RESOURCES RISING STARS
November / December 2022

AUSTRALIAN RARE EARTHS
Metals for our future

KOPPAMURRA

Clay Hosted Heavy Rare Earths

Developing an independent source of critical rare earths for a clean energy future



ASX: AR3

Securing Australia's rare earths for a diversified sustainable future

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Competent Persons Statement

The information in this report that relates to Exploration results is based on information compiled by Australian Rare Earths Limited and reviewed by Mr. Rick Pobjoy who is the Technical Director of the Company and a member of the Australian Institute of Mining and Metallurgy (AusIMM). Mr. Pobjoy has sufficient experience that is relevant to the style of mineralisation, the type of deposit under consideration and to the activities undertaken 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. Pobjoy consents to the inclusion in this report of the matters based on this information in the form and context in which it appears.

The Company confirms that it is not aware of any new information or data that materially affects the information included in the relevant market announcement (ASX announcement dated 4 July 2022) and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement (ASX announcement dated 4 July 2022) 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 (ASX announcement dated 4 July 2022).

The information in this report that relates to metallurgical results is based on information compiled by Australian Rare Earths Limited and reviewed by Mr. James Davidson who is the Technical Director of Wallbridge Gilbert Aztec and a member of the Australian Institute of Mining and Metallurgy (AusIMM). Mr. Davidson has sufficient experience that is relevant to the metallurgical testing which was undertaken 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. Davidson consents to the inclusion in this report of the matters based on this information in the form and context in which it appears.

EVs & WIND TURBINES DRIVE DECARBONISATION

THE OPPORTUNITY

- Demand growth for EV's and wind turbines require four key Rare Earth Elements
- Western World is seeking an independent supply chain (ex-China)
- Deposits containing all four REEs are rare



THE KOPPAMURRA PROJECT

- Has all four key REEs including the key heavy rare earths Dy & Tb
- Substantial JORC Resource of 81.4Mt at 785ppm TREO (Total Rare Earth Oxide)
- Open in all directions and has an adjoining (up to) 200Mt exploration target
- Clay-hosted deposit – same style that underpins China's massive rare earths industry
- Immense growth potential – Resource is < 5% of total acreage

THE PATH TO PRODUCTION

- Resource expansion and development drilling underway
- MOU signed with NEO Performance Materials for a Joint Development and Offtake Agreement
- Stakeholder engagement for Mine Lease Application underway
- Development pathway targeting first production in 2025/26

AN AUSTRALIAN CRITICAL METALS COMPANY

Experienced team, strong backing, well-funded with community support



Professor Dudley Kingsnorth

Chair

Internationally recognised rare earths industry expert, providing advice to producers, end users and governments

Professor Western Australian School of Mines

Previous roles with Ashton Mining (Mt Weld) and Greenbushes



Rick Pobjoy

Executive director – Acting MD, Co-Founder of AR3

Geologist with extensive experience in mineral sands exploration

Previous roles with Heathgate and Iluka



Bryn Jones

Non-executive director – Co-Founder of AR3

Skilled in process and technology development, specialising in uranium

MD entXLtd, NED Boss Energy, NED DevExResources

Previous roles with Laramide Resources, SO4 and Uranium Equities



Pauline Carr

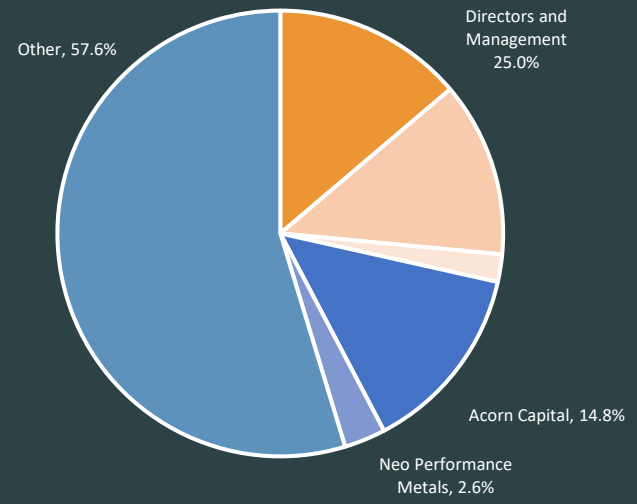
Non-executive director

Experienced company director in compliance, governance and risk

Chancellor of UniSA, Chair of National Pharmacies, Chair of Minerals and Energy Advisory Council,NED Highfield Resources

