Makuutu Rare Earths Project Scoping Study

Demonstrates Potential to develop a Sustainable, Long-Life, CREO/HREO Supply

4 May 2021

Important Notice and Disclaimer

Forward Looking Statements

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Competent Persons Statement

Information in this announcement that relates to previously reported Exploration Targets and Exploration Results has been crossed-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 March 2021 and is available to view on www.asx.com.au (ASX:IXR). The Mineral Resource Estimate is as at 3 March 2021 and was reported in accordance with JORC Code 2012 guidelines. 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 and that relates to mine design, planning and optimisation is based on information reviewed by Mr Lee White who is Principal Engineer of Ionic Rare Earths Limited and engaged through a service contract with Libertas Infinity Pty Ltd. Mr White is a Member of the AusIMM. Mr White has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined by the JORC Code 2012. Mr White consents to the inclusion in this announcement of the matters based on their information in the form and context in which it appears.

The information in this report and that relates to metallurgy testwork is based on information reviewed by Mr Tim Harrison who is Managing Director of Ionic Rare Earths Limited and engaged through a service contract with Horizon Metallurgy Pty Ltd. Mr Harrison is a Fellow of the AusIMM. Mr Harrison has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity being undertaken to qualify as a Competent Person as defined by the JORC Code 2012. Mr Harrison consents to the inclusion in this announcement of the matters based on their information in the form and context in which it appears.

Important Notice and Disclaimer

Cautionary Statement – Scoping Study Parameters

This Scoping Study has been undertaken to determine the potential viability of an open pit and heap leach process plan to produce a mixed rare earth carbonate product onsite at the Makuutu Rare Earths Project (“Makuutu” or the "Project"), and to provide Ionic Rare Earths Limited (“IonicRE” or "the Company") with the confidence to advance to Bankable Feasibility Study. The results should not be considered a profit forecast or a production forecast.

The Study is a preliminary technical and economic study of the potential viability of the Makuutu Rare Earths Project. In accordance with the ASX Listing Rules, the Company advises it is based upon low-level technical and economic assessments (+/- 50%) that are not sufficient to support the estimation of Ore Reserves, or to provide assurance of an economic development case at this stage, or to provide certainty that the conclusions of the Study will be realised.

Further evaluation work including infill drilling, metallurgical testwork and appropriate studies are in progress and required before IonicRE will be in a position to estimate Ore Reserves and to provide assurance of an economic development case.

In accordance with ASX and ASIC guidance, the Base Case Production Target over an initial life of 11 years referred to in this announcement is based upon JORC Mineral Resources which are classified as approximately 69% Indicated and 31% Inferred. The Company has concluded that it has reasonable grounds for disclosing this Production Target. This 11-year period covers the full allocation of installed process plant capital investment.

IonicRE confirms that the Base Case financial viability of the Makuutu Rare Earths Project is not dependent on the inclusion of Inferred Resources in the production schedule.

The Study is based upon material assumptions outlined elsewhere in this announcement. These include assumptions about the availability of funding. While IonicRE considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Study will be achieved.

The Company has concluded it has a reasonable basis for providing forward-looking statements included in this announcement and believes that it has a reasonable basis to expect it will be able to fund the development of the Project. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Study.

This announcement contains a series of forward-looking statements. Generally, the words "expect," “potential”, "intend", “estimate", "will" and similar expressions identify forward-looking statements. By their very nature forward-looking statements are subject to known and unknown risks and uncertainties that may cause actual results, performance or achievements, to differ materially from those expressed or implied in any forward looking statements, which are not guarantees of future performance. Statements in this announcement regarding IonicRE’s business or proposed business, which are not historical facts, are forward-looking statements that involve risks and uncertainties, such as Mineral Resource estimates, market prices of metals, capital and operating costs, changes in project parameters as plans continue to be evaluated, continued availability of capital and financing and general economic, market or business conditions, and statements that describe IonicRE’s future plans, objectives or goals, including words to the effect that IonicRE or management expects a stated condition or result to occur.

Forward-looking statements are necessarily based on estimates and assumptions that, while considered reasonable by IonicRE, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Since forward-looking statements address future events and conditions, by their very nature, they involve inherent risks and uncertainties. Actual results in each case could differ materially from those currently anticipated in such statements. Investors are cautioned not to place undue reliance on forward-looking statements, which speak only as of the date they are made.

IonicRE has concluded it has a reasonable basis for providing these forward-looking statements and believes it has reasonable basis to expect it will be able to fund development of the project. However, a number of factors could cause actual results or expectations to differ materially from the results expressed or implied in the forward-looking statements. Given the uncertainties involved, investors should not make any investment decisions based solely on the results of this study.

The project development schedule assumes the completion of a Bankable Feasibility Study (BFS) by the end of Q3 2022. Environmental permitting and development approvals are the main time determining factors to first production, scheduled for the first half of 2024. The key document for the environmental approval process is the Environmental and Social Impact Assessment (ESIA) and this is due to be lodged in Q1 2022. Delays in the environmental approval process or any other development approval could result in a delay to the commencement of construction (planned for early 2023). This could lead to a delay to first production. The Company’s stakeholder management and community engagement programs are also intended to increase awareness and communication across the local districts within Uganda to assist with facilitating approvals. Given these factors, the dates are indicative only.

To achieve the range of outcomes indicated in the Scoping Study, pre-production funding of approximately US$89 million will likely be required. Investors should note that there is no certainty that IonicRE will be able to raise that amount of funding when needed. It is also likely that such funding may only be available on terms that may be dilutive to or otherwise affect the value of IonicRE’s existing shares.

It is also possible that IonicRE could pursue other ‘value realisation’ strategies such as a sale, partial sale or joint venture of the Project. If it does, this could materially reduce IonicRE's proportionate ownership of the Project. Alternatively, IonicRE could seek to increase its ownership in the Project given the nature of the existing earn-in arrangement to the Project.

It is anticipated that finance will be sourced through a combination of equity from existing shareholders, new equity investment and debt providers. In February 2021, the Company completed a A$12 million share placement of which A$10 million was corner-stoned by highly experienced institutional investors. Further, strong indications of equity support exist from various groups including strategic partner interest and investment houses. The Board considers that the Project cash flows outlined in the Scoping Study are supportive of pre-production debt funding of the Project on normal commercial terms.

The Board considers that the Company has sufficient cash on hand to undertake the next stage of planned work programs, including the completion of a Bankable Feasibility Study (BFS), continued metallurgical testing, the commencement of further technical studies and ongoing exploration of the project area.

Robust Scoping Study Outputs

Base Case lays foundation, Extension of Life Potential Remains

- Scoping Study confirms **robust Base Case 11-year CREO and HREO production potential** and Strategic importance of Makuutu (51% IonicRE ownership)
- Highly attractive economic parameters (refer ASX 29 April 2021);
  - Post tax long term free cash flow **US$766 million** over 11 years
  - EBITDA of **US$1.28 billion**
  - Post tax Net Present Value (8) of **US$321 million**
  - Internal Rate of Return of **38%**
  - Pre-production CAPEX requirement of **US$89 million**
  - Expansion CAPEX of **US$212 million**
- **Infrastructure already there** – existing highway and road access to site, nearby power infrastructure with readily available hydropower, rail, cell phone communications and water availability
- **Highly desirable** Project given **Ionic Adsorption Clay (IAC) mineralisation**
- Strategic partnering process underway → Non-binding MOU signed with Chinalco subsidiary **China Rare Earths Jiangsu** to accelerate Makuutu mine development to production
- Potential for **substantially extending Life of Mine** with additional drilling committed to upgrade Inferred Resources → Indicated Resources at Makuutu → Increased Production Target for future studies

BASE CASE

11 Years, 69% Indicated Resource, 31% Inferred Resource

Post-Tax Free Cash Flow
US$766 million

EBITDA
US$1.28 billion

Post-Tax Net Present Value (8)
US$321 million

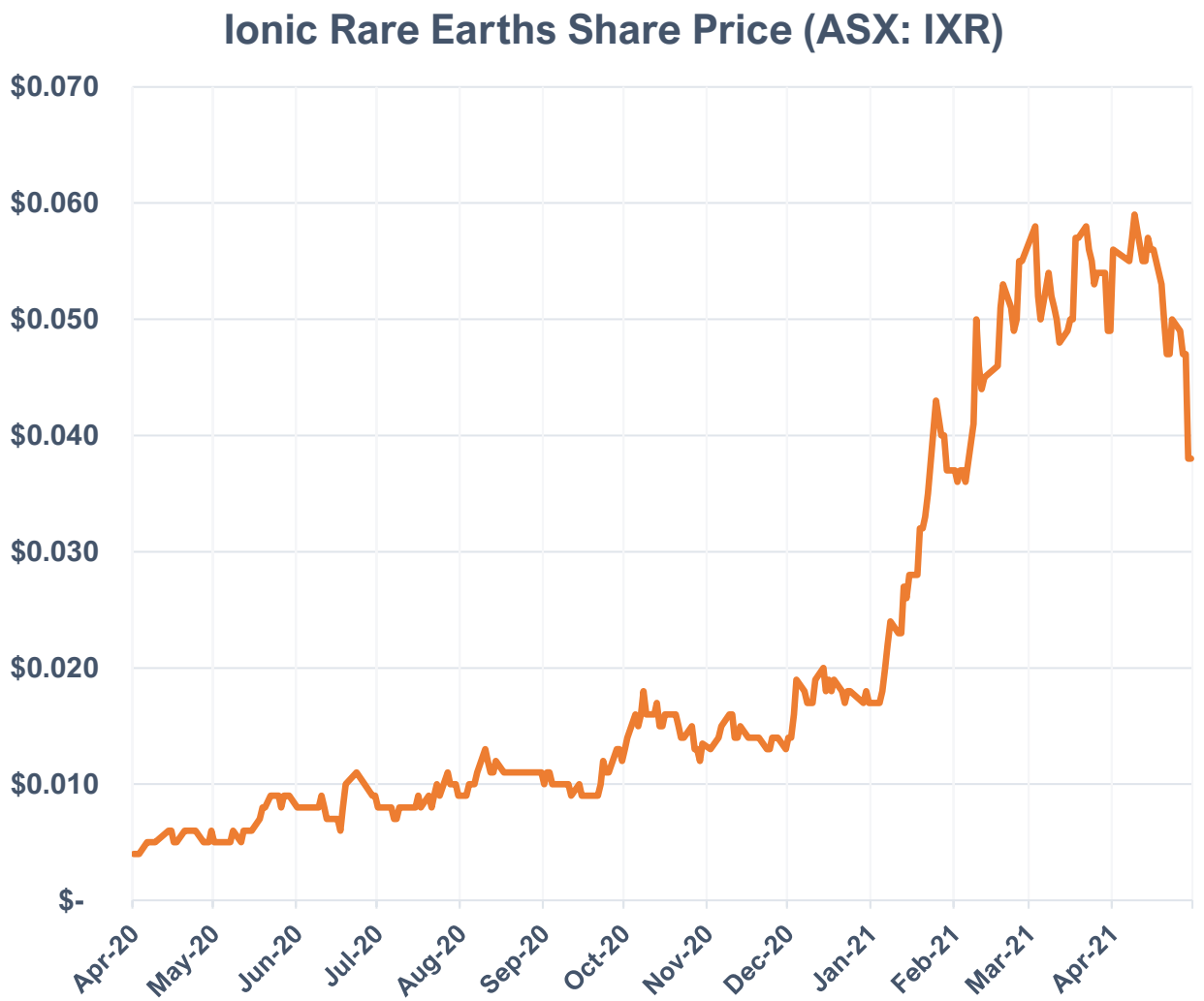
IRR (Post-Tax)
38%

Production Target only
84.5 Mt of 315 Mt MRE
→ Upside remains

+ Additional infill drilling
↑ Indicated Mineral Resources
Expanded plant CAPEX completed
REO Production capacity ramped up to 4,000 tpa REO equivalent

