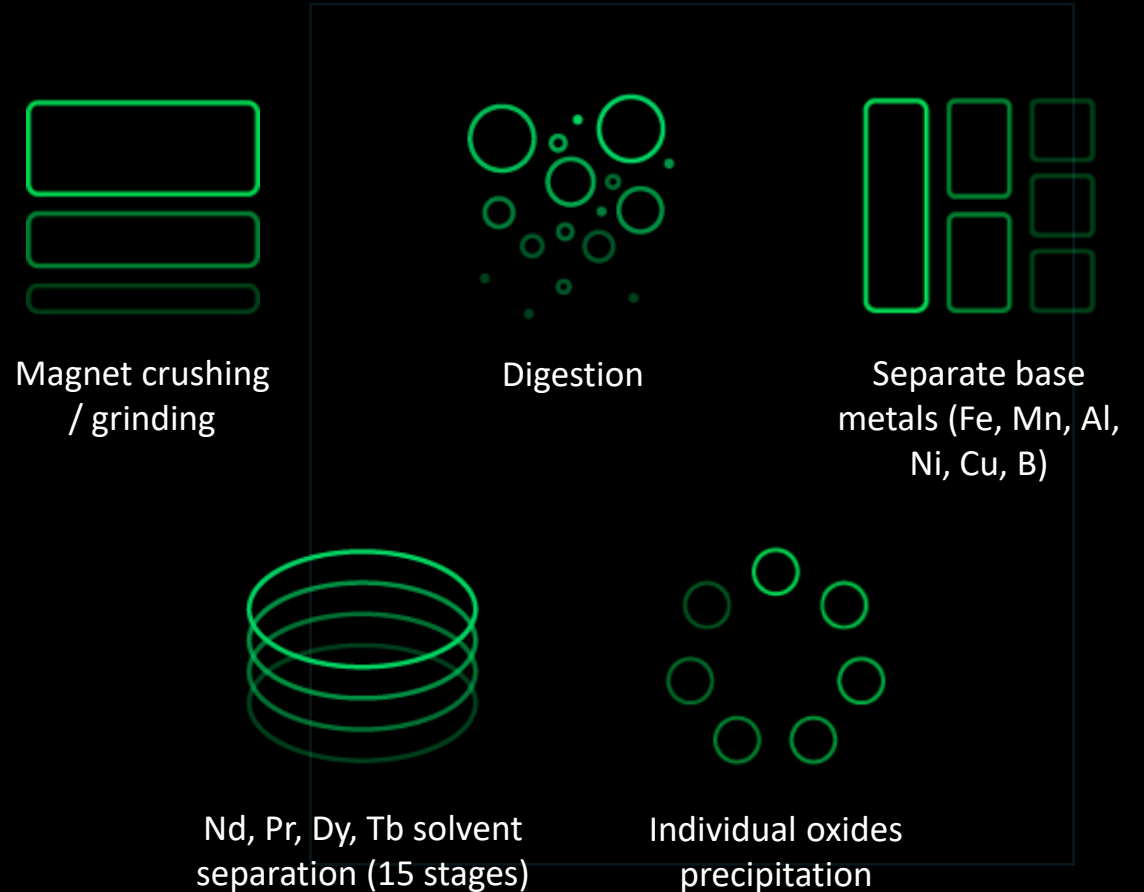
# Ionic Technologies' Technology

Ionic Technologies has developed rare earth element separation and refining technology, applying this to the recycling and refining of individual magnet rare earths from spent permanent magnets.

Our process is agnostic on feedstock quality and variability in composition to deliver high purity separated magnet rare earth oxides.