Previous roles with Normandy Mining and Newmont

Distribution of shareholders



CORPORATE SNAPSHOT

$10.8m
Cash at 30 Sep 2022

129.5m
Shares on Issue

$48m
Market capitalisation @ $0.37

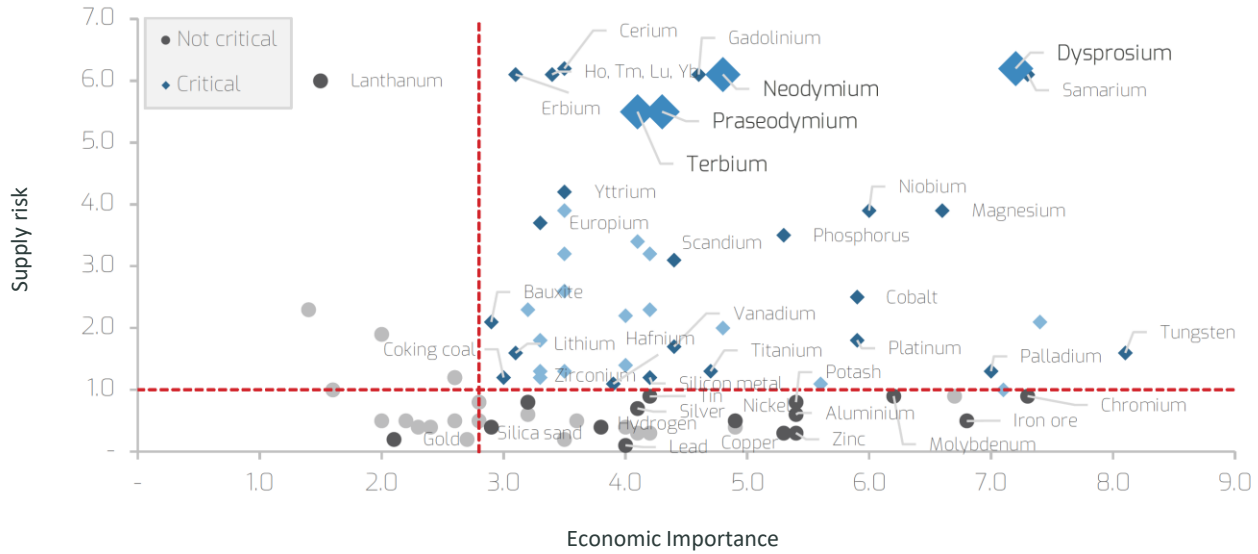
30.9m
Options on issue Exercisable at $0.30-$1.95
Expiry Dec 2023 - Jul 2025

THE RARE EARTH SUPPLY CHAIN

China and Myanmar dominate the supply chain, including majority of heavy rare earth production and end uses

- Minerals containing Neodymium and Praseodymium are mined from multiple global sources, **however, Dysprosium and Terbium are almost entirely sourced from ionic clays** in China and Myanmar
- **Chinese reserves are depleting**, with downstream producers turning to Myanmar and rest-of-world mixed rare-earth hard rock suppliers
- Dysprosium and Terbium are **considered highly critical by the US, Japanese and European governments**
- **An ionic clay resource in** Australia containing Dysprosium and Terbium is of **global significance**

EU Critical Raw Materials list 2020[1]



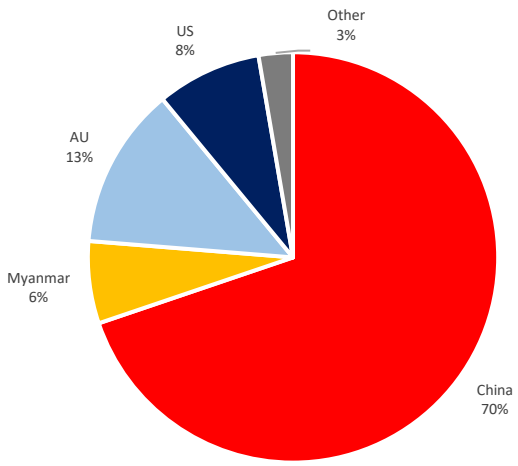
Sources: (1) European Commission Study on the EU's list of critical raw materials (2020)

THE RARE EARTH SUPPLY CHAIN

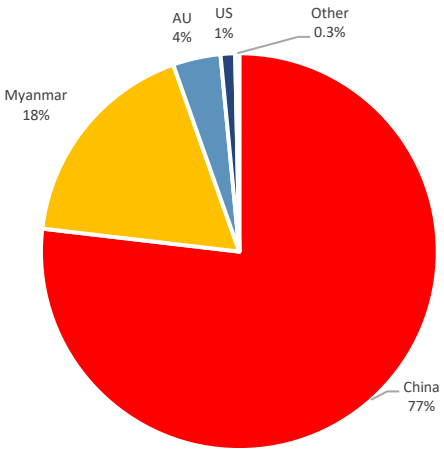
China and Myanmar dominate the supply chain, including majority of heavy rare earth production and end uses