Ionic Rare Earths Limited Corporate Snapshot

CAPITAL STRUCTURE (as @ 30/04/2021)	
Shares Outstanding	3,196,399,514
Total Options Outstanding	381,000,000 (exercisable at 0.75 to 6.0 cents)
Share Price	A$0.038
Market Capitalisation	A$121 million
52 week share price range	A$0.005 – A$0.065
Cash Balance (31/03/2020)	A$12 million
IXR MAJOR SHAREHOLDERS	
Major Shareholders	15%
Board, Executives, & Key Advisors	8%
BOARD AND MANAGEMENT	
Trevor Benson (B.Sc.)	Chairman
Tim Harrison (B.E(Chem), FAusIMM)	Managing Director
Brad Marwood (B.E(Mining), FAusIMM)	Non Executive Director
Brett Dickson (B. Bus, FCPA)	Company Secretary & CFO



315 Million tonne IAC Mineral Resource Estimate

11 year Base Case supported by 66Mt Indicated Resource

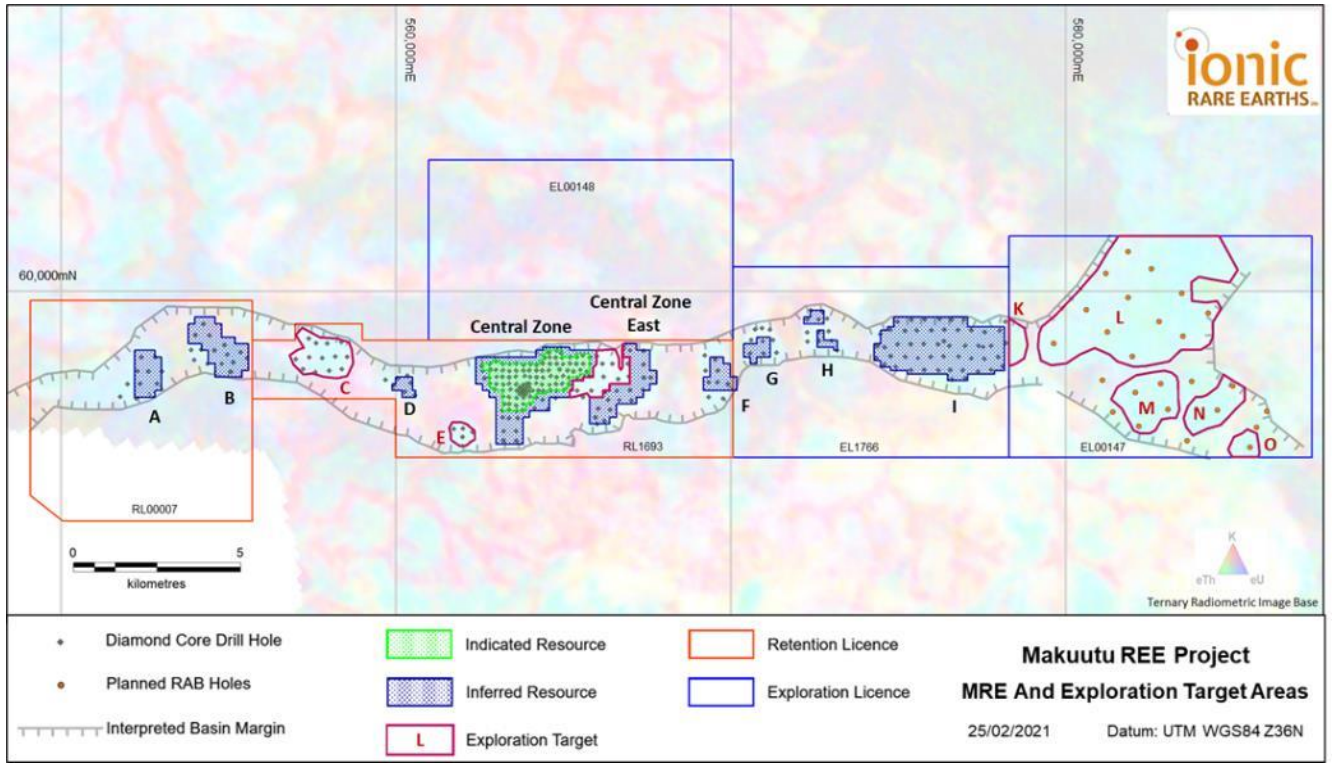
- 279 drill holes (4,754 metres) completed between October 2019 and October 2020 defining JORC MRE
- Updated MRE of **315 Mt @ 650 ppm Total Rare Earths Oxide (TREO)**[1], at a cut-off grade of 200 ppm TREO-CeO_2
- **Base Case Production Target of 84.5 Mt @ 810 ppm TREO** consisting of 69% Indicated Resource and 31% Inferred Resource – **potential to add Production Target with additional infill drilling**
- **Shallow, near surface mineralisation**, with clay layer averaging 5 to 12m thick under cover approximately 3m deep. Average hole depth ~17m
- Near term exploration upside on areas that haven't converted;

Area C: 14 – 27 Million tonnes grading 450 – 675 ppm TREO

Area E: 5 – 10 Million tonnes grading 450 – 675 ppm TREO

Central East: 8 – 17 Million tonnes grading 600 ppm – 820ppm 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.



Category	Estimation Domain	Tonnes (Mt)	TREO (ppm)	TREO no CeO_2 (ppm)	LREO (ppm)	HREO (ppm)	CREO (ppm)	Sc_2O_3 (ppm)
Indicated	Clay	66	820	570	590	230	300	30
Inferred	Clay	248	610	410	450	160	210	30
Total Resource	**Clay**	**315**	**650**	**440**	**480**	**170**	**230**	**30**

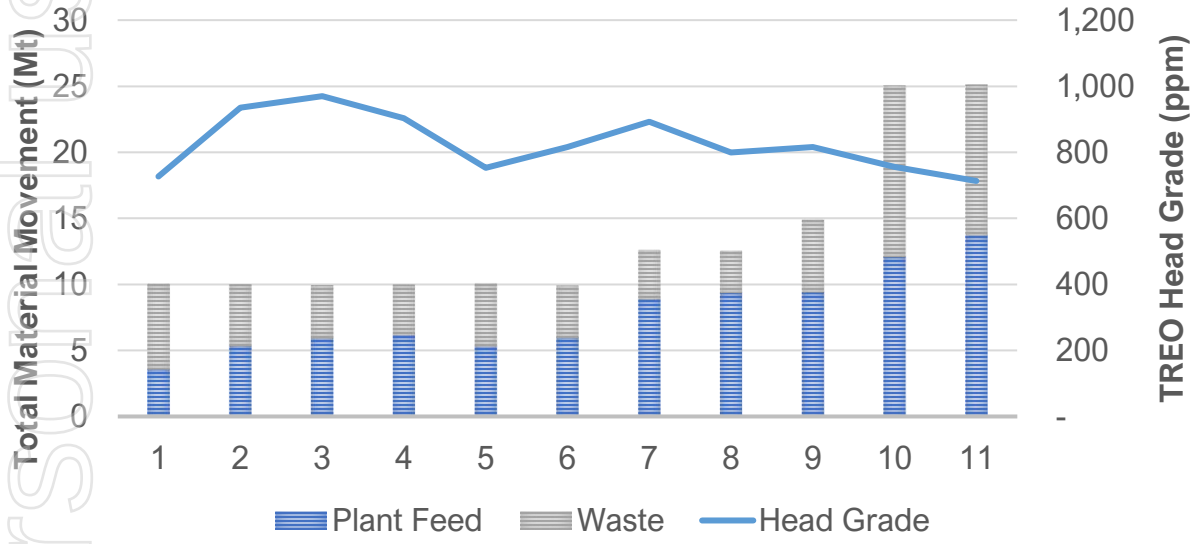
[1] ASX announcement 3rd March 2021

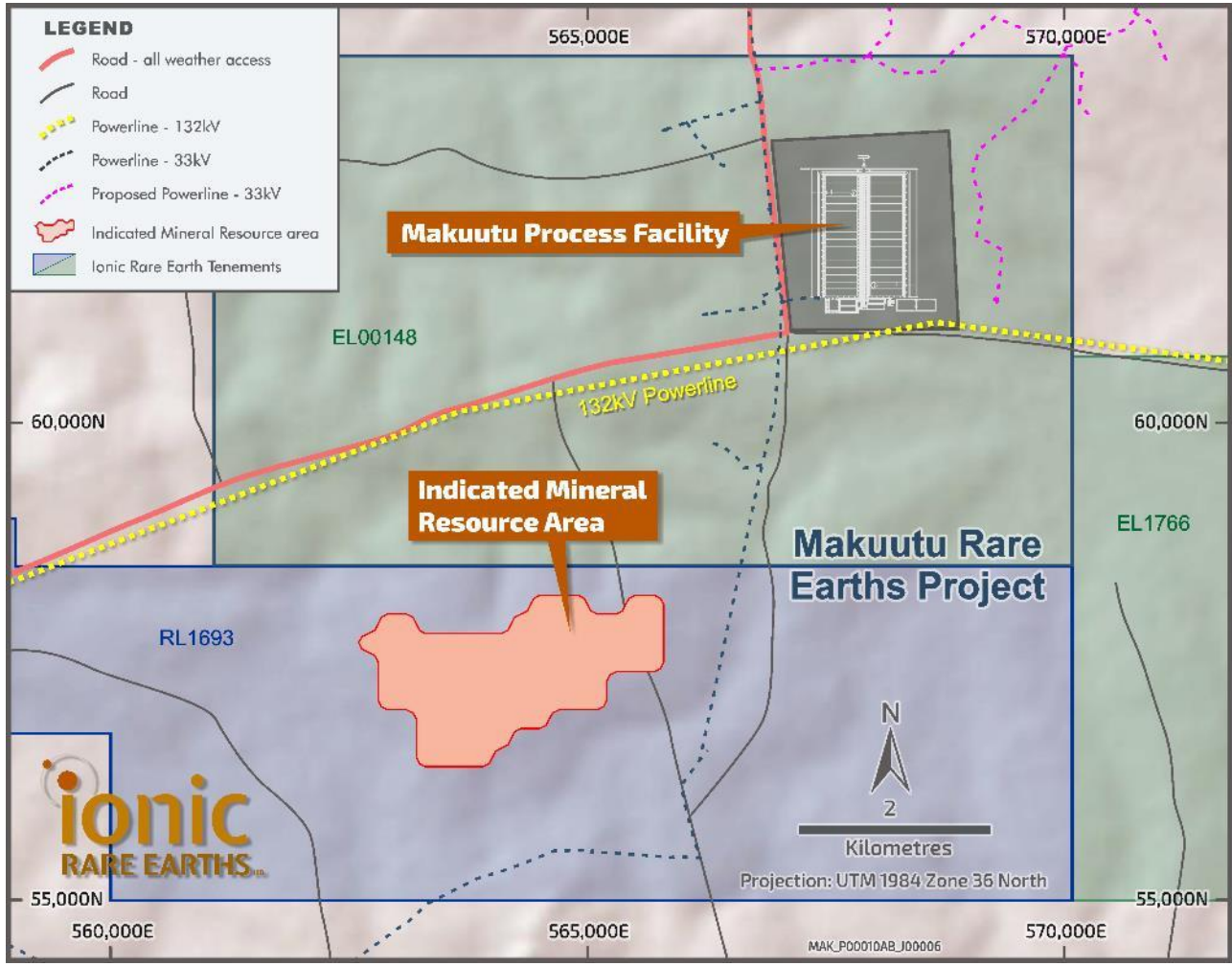
Rounding has been applied to 1Mt and 10ppm which may influence averaging calculation.

