



ASX Announcement

01 October 2024

IONIC TECHNOLOGIES SECURES UK FUNDING FOR RECYCLED RARE EARTH PERMANENT MAGNETS PARTNERSHIP

Partnership with LCM, VAC to advance UK/Europe supply chain

- **Ionic Technologies partnerships awarded two new grants with combined value of £1.265m (A\$2.46m), including direct funding totalling £470k (approx. A\$900k) to Ionic Technologies, to foster REE supply chain partnerships under next round of Innovate UK ‘CLIMATES’ program**
- **Funding secured for £843k groundbreaking ‘REEvaluate’ Project, partnering with metals and alloys manufacturer, Less Common Metals (LCM) and magnet manufacturer, Vacuumschmelze (VAC), 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 pre-consumer NdFeB magnet scrap (swarf) to Ionic Technologies for production of high purity magnet Rare Earth Oxides (REOs) at Belfast Demonstration Plant; LCM to then reduce oxide to Rare Earth metals/alloys and supply to VAC at required specification for magnet production; initial magnet scrap volume to be processed of up to 9 tonnes**
- **UK Government selects Ionic Technologies-led ‘MAGNOSTIC’ collaboration to deliver advanced, demagnetisation solution for end-of-life permanent magnets, working in partnership with Materials Processing Institute (MPI) and Swansea University, a centre of excellence for metal processing and handling**
- **MAGNOSTIC Project is valued at £422k, with Ionic Technologies to directly benefit from £178k of UK Government funding, also part of Innovate UK CLIMATES funding.**

Ionic Rare Earths Limited (“IonicRE” or the “Company”) (ASX: IXR) wholly owned subsidiary Ionic Technologies has secured significant new grant funding from the UK Government, facilitating new partnerships aimed at developing collaborative rare earth element (REE) supply chains within the



UK. The partnerships will advance the production of high purity, recycled magnet rare earth oxides (REOs) at Ionic Technologies' Demonstration Plant in Belfast, UK.

Two grants have been awarded to Ionic Technologies, a wholly owned subsidiary, under Innovate UK's 'CLIMATES' program. The first grant is for the groundbreaking 'REEValue' Project, under which Ionic Technologies will partner with UK-based metal and alloys manufacturer Less Common Metals (LCM) and Germany-based magnet manufacturer Vacuumschmelze (VAC) to produce magnets containing 100% recycled HREEs and LREEs.

A flagship Innovate UK project, REEValue demonstrates the UK Government's strong commitment to fostering collaborative REE supply chains within the UK, highlighting the key role of recycling in increasing domestic REE supply.

Under the partnership, VAC will provide pre-consumer NdFeB magnet scrap (swarf) to Ionic Technologies, which will use its patented technology to produce high purity magnet REOs from the scrap at its Belfast Demonstration Plant.

LCM will then use its unique technology to reduce the oxide to Rare Earth metals and alloys, supplying them back to VAC at the required specification for magnet production.

The initial magnet scrap volume to be processed through the partnership is expected to be up to nine tonnes, with any process wastes generated to be returned to Ionic Technologies for recycling.

Having previously received UK Government support via Innovate UK, as part of the first round of CLIMATES program funding for circular critical materials supply chains announced 12 months ago, Ionic Technologies will benefit from an additional £292k of grant funding for the REEValue Project, as part of UK Government support totalling £843k for the Project.

In a second successful grant, the UK Government has selected the Ionic Technologies-led 'MAGNOSTIC' collaboration to deliver an advanced, demagnetisation solution for end-of-life permanent magnets. Ionic Technologies is working in partnership with the Materials Processing Institute (MPI), a leading research and technology organisation specialising in critical materials, powder metallurgy and other materials processing, as well as Swansea University, a centre of excellence for metal processing and handling.

The MAGNOSTIC Project is valued at £422k, with Ionic Technologies also set to directly benefit from £178k of UK Government funding, also part of Innovate UK's 'CLIMATES' funding.

Ionic Technologies is a global first mover in the recycling of Neodymium-Iron-Boron (NdFeB) permanent magnets to high purity separated magnet rare earth oxides (REOs) – enabling the creation of sustainable, traceable, and sovereign rare earth supply chains.

Ionic Technologies is now a producer of a suite of magnet REOs including neodymium oxide (Nd₂O₃), didymium oxide (NdPr oxide), dysprosium oxide (Dy₂O₃) and terbium oxide (Tb₄O₇) and is a leader in producing such high-quality REO products.