Historical rare earth mine production by country[2]

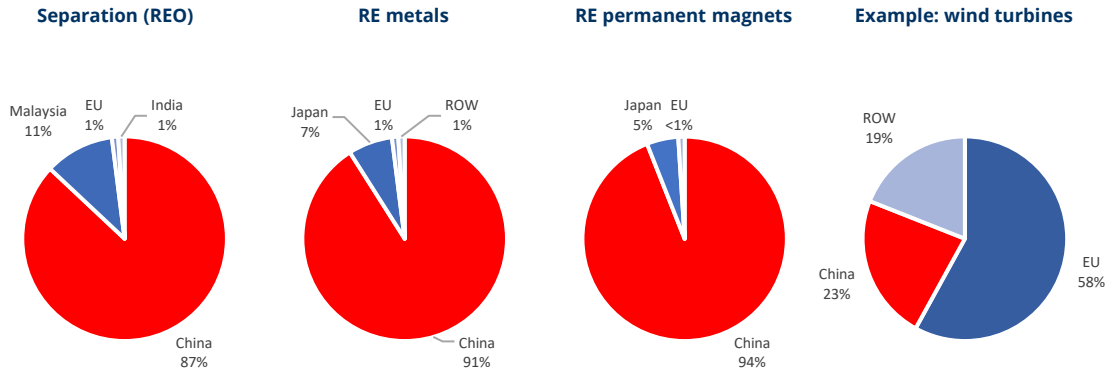
Neodymium & Praseodymium



Dysprosium & Terbium



Downstream supply chain also dominated by China[2]



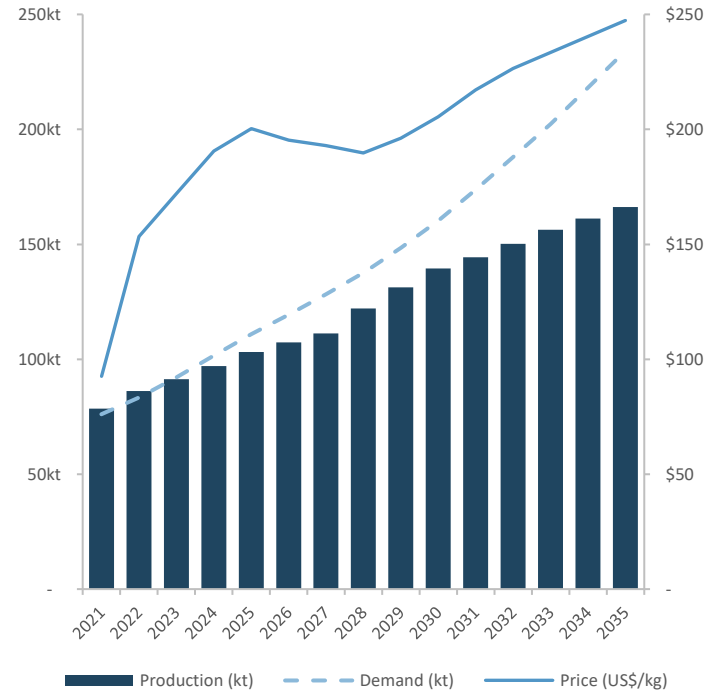
China currently produces 94% of permanent rare earth magnets, highlighting the urgent need for new independent supply sources.

(2) Adamas Intelligence, April 2022

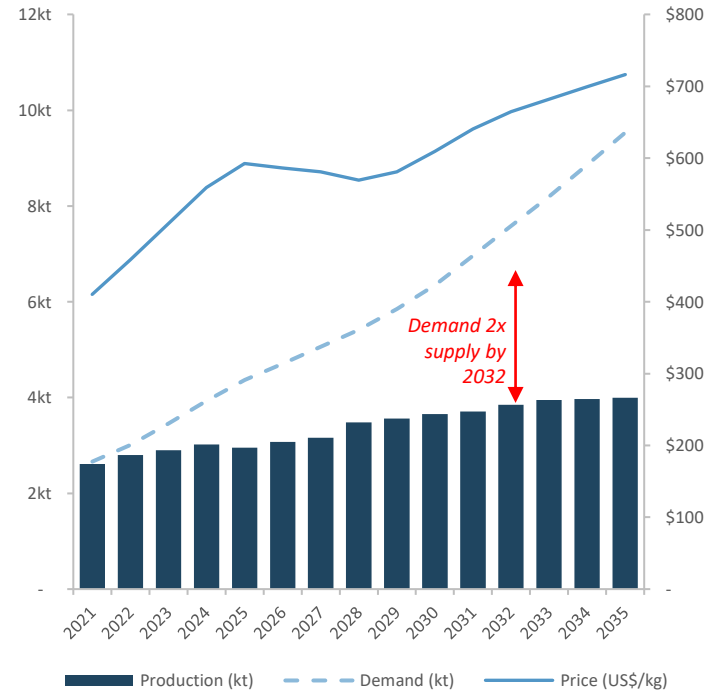
ADAMAS INTELLIGENCE FORECASTS

Supply deficits across all magnet REO's will support price accretion for the remainder of this decade