Mine Plan – Base Case

11 Year scenario that covers cost of Project Development

- Mine Plan developed with prioritisation of Indicated resource over Inferred resource
- 11 year Base Case Production Target of 84.5 Mt @ 810 ppm TREO consists of 69% Indicated Resource and 31% Inferred Resource
- Mining rate commenced at 10 Mtpa and stepped up to 12.5 Mtpa in Year 7, 15.0 Mtpa in Year 9 and 25 Mtpa in Year 10
- Strip ratio of 0.76



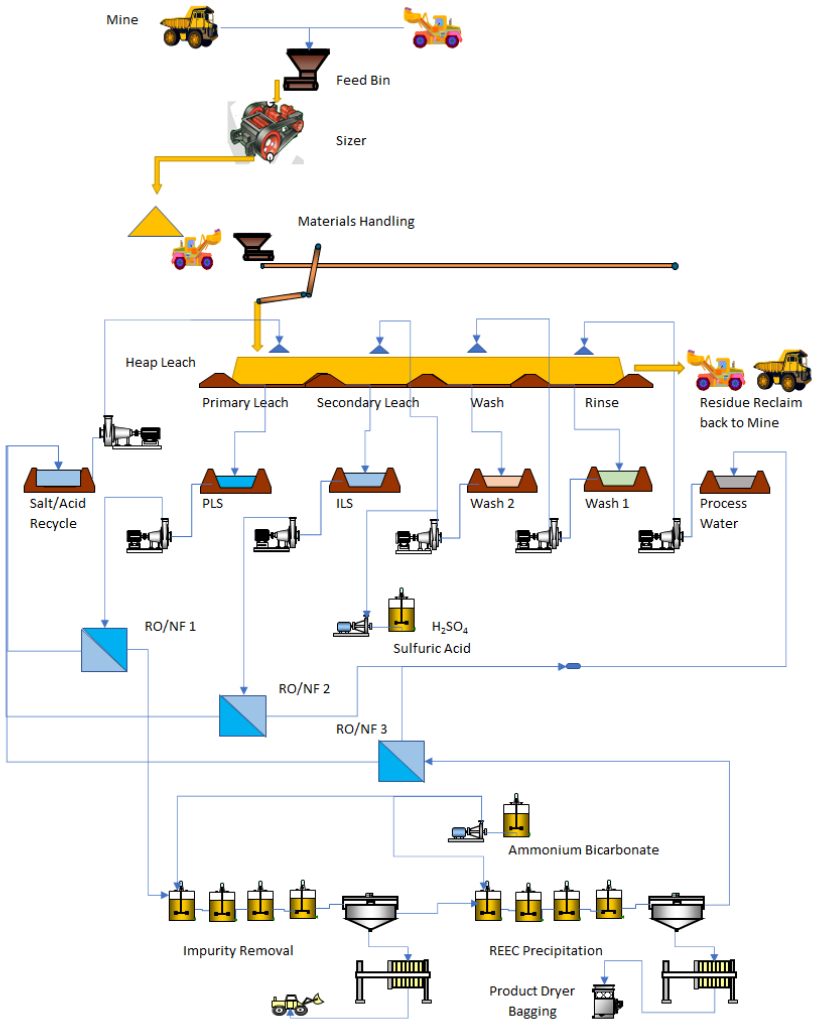


Makuutu Ramp Up Profile – Base Case

Modular Expansion ramping up production capacity

- Module 1 developed to mine 10 Mtpa total material movement and process 2.5 Mtpa via heap leach / desorption capacity, with 2,250 tpa precipitation circuit for mixed rare earth carbonate (MREC) product, including membrane water treatment circuits to enable recycling of process liquors, recovery of ammonium sulfate (salt) and upgrading of REE pregnant lech solutions (PLS) and intermediate leach solution (ILS)
- Additional Module 2 will increase heap leach / desorption processing capacity to 5.0 Mtpa plus add membrane circuit capacity
- Module 3 replicate Module 1 processing plant capacity (increase to 7.5 Mtpa) and expands MREC precipitation capacity to 4,500 tpa
- Modules 4 (to 10 Mtpa) and 5 (to 12.5 Mtpa) will each add heap leach / desorption and membrane water treatment capacity

Rated Capacity		Module 1	Module 2	Module 3	Module 4	Module 5
Heap Leach / Desorption	Mtpa Plant Feed	2.5	5.0	7.5	10.0	12.5
MREC Precipitation	ktpa REO equiv.	2,250	2,250	4,500	4,500	4,500
Water Treatment	Mtpa Plant Feed	2.5	5.0	7.5	10.0	12.5



Makuutu CAPEX Profile – Base Case

CAPEX (+/- 50%) spend over Base Case builds Project Capacity

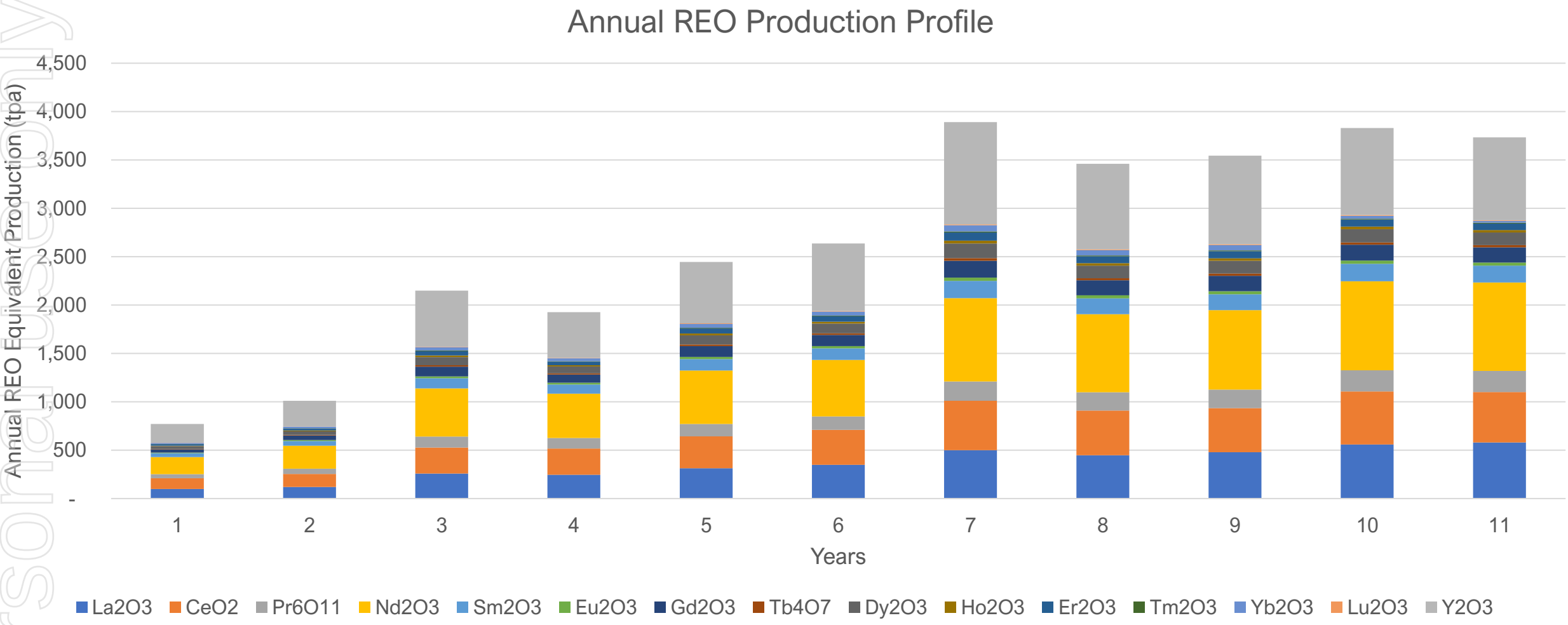
- Module 1 developed with Pre-Production CAPEX requirement of US$89 million, including mining fleet, process plant, infrastructure and Owner's cost -
- Ramp up to be optimised during BFS
- Modular Project development at Makuutu staged to enable funding (US$212 million)
- Staged approach limits investment risk whilst maximising upside for investors to grow Makuutu CREO & HREO production capacity
- CREO / HREO production capacity hitting straps by 2030 when forecast process begin to climb

Breakdown	Total	Yr 0	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 8	Yr 9
Mining	$32.2	$10.4	$1.7	$0.5	$0.3	$0.3	$7.5	$1.5	$9.9
Process	$216.3	$57.5	$33.8	-	$57.5	-	$33.8	-	$33.8
Infrastructure	$7.0	$5.0	-	-	$2.0	-	-	-	-
Owners Cost	$8.8	$5.0	-	-	$2.5	-	-	-	$1.3
Contingency	$36.7	$11.1	$4.6	$0.1	$7.8	$0.1	$6.0	$4.5	$2.5
Total, US$M	$301	$89.0	$40.0	$0.7	$ 70.1	$0.4	$47.3	$6.1	$ 47.5

Makuutu REO Production Profile – Base Case

Modular Expansion ramping up REO production

- Staged development capacity results in peak production from Year 7 onwards at ~ 4,000 tpa REO equivalent

