ionic
rare earths

ASX: IXR | FSE: 6UH

Sustainably Sourcing Magnet and Heavy Rare Earths for the New Economy

Proactive One2One Investor Forum

8 November 2024

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Competent Person Statement

Information in this report 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.

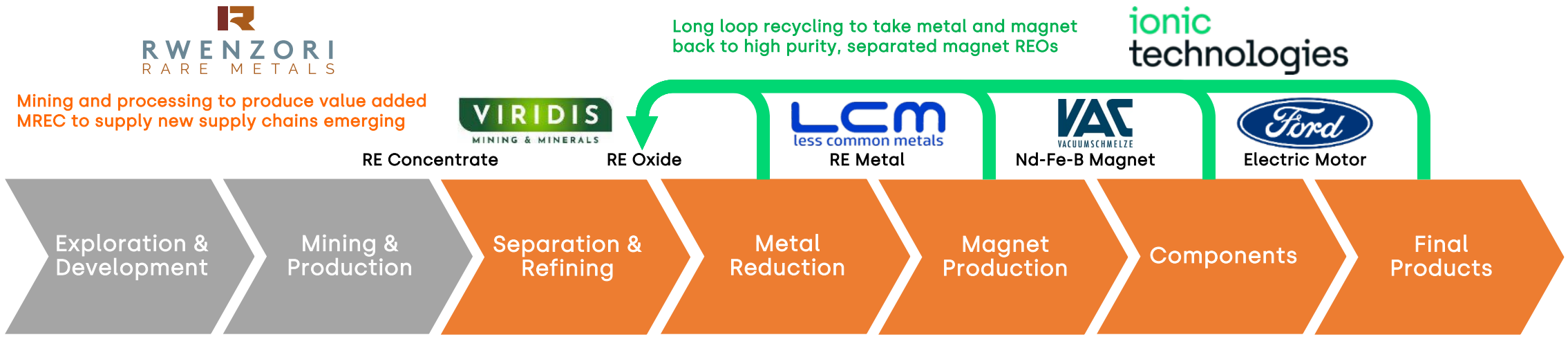
The information in this report that relates to Mineral Resources for the Makuutu Rare Earths deposit was first released to the ASX on 15 May 2024 and is available to view on www.asx.com.au. Ionic Rare Earths Limited confirms that it is not aware of any new information or data that materially affects 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. 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. 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.

REE Supply Chain and IonicRE Integration

IONICRE IS LEADING THE SECURE SUPPLY OF MAGNET RARE EARTHS, LEVERAGING OUR SUSTAINABLE TECHNOLOGY, PIONEERING MAGNET RECYCLING TO DRIVE THE NEXT GENERATION OF WIND TURBINES, ELECTRONIC VEHICLES, DEFENCE, AND ADVANCED MANUFACTURING



Makuutu Rare Earths Project (60% IonicRE → 94% IonicRE in H2 2024)

- Low capital, modular development IAC enables IonicRE to bring on highly sought-after, value added MREC basket of magnet and heavy REEs
- Mining Licence LML00334 Awarded, Environmental Permits issued
- Demonstration Plant produced MREC – offtake negotiations underway
- Expandable asset through free cash flow and growing market demand

IonicRE/ VMM Refinery

- 50/50 JV with Viridis Mining & Minerals Ltd (ASX: VMM) to develop refining and recycling footprint in Brazil
- Leveraging Ionic Technologies IP to be an early mover and first step towards establishing greater presence in emerging Brazilian rare earth market
- Signed MOU with CIT SENAI to accelerate NdFeB magnet capacity in Brazil via magnet recycling

Magnet Recycling (100% IonicRE)

- Low capital development to recycle spent magnets and swarf to produce separated and refined 99.9%+ REOs
- Demonstration Plant operating – Magnet REO production now (Nd, Pr, Dy and Tb)
- Addressing domestic supply chain / sovereign capability need with global opportunities, focus on EU and US
- First to revenue, supply independent of mine permitting, lower capital and technical, and supply chain risk
- Several JVs and partnerships on the table