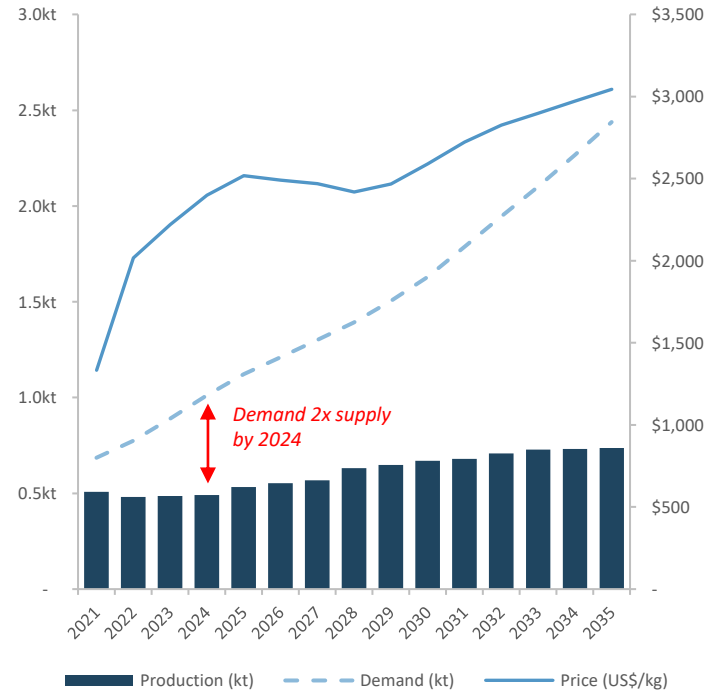
NdPr demand-supply balance (LHS) vs price (RHS)



Dy demand-supply balance (LHS) vs price (RHS)



Tb demand-supply balance (LHS) vs price (RHS)



KOPPAMURRA: Our cornerstone asset

A highly valuable potential source of critical rare earths in a Tier-1 location

- **100%-owned** clay-hosted critical rare earths deposit located ~300km SE of Adelaide
- Recent 104% increase in Mineral Resource to **81.4Mt at 785ppm TREO** confirms Koppamurra as a globally significant resource
- Consistent and shallow mineralisation facilitates **rapid, low-cost exploration and mining**
- Drill core assays and metallurgical testing confirm the presence of recoverable light and **highly sought after heavy rare earth elements**
- Actively **engaging with local community**, knowing their support is key to building a successful business
- Preparing inputs for a Q1 2023 Mine Lease application
- MOU signed with NEO Performance Materials for a Joint Development and Offtake Agreement
- Our **aim is to become a global supplier** of added-value rare earth products, working alongside government, academia, community and landowners



KOPPAMURRA: Australia's ionic clay hosted REE deposit

	Ionic clays	Hard rock
Location	• Historically mined **in China, now in Myanmar**, but resources are depleting	• China still dominates but mines in production and under development in USA, Australia etc
REE Assemblage	• Supply virtually **all heavy REE (>80%)** and a significant portion of light (La-Eu) REE globally	• Monazite or Bastnaesite ores which **typically do not contain high heavy REE component**
Scale	• Scalable development – lower initial capex requirements	• Typically require significant scale for economic viability given **very high capex requirements**
Exploration	• **Quick and cheap to define** resources given shallow drilling using aircore, auger, push-tube core	• Similar to other hard rock base metals requiring substantial drilling, geochemistry, geophysics etc
Mining	• Shallow free digging material with low strip ratio • Progressive rehabilitation	• Drill and blast with large mining fleet • Deep open pits or underground mining
Processing	• Simple metallurgy; screen then heap or tank leach • **No radioactive waste streams**	• High temperature +/- pressure leaching • Radioactive tailings
	Fast to develop, low capex and high value product	**Significant time and cost to develop, complex processing, radioactivity issues, lower product value**

GLOBALLY SIGNIFICANT RESOURCE

Large, consistent, shallow deposit – exceptional growth potential

- Updated July 2022 Indicated and Inferred Resource – 81.4Mt at 785ppm TREO (Total Rare Earth Oxide) - ASX announcement dated 4 July 2022
- +55% is in the Indicated classification – 45Mt at 835ppm TREO
- 15% higher grade within Indicated Mineral Resource
- Updated Mineral Resource based on 26,185m of drilling (2,727 holes)
- Strong potential for growth, with Exploration Target[2] of 90-220Mt subject to additional drilling