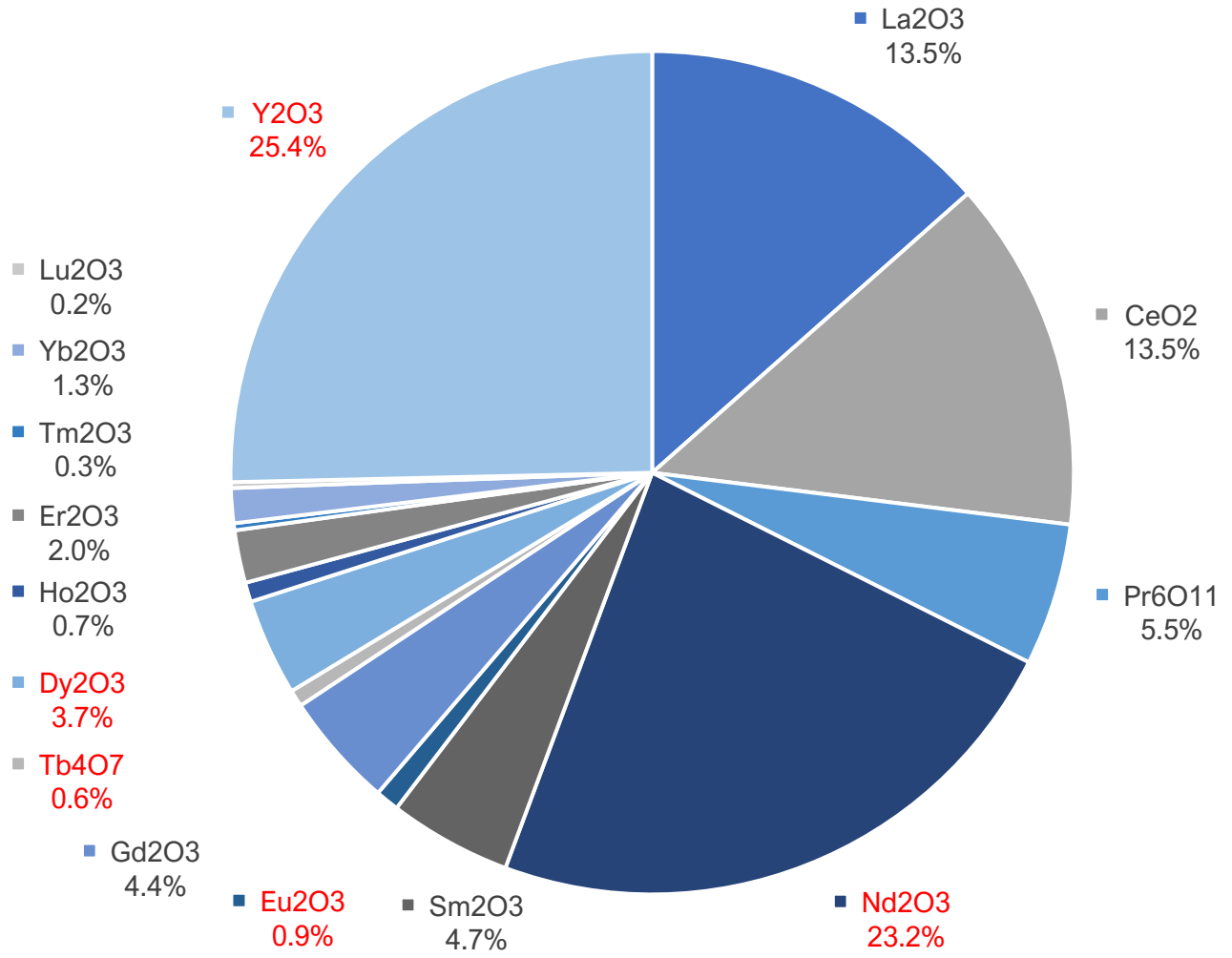


Makuutu REO Basket – CREO & HREO Dominant

Makuutu – One stop, REO shop

- Makuutu basket across Base Case and Upside Case near identical – approx. 33% magnet REO (Nd, Pr, Dy, Tb)
- 73% CREO+HREO content → Balanced product with potential to experience massive upside on HREO (44%) scarcity in future
- CREO (+Pr) content = ~59%

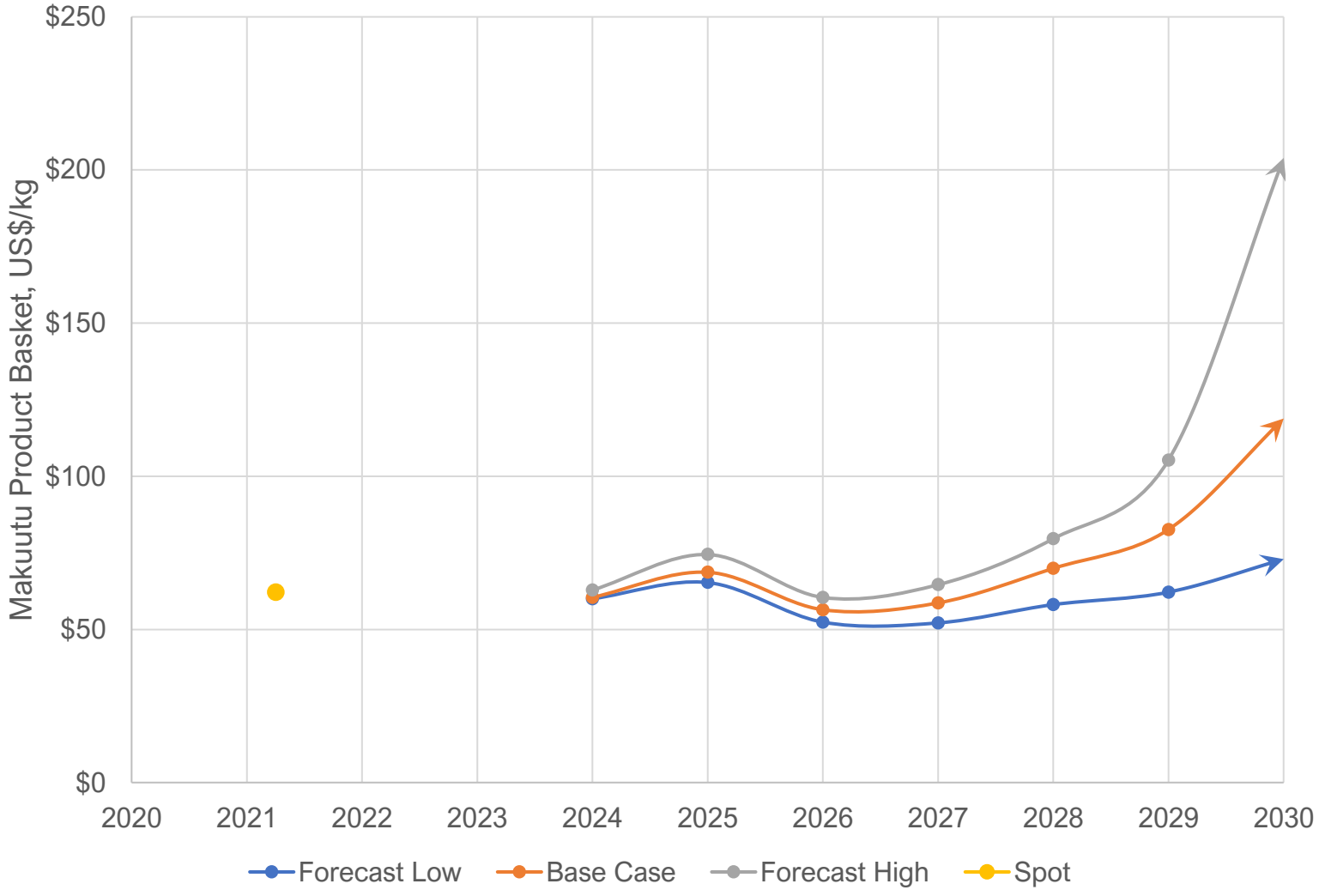
REO		Product, t	Product, %
La2O3	t	3,960	13.5%
CeO2	t	3,970	13.5%
Pr6O11	t	1,600	5.5%
Nd2O3	t	6,830	23.2%
Sm2O3	t	1,380	4.7%
Eu2O3	t	270	0.9%
Gd2O3	t	1,300	4.4%
Tb4O7	t	190	0.6%
Dy2O3	t	1,090	3.7%
Ho2O3	t	220	0.7%
Er2O3	t	590	2.0%
Tm2O3	t	80	0.3%
Yb2O3	t	390	1.3%
Lu2O3	t	70	0.2%
Y2O3	t	7,450	25.4%
TREO	t	29,400	100.0%
Sc2O3	t	740	



Makuutu CREO & HREO Product – Pricing Basis

REO Pricing to 2030

- Makuutu's basket value which is 73% CREO + HREO dominant
- Forecast to experience substantial appreciation over next 10 years
- China's Export Control Ban will reduce availability of CREO & HREO to global consumers which is driving up CREO and HREO prices since 1st December 2020 when implemented
- Starting to see divergence in magnet REO pricing (+Y) between Europe and China now
- Pricing basis adopted from recent Argus Analytics Price forecast to 2030 which is the first updated forecast released to factor in China's Export Control Ban
- Forecast prices for La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Y only
- HREO pricing for Ho, Er, Tm, Yb and Lu (4-5% of basket) remain at March 2021 spot in calculated Makuutu basket pricing basis – upside exists



Pricing specific to Makuutu product basket calculated based upon Argus Analytics research released 26 March 2021

REO Pricing Basis

Beyond Pricing to 2030 – But what about Beyond 2030??

- REO demand increasing at rates that exceed forecast driven by Government Stimulus spending on electric vehicles (EVs), renewable energy, communications, defence
- EVs providing major driver for NdPr pricing – worldwide EV sales to increase by 4-fold by 2025, 7-fold by 2030
- Offshore wind turbines need DyTb – pledges to add 230 GW of offshore wind turbine demand committed by 2030, 1400GW target by 2050 (?)
- Where are the HREO going to come from beyond 2030 – 95% of current world supply of HREO supplied from Chinese/Myanmar IAC deposits which are being depleted

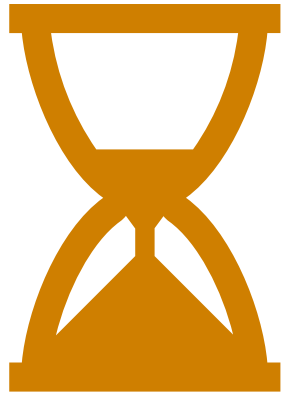
"When peering into the outlook for the next decade to come, it becomes quickly apparent that the rapid demand growth of the 2020s will soon be dwarfed by the astronomical demand growth of the 2030s – and therein lies the real defining challenge and opportunity facing the global rare earth industry today.

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

Realistically, where do we think CREO & HREO will come from? And with limited supply, where are CREO and HREO prices going?

Pricing Basis	Basket Value US$/kg	Base Case (11 Years) NPV (post tax) US$, M	Base Case (11 Years) IRR %
Spot	$62.13	$109	24.8%
Argus Low	$73.01	$114	22.5%
Argus Base	$118.51	$321	37.6%
Argus High	$203.23	$726	53.7%

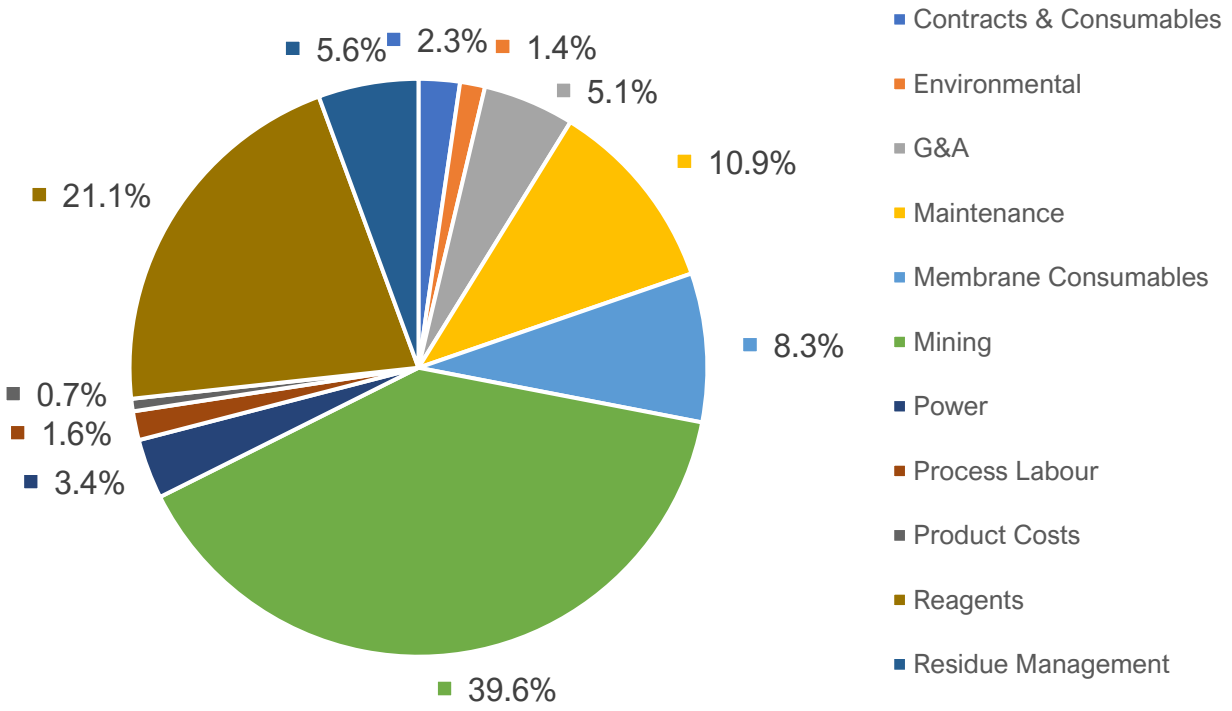


Makuutu OPEX Profile – Base Case

OPEX (+/- 50%) to produce MREC product over Years 0 to 11

- Base Case OPEX circa US$12.60 per tonne of plant feed, with 40% of cost in mining, 54% processing costs and 6% G&A
- Base Case OPEX circa US$36.27 per kg REO produced Vs. benchmarked Chinese IAC OPEX ~ US$38/kg REO[1]
- When incorporating a by-product credit for the Sc_2O_3 produced, the average unit operating cost decreases to
  - **US$23.70 per kg REO equivalent (inc. Sc_2O_3 credit)** produced, or
  - **US$8.26/t Plant Feed (inc. Sc_2O_3 credit)** processed
- BFS work program initiated to look at optimisation of OPEX