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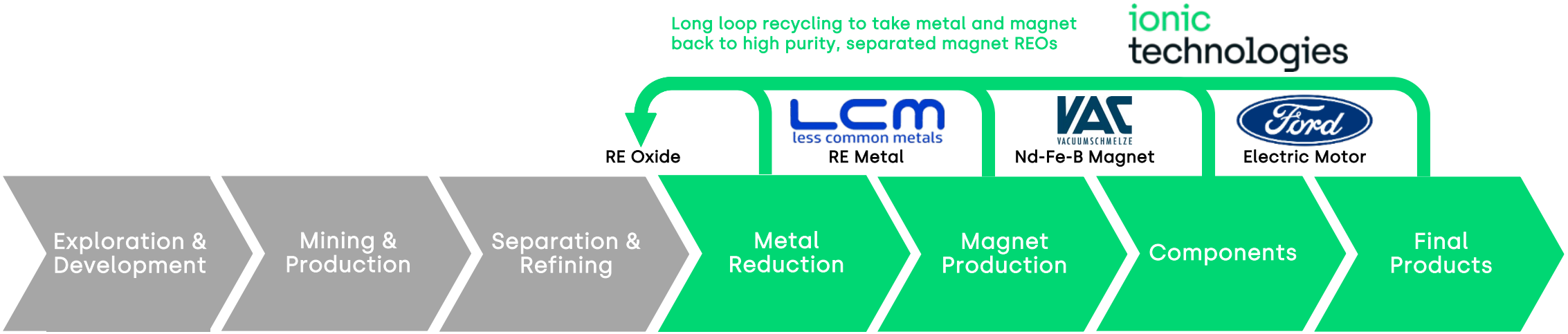
Leading Magnet Recycling and the Circular Economy of Rare Earths

Belfast now first producer of recycled magnet REOs in Western world

Recycling Supply Chain and IonicRE Integration an early leader

IONICRE IS LEADING THE SECURE SUPPLY OF MAGNET RARE EARTHS, LEVERAGING OUR SUSTAINABLE TECHNOLOGY, PIONEERING MAGNET RECYCLING TO DRIVE THE NEXT GENERATION OF WIND TURBINES, ELECTRONIC VEHICLES, DEFENCE, AND ADVANCED MANUFACTURING



Magnet Recycling – Ionic Technologies (100% IonicRE)

- Low capital development to recycle spent magnets and swarf to produce separated and refined 99.9%+ REOs → Lower Risk Profile
- Demonstration Plant operating – Magnet REO production now (Nd, Pr, Dy and Tb)
- Addressing domestic supply chain / sovereign capability need with global opportunities, focus on EU and US with several JVs and partnerships on the table
- Low carbon footprint changes sustainability benchmark for customers – Life Cycle Assessment expect Q1 2025
- First to revenue, supply independent of mine permitting, lower capital and technical, and supply chain risk

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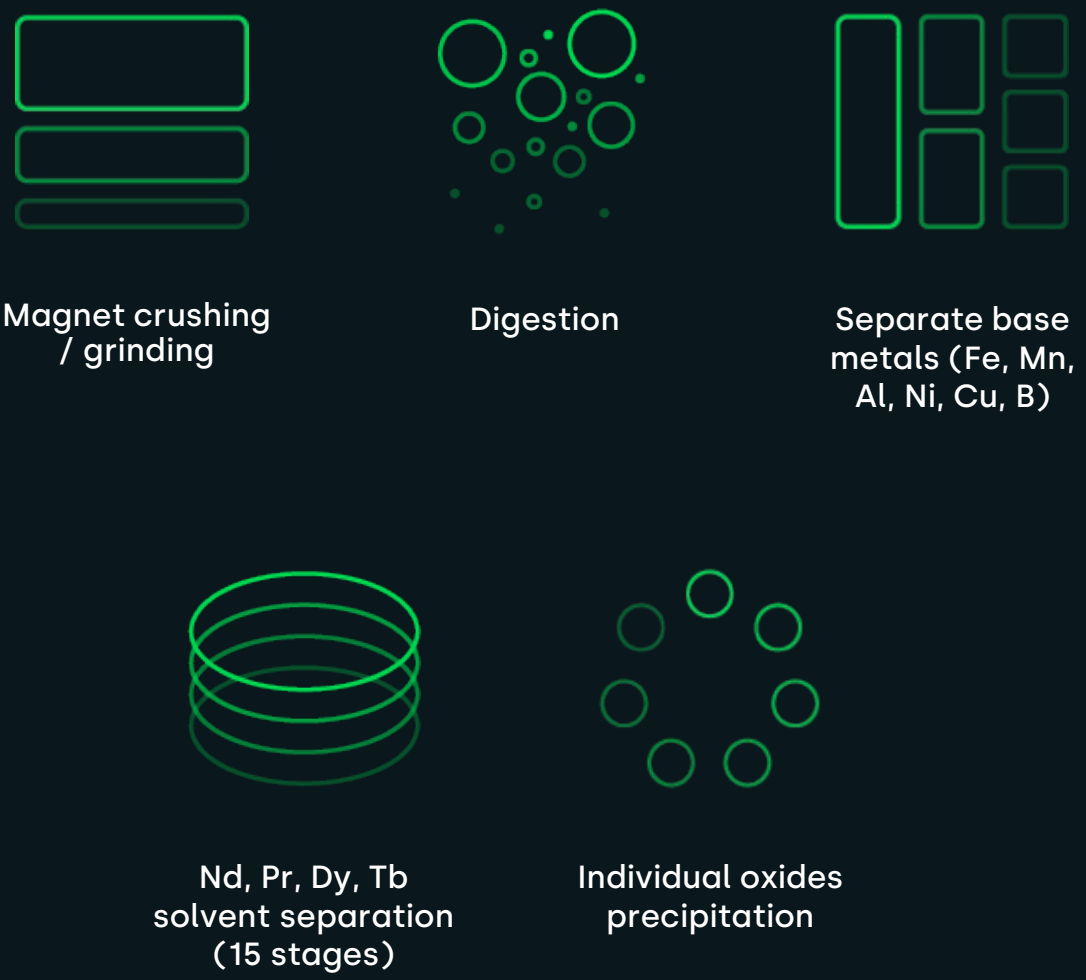
Ionic Technologies Process Flowsheet