Koppamurra mineral resource estimate – July 2022

			Magnet Rare Earths							
JORC	Tonnes	TREO	Praseodymium[1]		Neodymium[1]		Terbium[1]		Dysprosium[1]	
Category	Mt	ppm	ppm	% TREO	ppm	% TREO	ppm	% TREO	ppm	% TREO
Indicated	45	835	37	4.4	142	17	4	0.5	22	2.6
Inferred	36	721	32	4.4	122	17	3	0.5	19	2.6
Total	81	785	34	4.4	133	17	4	0.5	21	2.6
Exploration										
Target[2]	90-220	629-849	29-41	4.6-4.8	110-150	17-18	3-4	0.5-0.5	16-22	2.5-2.6
April 2021 Initial Resource										
Inferred	39.9	725	32	4.4	124.6	17.2	3.5	0.5	19.2	2.6

[1] For the purposes of this report the primary focus elements for the Koppamurra project are converted to their oxide form for reporting purposes, using known conversion factors, they are Pr_6O_{11}, Nd_2O_3, Tb_4O_7 & Dy_2O_3.

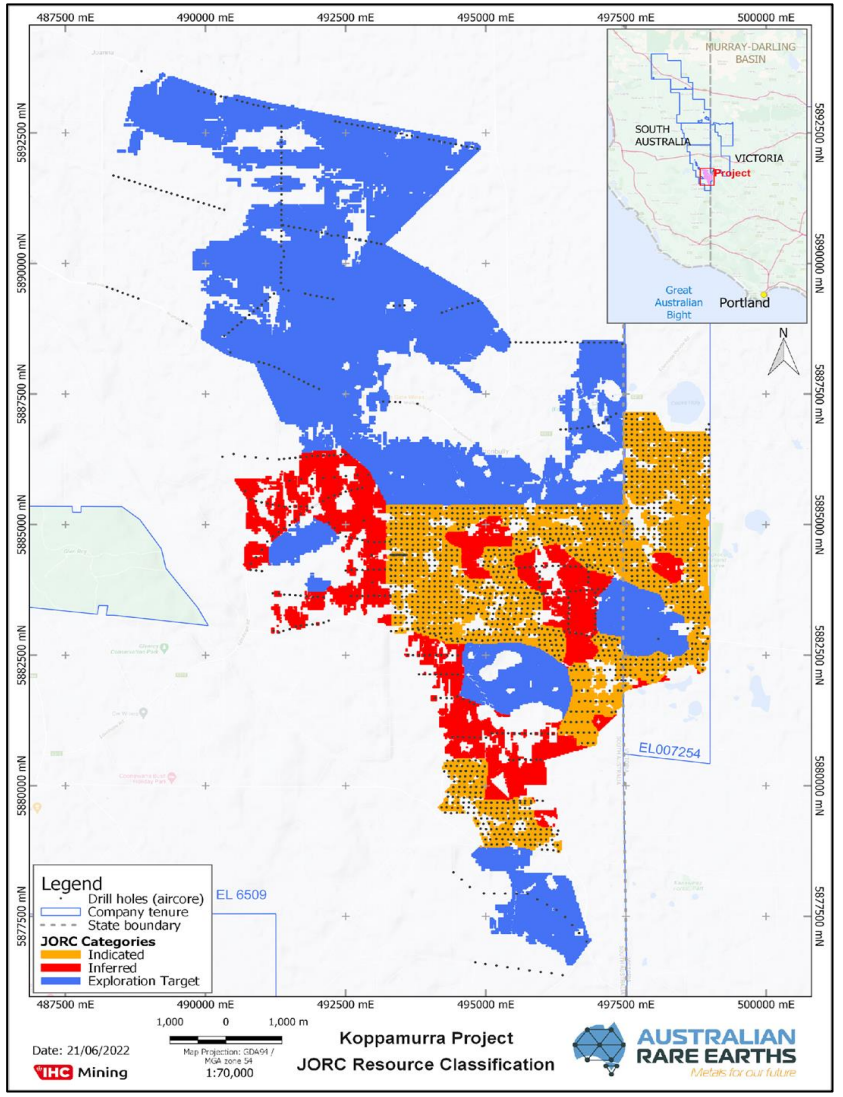
Mineral Resources reported at a cut-off grade of 325 ppm TREO-CeO2, consistent with the previous MRE.

[2] The potential quantity and grade of the Exploration Target is conceptual in nature. Further exploration is required to estimate a Mineral Resource and it is uncertain if further exploration will result in the estimation of a Mineral Resource.