OPEX Split	Years 0 to 11 OPEX US$M	Years 0 to 11 Average Annual OPEX, US$	Years 0 to 11 Average OPEX, US$/kg REO	Years 0 to 11 Average OPEX, US$/tonne Plant Feed
Mining	$422	$38.4	$14.36	$4.99
Process	$567	$51.6	$19.30	$6.71
G&A	$77	$7.0	$2.61	$0.91
Total, US$	$1,066	$97.0	$36.27	$12.62
Total, US$ less Sc_2O_3 credit	$1,066	$97.0	$23.70	$8.26



[1] Roskill, Rare Earths: Outlook to 2030, January 2021.

Makuutu Development Timetable

Aim for Makuutu Module 1 to be in Production by H1 2024

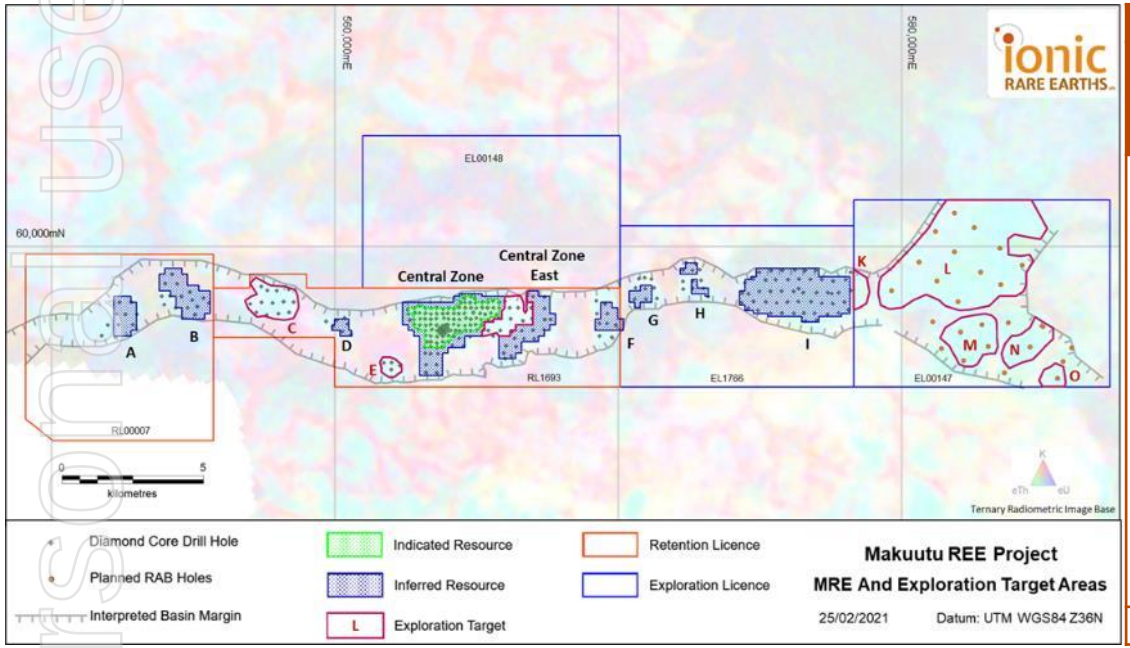
- Active program now underway to deliver BFS and ESIA by Q3 2022;
- Mining Licence Application in or before Oct 2022;
- Final Investment Decision planned for late 2022;
- Construction early 2023; and
- Ramp up of Module 1 in Q1 2024, first product before Q2 2024

	2021			2022				2023				2024	
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Scoping Study													
Resource Drilling													
Metallurgy Testwork													
MRE Update													
BFS													
ESIA													
Landowner Agreements													
Demonstration Plant													
Funding Agreements													
Mining Licence Application													
Final Investment Decision													
Site Early Works													
Construction													
Mining													
Commissioning													
Plant Production													

315 Million tonne IAC Mineral Resource Estimate

Upside Potential – Inferred Resource has potential to extend LOM

- 315Mt @ 650 ppm TREO MRE consisting of 26% Indicated Resource and 74% Inferred Resource
- Scope to extend life of Makuutu by converting Inferred Resources to Indicated Resources
- Additional infill drilling to commence in June to work towards increasing Indicated Resource base to support BFS
- Exploration Target on EL00147 reconnaissance drilling completed, remaining RAB drilling expected to be competed by end of April 2021 with results expected late Q2 2021 to confirm potential for MRE extension across all 5 tenements at Makuutu



Classification	Indicated Resource			Inferred Resource			Total Resource		
Area	Tonnes (M)	TREO (ppm)	TREO-CeO_2 (ppm)	Tonnes (M)	TREO (ppm)	TREO-CeO_2 (ppm)	Tonnes (M)	TREO (ppm)	TREO-CeO_2 (ppm)
Central Zone	66	820	570	51	730	500	118	780	540
A				12	570	390	12	570	390
B				25	410	280	25	410	280
C				-	-	-	-	-	-
D				6	560	400	6	560	400
E				-	-	-	-	-	-
Central Zone East				37	740	520	37	740	520
F				11	570	390	11	570	390
G				6	660	450	6	660	450
H				4	780	560	4	780	560
I				96	550	350	96	550	350
Total Resource	66	820	570	248	610	410	315	650	440

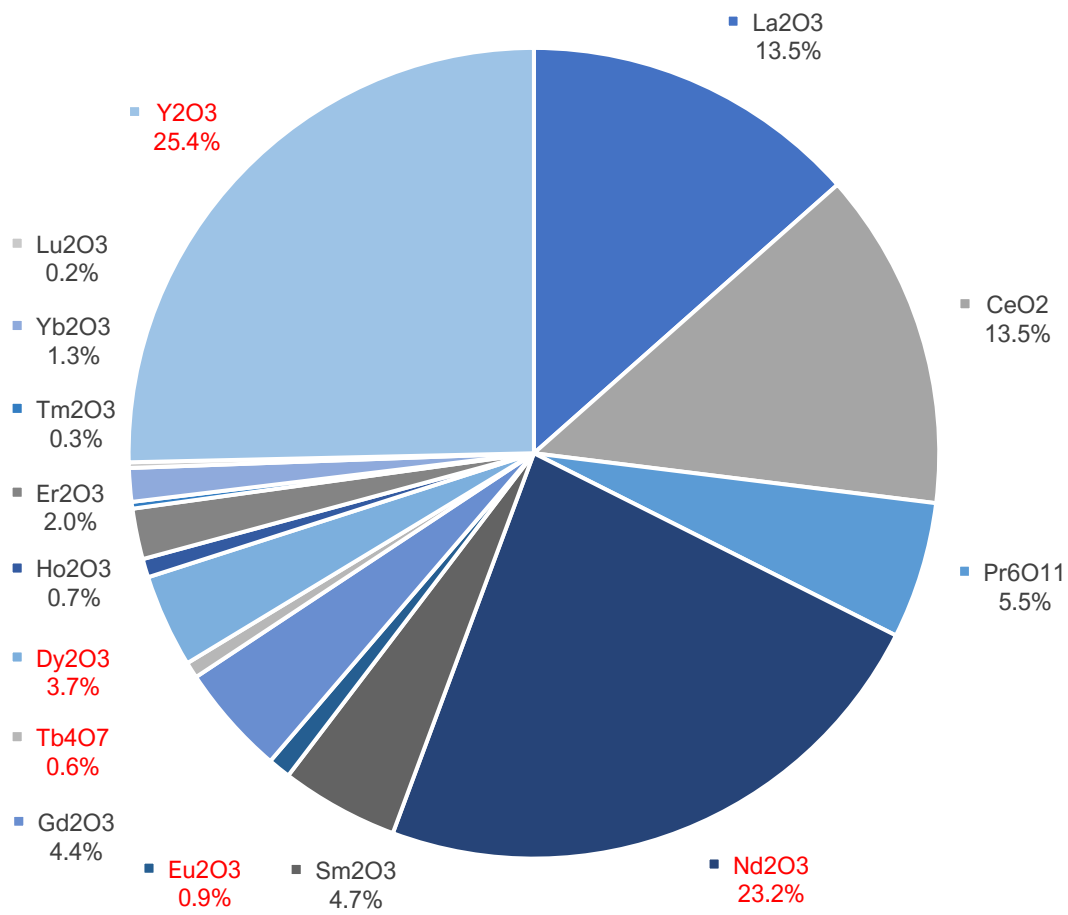
ASX announcement 3rd March 2021; TREO = Total Rare Earth Oxide; Tonnes are dry tonnes rounded to the nearest 1.0Mt; All ppm rounded from original estimate to the nearest 10 ppm which may lead to differences in averages.

Makuutu Investment Highlights

11 Year LOM, Low CAPEX, High Margin, Unique CREO/HREO Basket

- Scoping Study confirms **robust Base Case 11-year CREO and HREO production potential** and Strategic importance of Makuutu (51% IonicRE ownership)
- Highly attractive economic parameters;
  - Post tax long term free cash flow **US$766 million** over 11 years
  - EBITDA of **US$1.28 billion**
  - Post tax Net Present Value (8) of **US$321 million**
  - Internal Rate of Return of **38%**
  - Pre-production CAPEX requirement of **US$89 million**
  - Expansion CAPEX of $212 million funded by Project free cash flow
- **Infrastructure already there** – existing highway and road access to site, nearby power infrastructure with readily available hydropower, rail, cell phone communications and water availability
- **Highly desirable** Project given **Ionic Adsorption Clay (IAC) mineralisation**
- Strategic partnering process underway → Non-binding MOU signed with Chinalco subsidiary **China Rare Earths Jiangsu** to accelerate Makuutu mine development to production
- Potential for **substantial additional life out to 27 years Life of Mine** *pending further drilling plus **Exploration upside** still to be realised → potential for MRE extension with highly prospective EL00147 recently tested via RAB drilling (pending assays)

HIGH VALUE CREO / HREO PRODUCT



ADDITIONAL SLIDES

Tier-One Infrastructure already there!