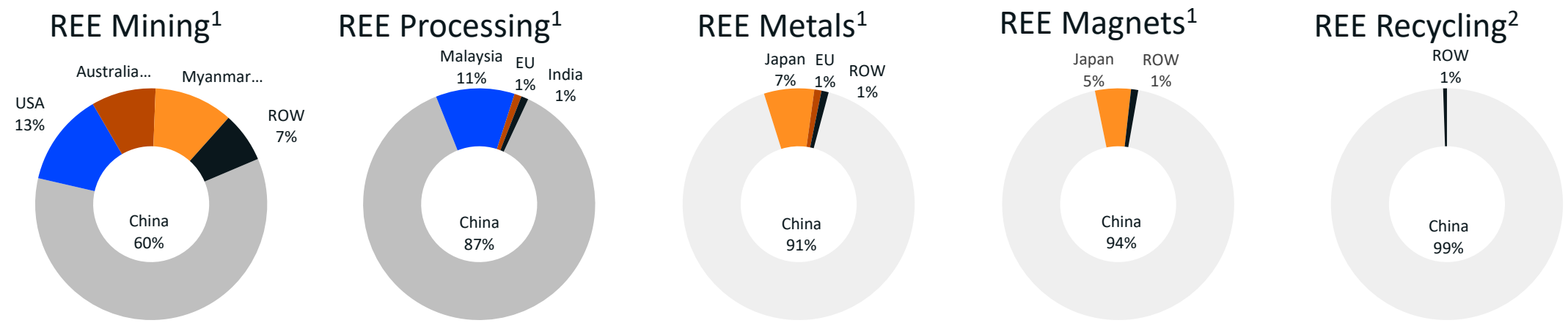
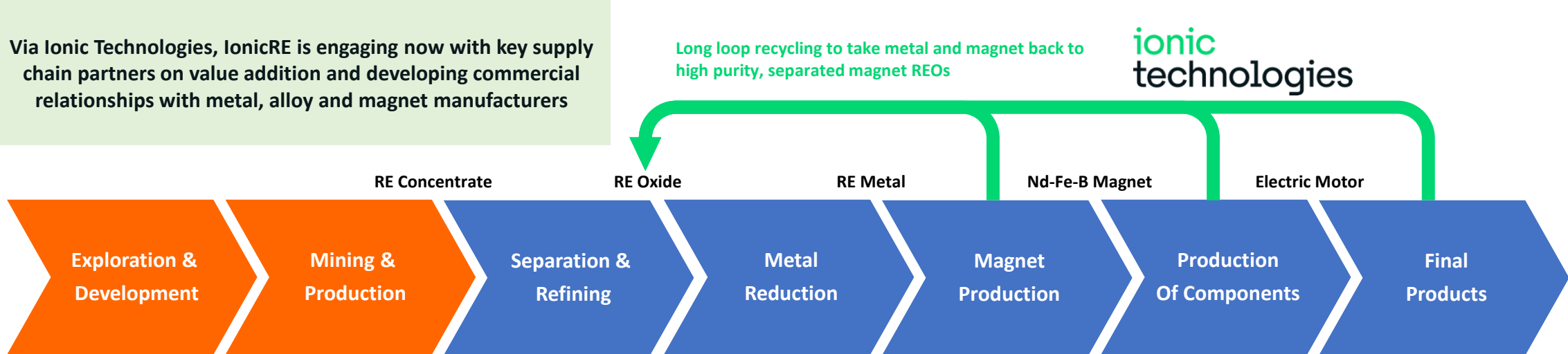
## Intake flexibility

Our technology can recycle any form of mixed waste magnets and production swarf regardless of type, age or coatings. We are not reliant on a single feedstock stream.



# Rare Earth Supply Chain

## The unlock through Ionic Technologies



<sup>1</sup> Rare Earth Magnets and Motors: A European Call for Action A report by the Rare Earth Magnets and Motors Cluster of the European Raw Materials Alliances, Oct 2021. Argus Analytics Oct 2021. <sup>2</sup> Wood Mackenzie Global rare earths short-term outlook August 2022.

# Ionic Technologies Demonstration Plant

Our Demonstration Plant in Belfast is producing high purity, separated magnet REO now.

Ionic Technologies is processing both end of life magnets (waste) and swarf, to recover, separate and refine high-purity magnet Rare-Earth Oxides (REOs) using our sustainable, patented technology.

Next 12-month plan is to process 30 tonnes of NdFeB magnet feedstock, producing over 10 tonnes of separated magnet REOs.

Over 50 tonnes of NdFeB magnets secured.