OUTSTANDING GROWTH POTENTIAL

Deposit remains open with a substantial upside remaining

- **~4,000km² of granted tenure** in South Australia and Victoria
- Updated July 2022 Mineral Resource based on **drilling conducted over ~200km²** – equivalent to ~5% of the total area
- Rare earth mineralisation **hosted in a clay layer < 10m from surface**, deposited above a limestone base
- **Consistent mineralisation observed** over the entire drilled area – ongoing drilling will unlock further exploration upside
- Proven prospectivity extends 40km north of existing Resource
- **Next drilling program** has commenced aiming to grow the total Resource volume **to support preliminary mine planning**

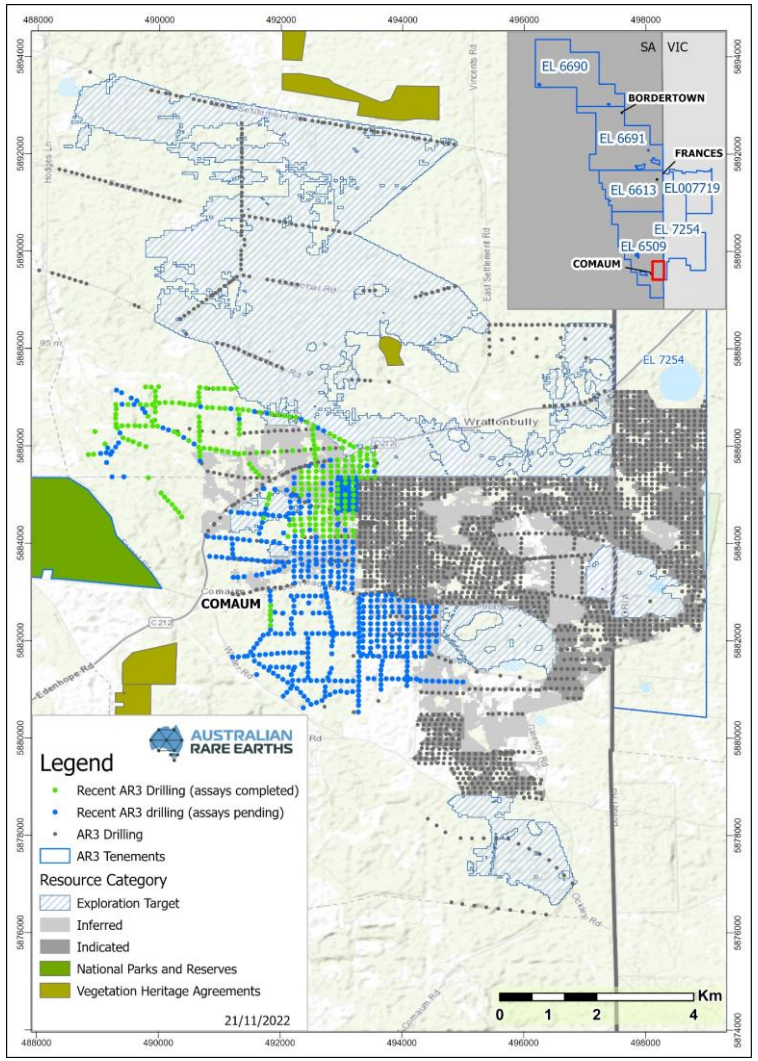


RECENT RESOURCE EXPANSION DRILLING

Validating consistent mineralisation across the project area

Strong assays reveal **significant extensions of clay-hosted mineralisation beyond the current Mineral Resource and Exploration Target areas**. Results include:

- KM2403 - 6m @ 1,668ppm TREO from 6m, with 28.2% combined Neodymium / Praseodymium (Nd/Pr) and 2.74% Dysprosium (Dy)
- KM2407 - 4m @ 808ppm TREO from 5m, with 21.8% combined Nd/Pr and 2.83% Dy
- KM2409 - 3m @ 1,177ppm TREO from 6m, with 23.8% combined Nd/Pr and 2.83% Dy
- KM2440 - 6m @ 1,123ppm TREO from 4m, with 21.4% combined Nd/Pr and 2.76% Dy
- KM2482 - 2m @ 1,169ppm TREO from 2m, with 18.4% combined Nd/Pr and 2.51% Dy
- KM2483 - 2m @ 1,527ppm TREO from 2m, with 26.5% combined Nd/Pr and 2.40% Dy
- KM2520 - 2m @ 2,199ppm TREO from 4m, with 23.0% combined Nd/Pr and 2.49% Dy
- KM2521 - 2m @ 1,058ppm TREO from 3m, with 19.5% combined Nd/Pr and 1.89% Dy
- KM2531 - 3m @ 1,227ppm TREO from 2m, with 19.7% combined Nd/Pr and 2.92% Dy