Excellent local infrastructure supports low CAPEX development

Logistics

- Approximately 10 km from Highway 109, connecting Makuutu to both capital city Kampala and Port of Mombasa, Kenya
- Approximately 20 km from rail line connecting to Port of Mombasa

Power

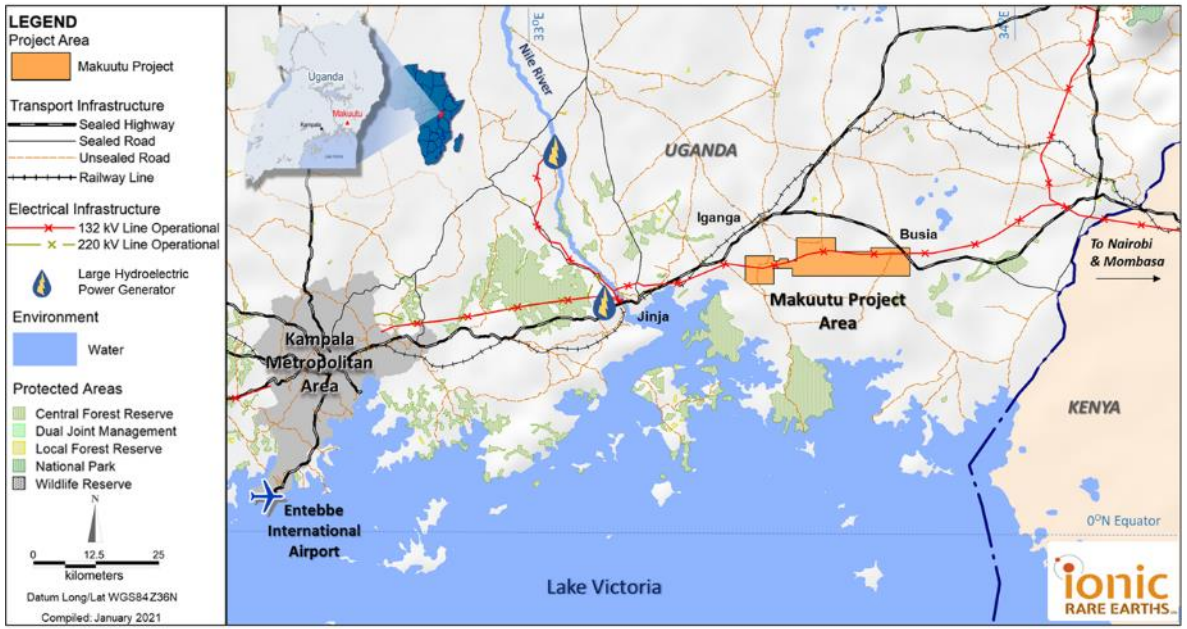
- Large hydroelectric generation capacity (+810MW) within 65 km of Makuutu Project area will deliver very low-cost (US$0.05/kWh), plus further capacity being developed
- Existing electrical grid infrastructure immediately adjacent to site to provide stable power

Water

- Plentiful fresh water within and near project area (water harvesting)

Workforce

- No camp required – low-cost professional local workforce available



Makuutu Rare Earths Project site and existing Infrastructure Access





Images; From left, Isimba hydroelectric dam with 183 MW installed capacity at Jinja, rail line connect to Kampala and Port of Mombasa, all weather access roads connecting site to highway, sealed highway running directly adjacent site, and 132 kV power lines running through site.

Environment, Social, Governance (ESG)

ESG initiatives ‘front and centre’ at Makuutu

- IonicRE aspires to be a leader in adopting high ESG standards in the development of the Makuutu Rare Earths Project. We consider ESG in our development planning, which will adhere to the Equator Principles, and covers a broad range of factors
- Project area covers portions of the Bunya, Kigulu, Bugweri, and Bukooli Counties and the Bugiri Municipality in the Iganga, Bugweri, Mayuge, and Bugiri Districts of the Eastern Uganda Region
- IonicRE aims to leave a positive lasting legacy of opportunity in the Project area through community programs, plus potential for additional industry developed as part of the progressive rehabilitation of the mining area at Makuutu
- Makuutu Base Case to contribute US$399 million in taxes and royalties to Uganda

Environment, Social, Governance (ESG)

Environmental

- Compliance fully with the laws of Uganda governing environmental protection: the National Environment Act 1995 and local government bye-laws.
- The shallow depth of the deposit will minimise environmental impacts of mining and enable progressive land rehabilitation, ensuring the timely restoration of the landscape.
- The Project will use locally generated low-cost hydroelectric power from Uganda's vast and reliable hydroelectric scheme, and as such aims to have a minimal overall carbon footprint.
- Low carbon footprint at Makuutu through use of hydroelectric power; Base Case 11-year CO_2 footprint ~ 600,000 tonnes CO_2
- Makuutu Base Case has potential to produce enough Nd, Pr, Dy and Tb to produce approximately 35 GW of offshore direct drive wind turbine capacity
- The enabled offshore wind turbine capacity from Makuutu will offset 300 million tonnes of CO_2 annually for the life of the permanent magnets (which can be recycled)

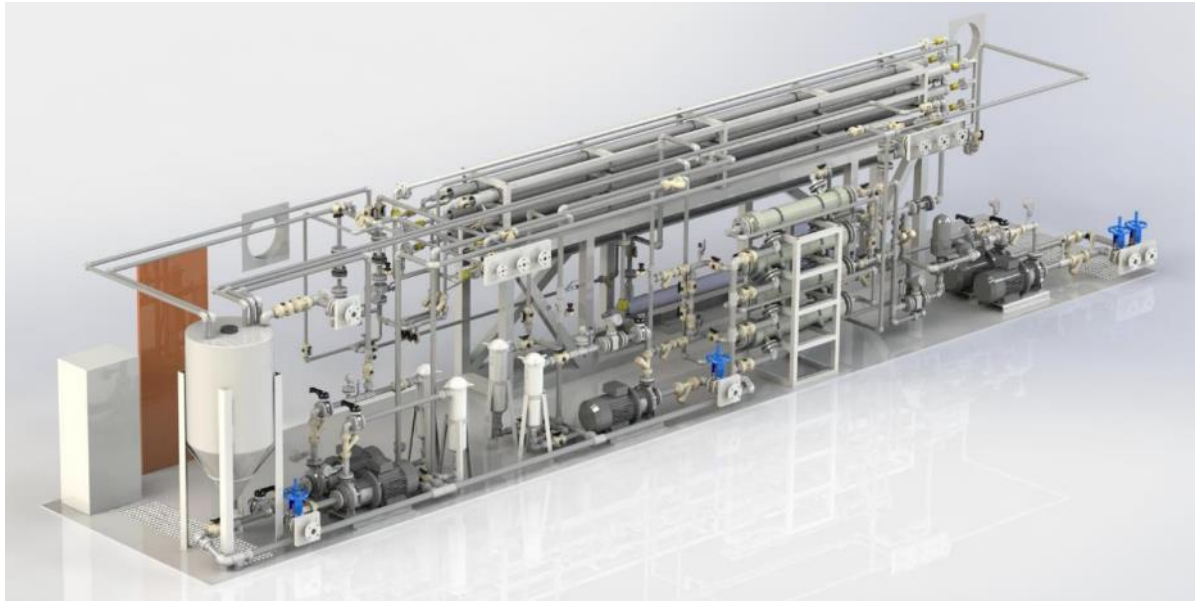
The world's largest offshore wind farm, being developed by UK's SSE and Norway's Equinor will see 3.6 GW capacity wind farm built over three years on an artificial island in the North Sea, known as Dogger Bank, just 130 km from Yorkshire, off the UK's east coast. Britain's homes will be powered by 12 MW direct drive wind turbines, 260 m tall, making them the largest offshore wind farm turbines in the world. They will generate clean energy as the powerful offshore winds turn their 110 m blades. A total of 4.5 million homes will be able to reap the benefits of the project's generation of clean energy, with a single turbine having the capacity to generate power for 16,000 homes.[1]

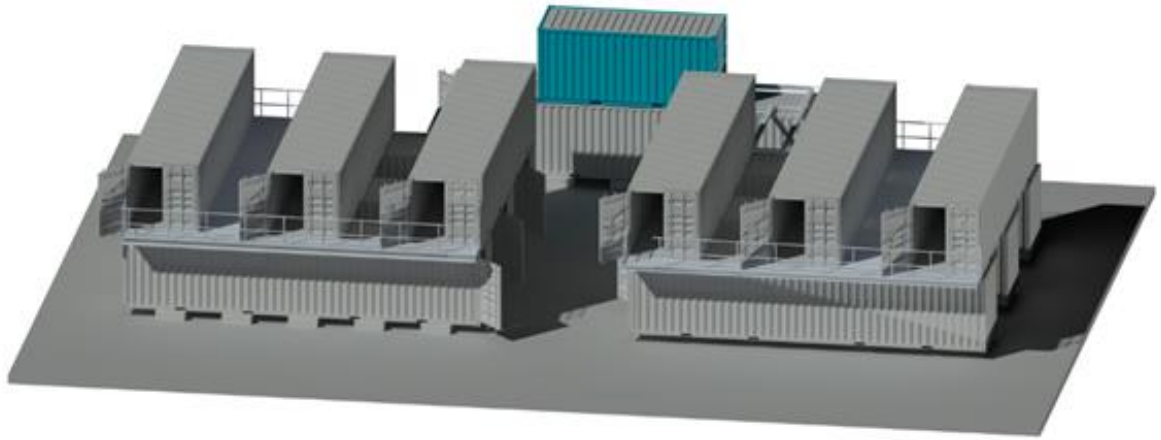
https://www.azocleantech.com/article.aspx?ArticleID=1072.
Image Credit: Masha Basova/Shutterstock.com

Environment, Social, Governance (ESG)

Water Treatment using best practice

- As the Makutu is near the equator, and the nature of the REE mineralisation and processing requirements will be net positive in the water balance, water treatment of the excess process liquor is required and included in the plant design.
- The Process plant has three initial membrane circuits to ensure all salts and reagents are recovered from process liquors, permitting a permeate of high-quality water, to be produced and post testing to meet environmental standards for site discharge, will be either recycled in the plant or discharged from site.
- Membrane circuits will concentrate the cations and salts for recovery and recirculation, with the permeate (clean water) then available for recycling in the process plant
- The modular nature of the membrane circuits, which come in shipping containers, will enable capacity to be added sequentially as the operation ramps up throughput
- Catchment ponds will prevent run-off water from leaving site
- Laboratory facilities on site will monitor water quality to ensure any water to be discharged from site meets water quality standards before release





Environment, Social, Governance (ESG)

Social and Governance

- We endeavor to maintain our ‘licence to operate’ – by actively managing our relationships with our key stakeholders, primarily the local communities across the Makuutu Rare Earths Project – and identifying initiatives to assist and benefit local community programs
- We actively engage with key Ugandan agencies to initiate opportunities for training and engagement, with a view to long term collaborative approach to building sustainable capacity in the Ugandan mining industry.
- We aspire to have a majority Ugandan workforce with minimal Expat staff providing up to 500 jobs initially within Uganda with scope to significantly increase as the Project ramps up production in the future.
- We aspire to manage our supply chains and actively engage local suppliers within Uganda to ensure awareness of ESG initiatives and benefits.
- We have an effective, fit and proper governance policies meeting our ASX requirements plus local Ugandan requirements through our 51% owned subsidiary Rwenzori Rare Metals Limited, and we have implemented transparency about the Company’s operations, and a governance structure that demonstrates appropriate accountabilities.
- We have a zero-tolerance for bribery or other corrupt practices; these policies are communicated to all our management and staff.