Ionic Technologies has developed separation and refining technology that can be applied to the recycling and refining of individual magnet rare earths from used permanent (NdFeB) magnets.

Our hydrometallurgical process is able to deliver high purity separated magnet rare earth oxides no matter the quality and variability in composition of magnet feedstock.



Intake flexibility

Unlike other recycling processes, 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.

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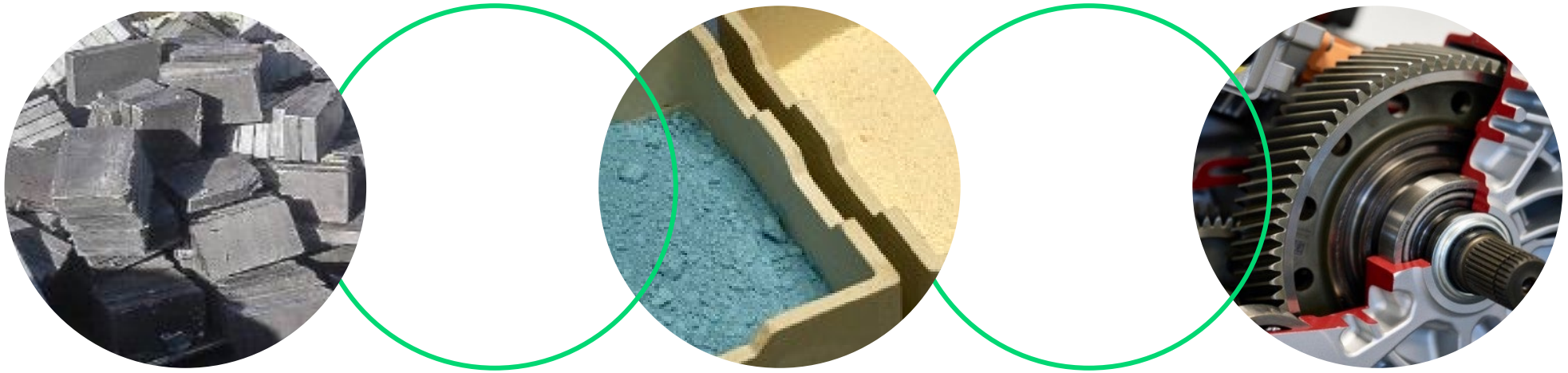
Upcycling Neodymium Permanent (NdFeB) Magnets

Commercialising recycling of End-of-Life (EOL) NdFeB magnets and swarf to high purity magnet REOs



Mixed grades of waste permanent magnets and swarf from existing metal, alloy and magnet manufacturing

100% recycled separated high purity (>99.5%) grade magnet rare earth oxides

- ✓ Nd_2O_3
- ✓ Pr_6O_{11}
- ✓ $(NdPr)_2O_3$
- ✓ Dy_2O_3
- ✓ Tb_4O_7
- ✓ Ho_2O_3

High spec permanent magnets for net zero carbon technologies such as EV motors and off-shore wind turbines

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Policy Supporting Domestic Capability & Recycling

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UK refreshed the Critical Minerals Strategy in 2023 highlighting the Circular Critical Materials Supply Chains as a key area of focus

EU's Critical Raw Material Act (CRMA) 2023, a €300 billion initiative aimed at countering the Chinese Belt and Road Initiative implemented into law earlier this year