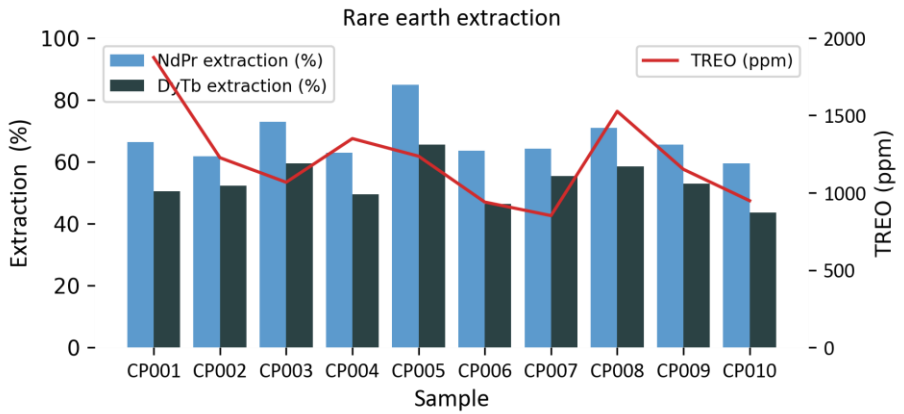
KOPPAMURRA METALLURGY

Process development in collaboration with world experts

- Results demonstrate a 50% reduction in acid consumption while maintaining **average recoveries of 65% and up to 77% for the four key magnet Rare Earth Elements**
- Consistent recovery achieved across a wide geographical area
- **ANSTO to generate a mixed rare earth carbonate (MREC) from 800kg bulk sample**
- Initial process flow sheet design and water balance nearing completion
- **Assembled a world class metallurgical team:**



Metallurgical extraction tests at ANSTO



Valuable rare earth extraction for the Koppamurra Mineral Resource area composite samples CP001 to CP010 at pH 1, 6 hours

TRIAL MINING & REHABILITATION PROGRAM

Commitment to continuous land rehabilitation as part of the mining process







- Innovative trial mining program completed in April-June 2022
- Opportunity to investigate continuous land rehabilitation
- No long-term impact on the landscape – minimal disturbance with the land returned to its original status
- Provided insights into geological interpretation and mine design
- Collected a 500t clay sample for metallurgical testing
- Provided an opportunity for stakeholder engagement; “seeing is believing”

COMMUNITY AND LAND

An active and responsible member of the community

- Naracoorte office/warehouse established and managed by local personnel
- Groundwater, ecological and heritage studies have commenced
- Educational initiatives underway with local schools and Universities
- Building an open and collaborative community relationship underpins AR3's approach to engagement

- ✓ *Naracoorte Office Opening*
- ✓ *Full-time local Personnel*
- ✓ *Sponsorships*
- ✓ *South-east Field Day exhibit*
- ✓ *Student Awareness*
- ✓ *60 Meetings, 7 Feature Articles*