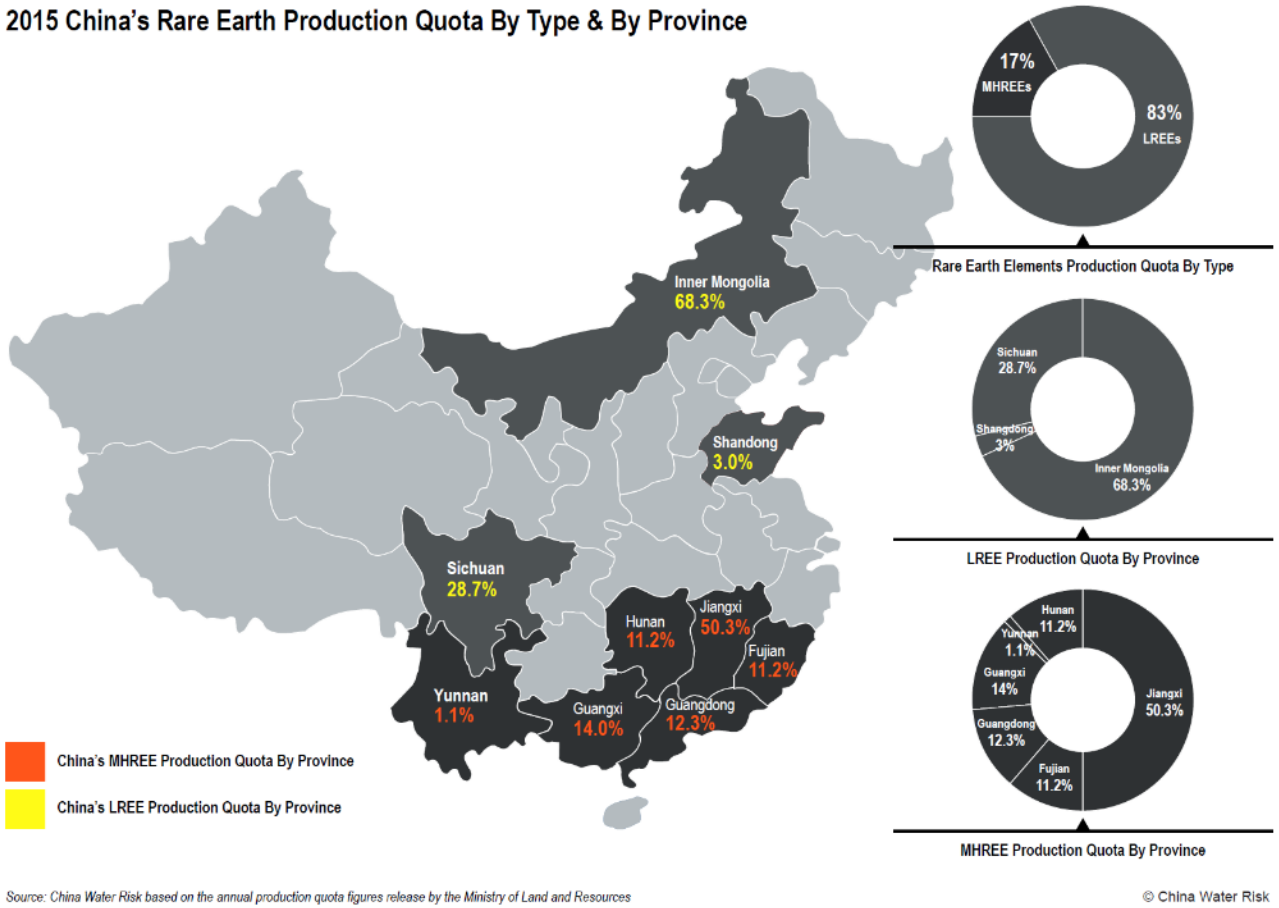
RWENZORI RARE METALS

China's REE Dominance – IACs provides HREO Balance

China understands the balance problem – but what happens when IACs run out?

- China derives the 86% of the total REE production from a handful (3) of mineral concentrate LREE mines
- Bayan Obo world's largest REO producer (~74 ktpa REO) via by-product REO from magnetite tailings with REE mineral Bastnaesite
- Reluctance in China to award quota to monazite only producers (enhanced radionuclide issues with tailings)
- Numerous smaller scale IAC mines, common across southern China, produce >95% of the worlds HREE production
- Low cost and simple to operate

Province (Autonomous Region)	2020 Mining Quota Rare Earth Oxides (REO, t)	
	Rock Type (LREE)	Ionic Clay (HREE)
Inner Mongolia (Bayan Obo)	73,550	-
Fujian	-	3,500
Jiangxi	-	8,500
Shandong	4,300	-
Hunan	-	1,800
Guangdong	-	2,700
Guangxi	-	2,500
Sichuan	43,000	
Yunnan	-	150
Sub-total	120,850 (86%)	19,150 (14%)
Total	140,000	



Advantage of Ionic Adsorption Clays (IAC)

The Holy Grail of REE Deposits[1]

- Very rare deposits outside of southern China
- Significant Project and cost advantages with IAC projects like Makuutu vs hard rock REE projects
- Simple mining and processing
- Higher HREO content → Higher value products
- Higher payability product (IAC products attract payability of 70% vs 35-40% for minerals concentrates from hard rock REE projects
- No radionuclide issues

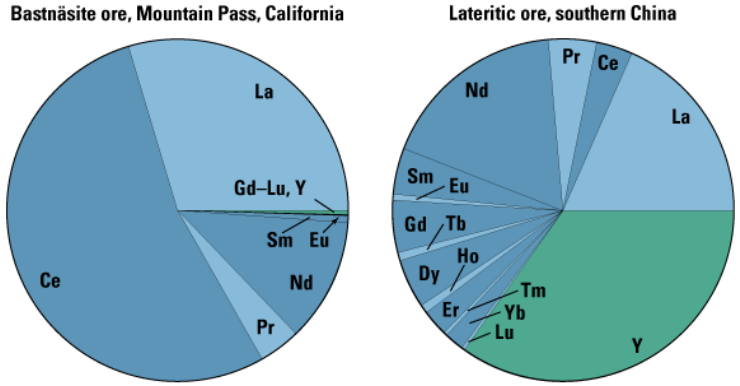


Figure 6. Proportions of individual REE in two representative ores: bastnäsite, dominated by La, Ce, and Nd, with Eu through Lu plus Y totaling only 0.4%; and lateritic ion-adsorption ore, Y-dominated. Dark blue and light blue sectors represent lanthanides of even and odd atomic number, respectively (see figs. 2, 3). Yttrium is indicated by green.

REE HARD ROCK MINING/PROCESSING VS REE CLAY MINING/PROCESSING

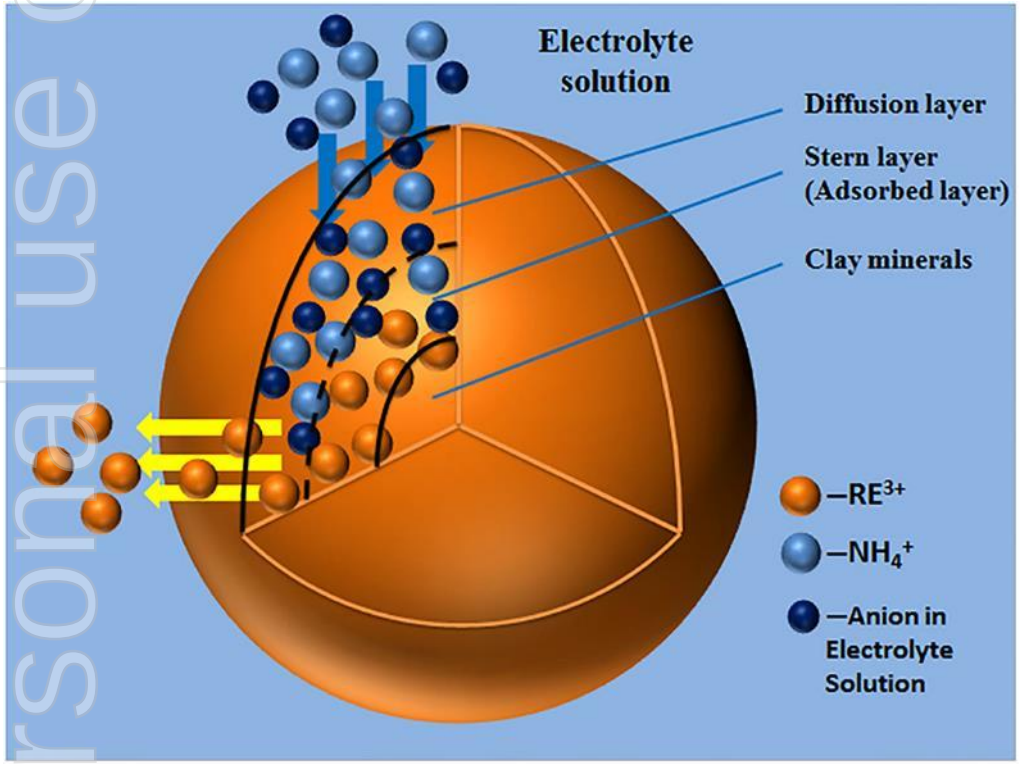
MINING/PROCESSING STAGES	REE CLAY	REE HARD ROCK
Mining	Low operating costs: • Surface mining (0-15m) • Soft material – free digging • Minimal stripping required • Quick back-filling of pits & rehabilitation	High operating costs: • Blasting required • Could have high strip ratios • Could be underground • Long term rehabilitation provisions required
Processing - Crushing	• No crushing (or only very mild grinding)	• Intensive crushing and grinding required (intensive power consumption)
Processing - Screening	• Intensive washing and screening required • Very large volumes of ores to be processed	• Simple screening into several size fractions
Processing - Leaching	• Heap leaching or in-situ leaching • Inorganic salt solutions required • Ambient temperature (no power required) • Simple plant • Easy recycling of solvents & water	• Strong acids required & in large quantities • High temperature required (intensive power consumption) • Complex plant (to withstand strong acids and high temperatures)
Processing - Environmental	• Non-radioactive tailings • Neutralisation of tailings (i.e. removal of acids/ solvents) required before back-filling	• Tailings often radioactive (complex and costly disposal)
End-product	• Mixed but "liberated" REE oxalate/carbonate grading 45-50% TREO • Mixed REE oxides grading >95% TREO	• Mixed REE concentrate at relative low grade (10-20%TREO) • Mixed REE oxalate/carbonate grading c.45-50% TREO • Mixed REE oxides grading >95% TREO
Plant Capex and Opex	• Moderate to low Capex and low Opex	• Very high Capex and high Opex

[1] Hallgarten & Company;
USGS, Rare Earth Elements—Critical Resources for High Technology _ USGS Fact Sheet 087-02_files