- The Act identifies a list of strategic raw materials crucial to Europe's green and digital ambitions and for defence and space applications
- In late 2023, the co-legislators reached a political agreement on the EU CRMA and increased the recycling component from 15% to 25%

USA highlighted recycling as art of its America's Supply Chains Executive order in 2021 as part of Federal Plan to ensure secure and reliable supplies of critical minerals

EU CRMA 2023 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 **25%** of the EU's annual consumption from recycling

Not more than **65%** of the EU annual consumption at any stage of processing from a single third country

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Collaborative Stakeholders

Strong support from the UK Government to date via ~£5.0m in matched grant funding

ADVANCED PROPULSION CENTRE UK www.apcuk.co.uk	Scale-up Readiness Validation to scale Ionic Technologies process at Demonstration Scale	UK Government supported capital project to demonstrate Ionic Technologies' process, de-risking scale-up to commercial production	Started October 2022 Delivered Q2 2024
UKRI Innovate UK British Geological Survey	Feasibility study into the construction and supply side dynamics of a magnet rare earth recycling plant in the UK	Working in partnership with BGS to better understand wider needs for critical minerals and to collate data on magnet import, export and application.	Started October 2023 Ionic Technologies on track to complete Q3 2024, BGS in Q2 2025
UKRI Innovate UK LCM less common metals Ford	EV permanent magnet circular supply chain	This project will enable Ionic Technologies, Ford UK and LCM to develop a traceable, circular model supply chain within the UK for REEs.	Started October 2023 Ionic Technologies on track to deliver first product to LCM this month

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New Grants – Climates II, September 2024

Strong support from the UK Government to date via ~£5.0m in matched grant funding

Innovate UK
LCM less common metals
VAC VACUUMSCHMELZE

'REEValuate' Project to produce Rare Earth alloys for permanent magnets containing 100% recycled Heavy Rare Earth Elements (HREEs) and Light Rare Earth Elements (LREEs)

VAC to provide up to 9 tonnes of pre-consumer NdFeB magnet scrap (swarf) to Ionic Technologies for production of high purity magnet REOs; LCM to then reduce oxide to Rare Earth metals/alloys and supply to VAC at required specification for magnet production

Started October 2024

Ionic Technologies on track to complete in 2025

Innovate UK
Materials Processing Institute
Swansea University Prifysgol Abertawe

'MAGNOSTIC' Project collaboration to deliver an advanced demagnetisation solution for end-of-life permanent magnets

Working in partnership with Materials Processing Institute (MPI) and Swansea University, to determine efficient methods for demagnetising end-of-life rare earth permanent magnets (REPMs)

Started October 2024

Program expected to be completed by Q1 2026

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Our Path to Commercialisation

Rapid acceleration of our technology ready to scale globally

Scale Up Factor

20x → 40x →

Lab scale

April 2022

Pilot scale

July 2022

Demonstration scale

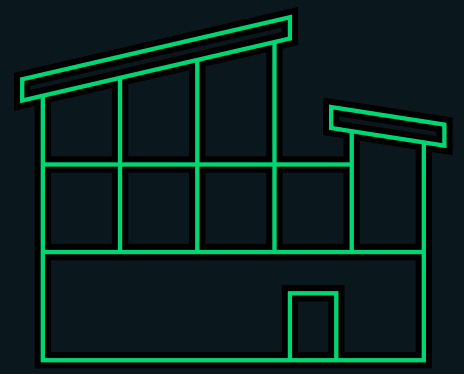
2023 / 2024

Demonstration Plant @ 24/7 plant operations

Full program for next 18 months

Examining de-bottlenecking to scale up capacity now

FS Expected Q4 2024



Commercial scale

2026 planned operations

Ready to scale out globally via JVs and commercial partnerships

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Ionic Technologies TRL Status

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TRL 1	Basic Research: Initial scientific research has been conducted. Principles are qualitatively postulated and observed. Focus is on new discovery rather than applications.	✓
TRL 2	Applied Research: Initial practical applications are identified. Potential of material or process to solve a problem, satisfy a need, or find application is confirmed.	✓
TRL 3	Critical Function or Proof of Concept Established: Applied research advances and early-stage development begins. Studies and laboratory measurements validate analytical predictions of separate elements of the technology.	✓
TRL 4	Lab Testing/Validation of Alpha Prototype Component / Process: Design, development and lab testing of components/processes. Results provide evidence that performance targets may be attainable based on projected or modeled systems.	✓
TRL 5	Laboratory Testing of Integrated / Semi-Integrated System: System Component and/or process validation is achieved in a relevant environment.	✓
TRL 6	Prototype System Verified: System/process prototype demonstration in an operational environment (beta prototype system level).	✓
TRL 7	Integrated Pilot System Demonstrated: System/process prototype demonstration in an operational environment (integrated pilot system level).	✓
TRL 8	System Incorporated in Commercial Design: Actual system/process completed and qualified through test and demonstration (pre-commercial demonstration).	Ongoing
TRL 9	System Proven and Ready for Full Commercial Deployment: Actual system proven through successful operations in operating environment, and ready for full commercial deployment.	