# IonicRE Activity Ramping Up Year-on-Year

VALUE UNLOCKED THROUGH ACCELERATED WORK PROGRAMS AT MAKUUTU & IONIC TECHNOLOGIES



# IonicRE is on the cusp of a re-rate via de-risking Makuutu / IonicTech

## CAPITAL STRUCTURE (as @ 01/09/2023)

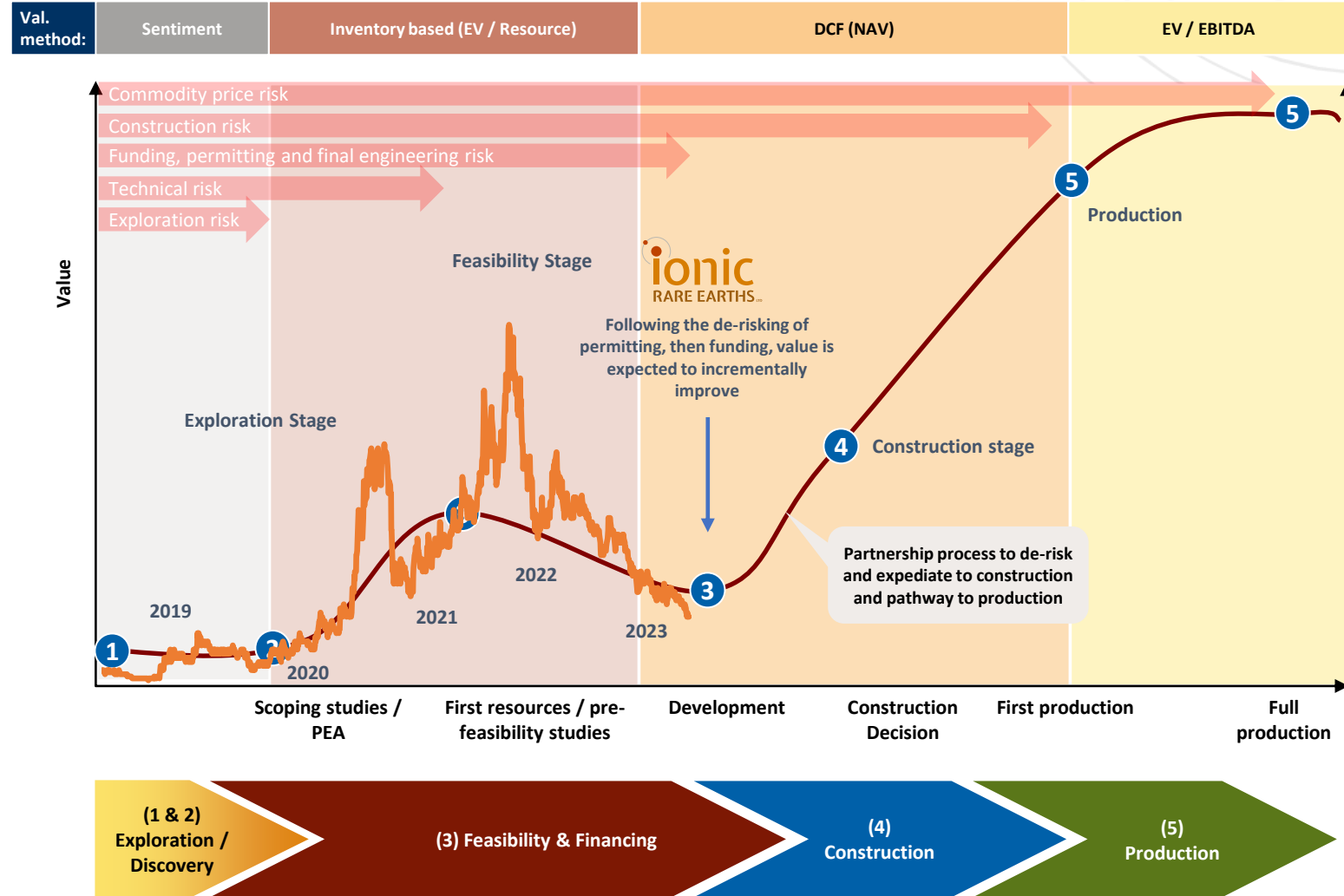
Shares Outstanding	3,946,104,920
Total Options Outstanding	150,000,000 (exercisable at 2.15 to 6.4 cents)
Total Outstanding Performance Rights	6,700,000
Share Price	A\$0.019
Market Capitalisation	A\$75 million
12-month Share Price Range	A\$0.016 – A\$0.051
12-month Average Daily Volume / Turnover	14m shares (~A\$0.5m)
Cash Balance (30/06/2023)	A\$11 million

## IXR MAJOR SHAREHOLDERS

Major Shareholders (Top 20)	26.4%
Board, Executives, & Key Advisors	8.0%

## BOARD AND MANAGEMENT

Tim Harrison	Managing Director
Max McGarvie	Non-Executive Director
Sufian Ahmad	Non-Executive Director
Brett Dickson	Company Secretary & CFO
Tommie van der Walt	Chief Operating Officer
Lynden Polonsky	Chief Development Officer



# IonicRE Value Proposition

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- DIRECT EXPOSURE TO RARE EARTHS MARKET GROWTH
- IONIC TECHNOLOGIES → ENTRY INTO A CIRCULAR ECONOMY FOR MAGNET RARE EARTHS
- MAKUUTU IS A LARGE, DEVELOPMENT READY IONIC ADSORPTION CLAY DEPOSIT
- LOW CAPITAL ACCESS TO MAGNET AND HEAVY RARE EARTHS
- STRATEGIC IMPORTANCE AS ONE OF FEW EX-CHINA SUPPLY OPTIONS
- GEO-POLITICAL TENSIONS DRIVING DEMAND FOR SECURE AND RESILIENT ALTERNATIVE SUPPLY
- DOWNSTREAM REFINING POTENTIAL TO UNLOCK VALUE OF MAKUUTU BASKET

*“When peering into the outlook for the next decade to come, it becomes quickly apparent that the rapid demand growth of the 2020s will soon be dwarfed by the astronomical demand growth of the 2030s – and therein lies the real defining challenge and opportunity facing the global rare earth industry today.*

*If the global industry continues to operate myopically – preparing, anticipating and investing only for a three to five-year outlook – the rate of demand growth for magnet rare earths will soon reach ‘escape velocity’; a point at which annual demand growth becomes so great (i.e. >6,000 tonnes per annum) that it is simply implausible for the already-lagging supply-side to catch up and keep up.”*

**Adamas Intelligence, Sept 28, 2020**



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