AR3 Exhibit at Naracoorte Show

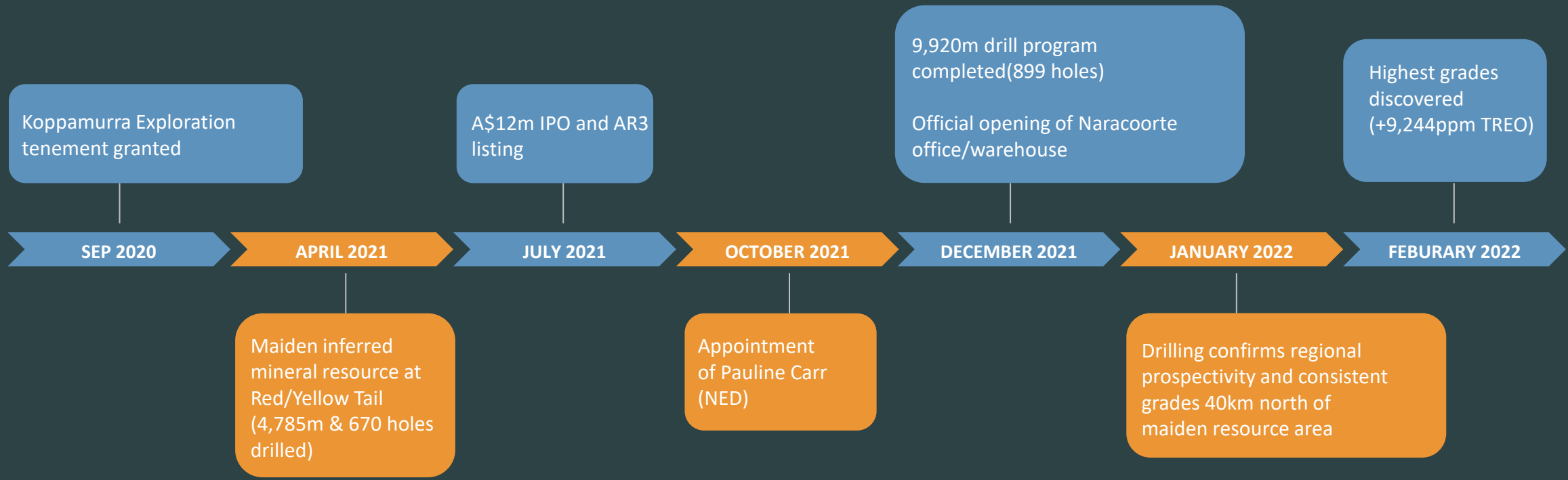


AR3 Office/Warehouse Officially Opened

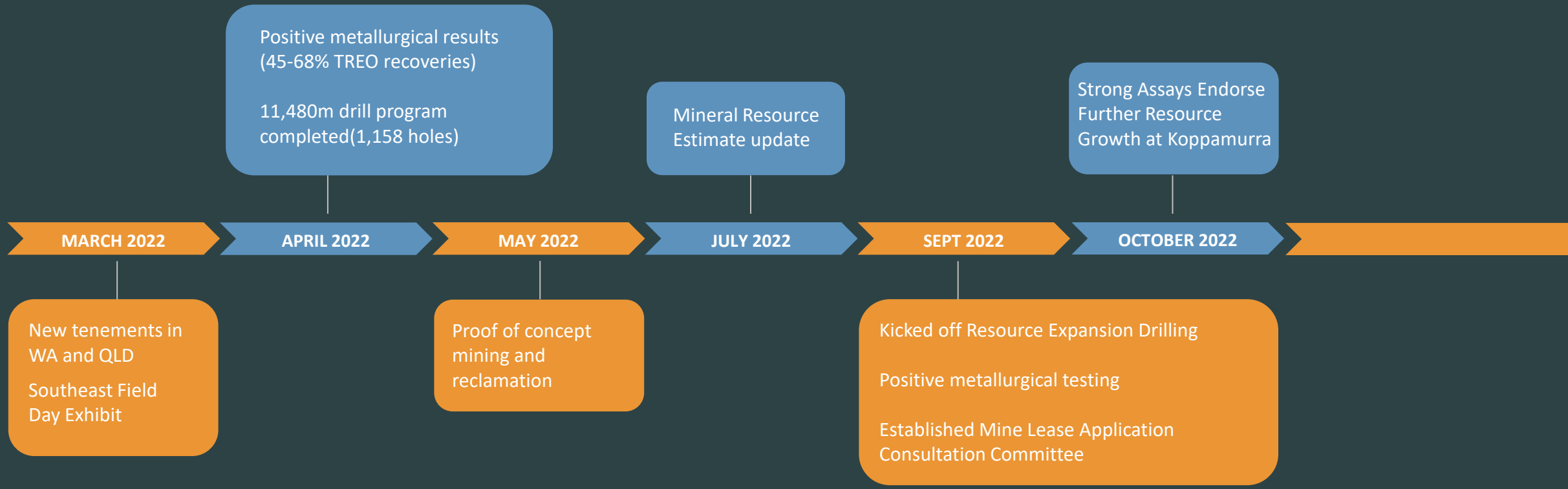


Year 11 students learning about Rare Earths

ACHIEVEMENTS AND FUTURE MILESTONES



ACHIEVEMENTS AND FUTURE MILESTONES



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Metals for our future

ACHIEVEMENTS AND FUTURE MILESTONES

Near-term catalysts:

- Mining Lease Application studies and submission
- Continued drilling to grow the resource
- Finalise mineral processing tests & flowsheet development
- Preliminary mine planning and project studies

Q4 2022 to Q1 2023



AUSTRALIAN RARE EARTHS
Metals for our future

WHY AUSTRALIAN RARE EARTHS?

1



THE OPPORTUNITY

- Substantial market opportunity driven by global decarbonisation
- Critical rare earths Nd-Pr and Dy-Tb are essential ingredients in permanent magnets for EV's and wind turbines
- Strong demand growth supported by need for an independent supply chain

2



THE KOPPAMURRA PROJECT

- Endowment of all four of the high value rare earth elements
- Large resource with exceptional potential to growth
- Tier-1 location with strong community and landowner support
- Project Support through NEO Performance Materials MOU

3



THE PATH TO PRODUCTION

- Low CAPEX, staged development to reduce project risk
- Studies underway in parallel with resource definition drilling
- Government and Stakeholder engagement established
- Downstream off-take discussions
- Targeting first production in 2025/26



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