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Peer Comparison

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	Product	Location	Status	Demonstration Plant Feed Capacity (tpa)	Valuation
ionic technologies	Separated magnet REOs		Demonstration Plant / Feasibility Study due Q4 2024	30	A$44m / US$29m (ASX: IXR)
Cyclic Materials™	Mixed magnet REOs		Demonstration Plant	100	Private Series B Funding raised US$53m (09/2024) Series A Funding raised US$27m (04/2023)
REEcycle	REOs (Formates)		Pilot Plant	N/A	Private US$25m
Re ELEMENT	Separated magnet REOs		Pilot Plant	N/A	US$79m (NASDAQ: AREC)

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Feasibility Partners

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WSP were appointed to complete an AACE Class 3 Feasibility Study defining engineering design and deliverables for the Commercial Plant with supporting capital and operating cost estimates for a -15% / +20% basis.

Minviro are developing a Life Cycle Assessment (LCA) for the Commercial Plant process, utilising an established methodology and several comparator REE sources globally, and are working in partnership with British Geological Survey for peer review.

Turley Planning are supporting the planning application with Belfast City and Belfast Harbour stakeholders. The appraisal has been completed with no major planning issues have been experienced or are anticipated.

Soapstone Associates are acting on behalf of Ionic Technologies to administer the application stages for the Advanced Propulsion Centre (APC) Automation Transformation Fund (ATF) /Auto2030 funding grant opportunity. Soapstone Associates specialise in grant applications and communicating value propositions for UK Government supported projects.

Feasibility Stakeholders

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ADVANCED PROPULSION CENTRE UK

www.apcuk.co.uk

APC have supported the development of the Demonstration Plant, providing £1.72million via the Scale-Up Readiness Validation (SuRV) funding, as part of the Automotive Transformation Fund. They have expressed significant interest in supporting a commercial scale magnet recycling plant to support their objectives for Auto 2030.

British Geological Survey

BGS are conducting a supply-side study on the volumes of magnets in application presently in the UK and forecasting future demand as well as availability of feedstock for the commercial plant.

Innovate UK

InnovateUK have part funded the Project, as part of their CLIMATES program, which is centred on establishing circular supply chains for REEs in the UK. Ionic Technologies was the largest beneficiary of the first round of funding.

Belfast Harbour

TITANIC QUARTER

Belfast Harbour are the landowner of the 2000-acre harbour estate, within which the Demonstration Plant and the proposed Commercial Scale plant location are situated. Both organisations have worked in partnership with Ionic Technologies to capitalise on the opportunity to bring high value manufacturing to Queen's Island.

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Viridion – Brazilian Joint Venture – Refining and Recycling

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- IonicRE and Viridis Mining and Minerals Ltd (ASX: VMM) announced 50/50 JV on 3 April 2024
- Viridion JV aims to construct a refinery and magnet recycling facility in Brazil utilising Ionic Technologies' separation technology
- IonicRE will supply separation technology expertise to ensure successful commercial operation for the JV
- Magnet Recycling likely the first step in developing a domestic integrated supply chain in Brazil
- Ongoing discussions with Brazilian government agencies for accelerated approvals process, leveraging access to government funding support
- JV cements IonicRE as an industry first leader on a path to REE production and supply
- Viridis' Colossus Rare Earth Project ("Colossus"), located in Poços de Caldas, Brazil, is potentially a major high grade IAC deposit
- Viridis agrees to supply mixed rare earth carbonate (MREC) processed from the Colossus Project on standard market terms; no offtake as yet

ionic rare earths — 50%

VIRIDIS MINING & MINERALS — 50%

JV Company

- Magnet and Heavy Rare Earth Refinery
- Magnet Recycling Facility
- Further integration into Brazilian RE footprint

Corporate Snapshot

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Share Price	Market Capitalisation	Shares on Issue	Various Options	Cash Position	12-month Range (min – max)
A$0.009	A$44m	4,869,762,647	432,307,690	A$0.7m	A$0.005–A$0.031
5 November 2024	5 November 2024	5 November 2024	Exercisable at 2.0 to 6.4 cents	30 September 2024	

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