Makuutu – Metallurgy Optimised

Testwork identified step change in simple 'salt' extraction

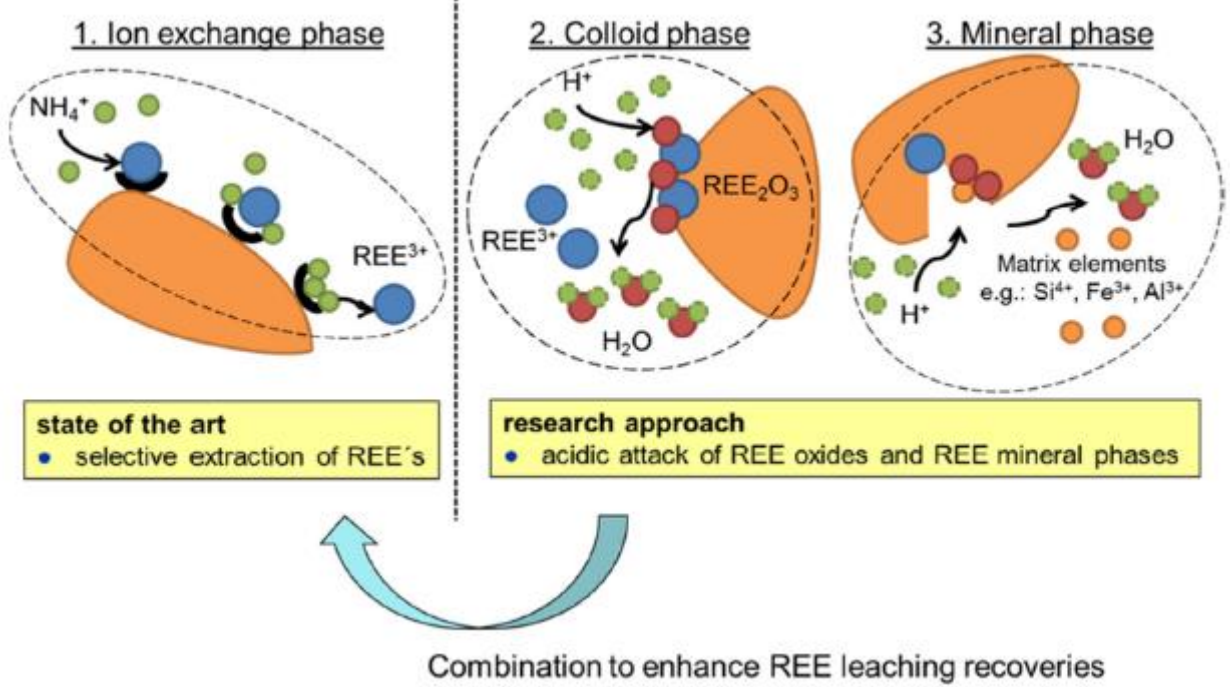
- REE^{3+} host in clay via ionic bond
- Desorption is the breaking of the ionic bond using ion exchange to swap 'salt' cation NH^{4+} for the REE^{3+} in the clay
- pH adjustment solubilises colloidal REE phase providing step change in extraction



- Chemical process, not a mineral concentration step
- Product is a liquor that contains REE_{3+} from which mixed rare earth carbonate (MREC) can be precipitated

Phase 1 met testwork demonstrated the initial basis with a simple salt desorption to exchange three NH_4^+ cations for one REE^{3+} cation

Optimisation met testwork enhanced the results by utilising acid addition (H^+) to solubilse REE colloidal component in the ore, releasing REE^{3+} cation for extraction.



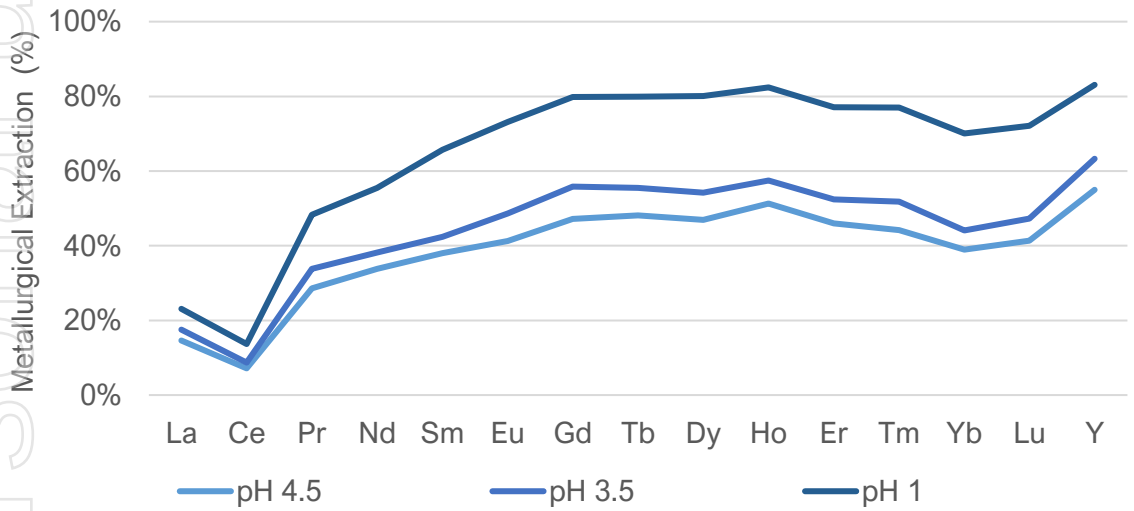
Ru'an Chi, et al., Effects of Ion Characteristics on the Leaching of Weathered Crust Elution-Deposited Rare Earth Ore, December 2020.

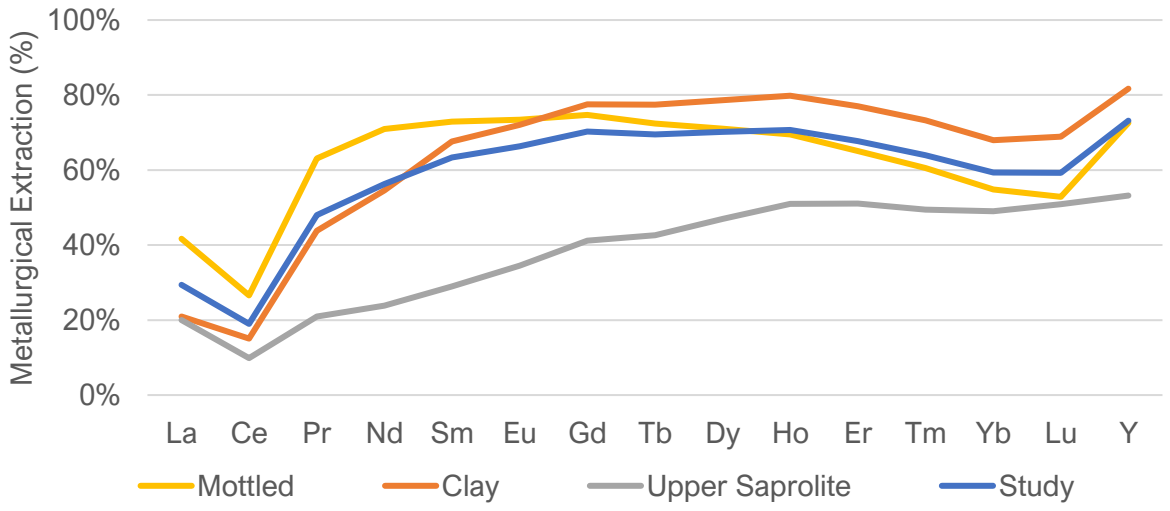
Stoltz, Geometallurgical Investigation of Ion Adsorption Clays, 2017.

Makuutu – Metallurgy Optimised

Process Metallurgy Upgrades CREO & HREO basket composition

- A key attribute of the metallurgical response at Makuutu is the elevated extractions of HREO over LREO → increase in the % CREO and HREO in the Makuutu product basket
  - LOM Head composition is ~ 48%CREO+HREO
  - LOM Product composition is ~ 72-73% CREO+HREO
- Conditions optimised to extract colloidal REO via acidified conditions
- Based upon the TREO head grade of the MRE, the resultant overall TREO metallurgical recovery is 44%, or TREO-CeO_2 of 54%.
- Sc_2O_3 recovery of 30% demonstrated in optimised conditions and used for the Study

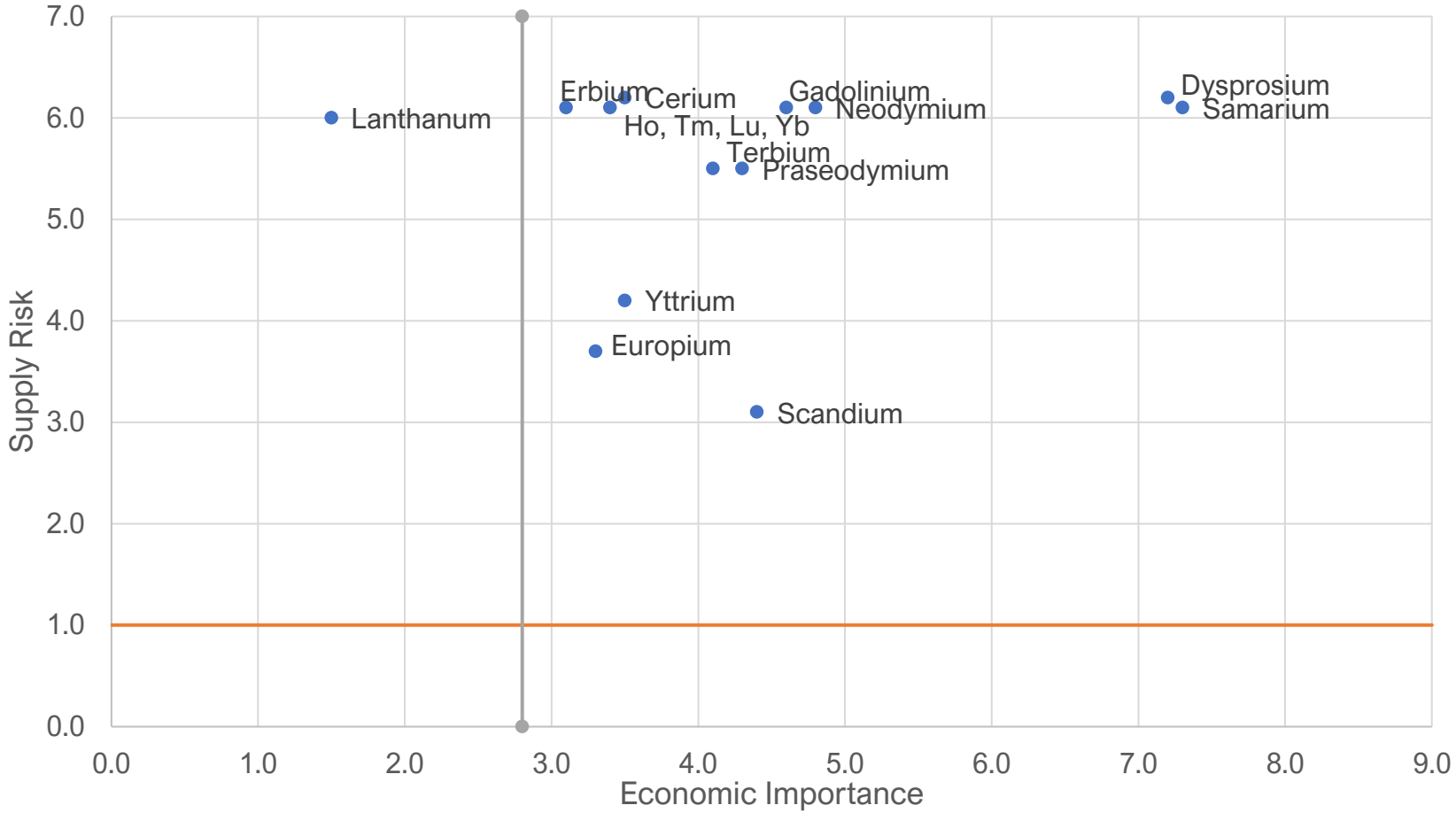




Makuutu and Critical Raw Materials 2020

Makuutu basket contains high ranked CRMs identified in 2020 EU study required to achieve carbon neutrality

- Secure and sustainable supply of both primary and secondary raw materials, specifically of critical raw materials (CRM), for key technologies and strategic sectors as renewable energy, e-mobility, digital, space and defence is one of the **pre-requisites to achieve climate neutrality**
- European Commission report identified Global **competition for resources will become fierce in the coming decade**
- **Dependence of critical raw materials may soon replace today's dependence on oil**
- **Makuutu has them all** in appreciable quantities



European Commission, Study on the EU's list of Critical Raw Materials – Final Report, 2020.

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