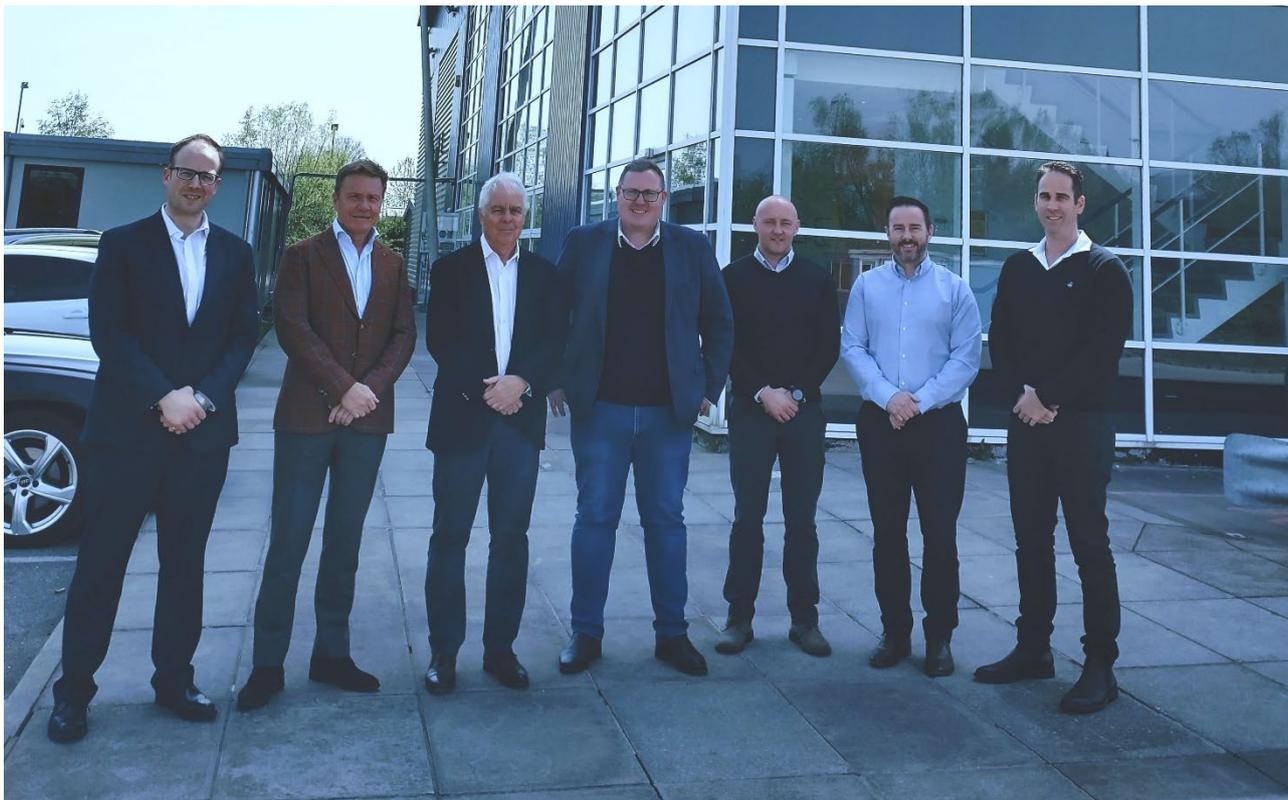


Figure 1: Leadership Teams of IonicRE and LCM: Left to Right, Thomas Kelly (Director of Operations, Ionic Technologies), Brett Lynch (Chairman, IonicRE), Grant Smith (Chairman, LCM), Tim Harrison (Managing Director, IonicRE), Aaron Riley (Director, LCM), Mark Thompson (Commercial Director, LCM), Lynden Polonsky (Chief Development Officer, IonicRE).

Supply Chain Collaboration – REEValue Project

Ionic Rare Earths' Managing Director, Mr Tim Harrison, commented on the significance of the strategic partnership with leading supply chain partners, LCM and VAC: *“Collaborating with key supply chain partners is essential in establishing Western supply chains for magnet manufacturing, utilising both light and heavy rare earths.*

“LCM is the only Western rare earth metal/alloy manufacturer, and it is of significant benefit to Ionic Technologies and LCM to be able to deliver a project as significant as this within the UK. Similarly, working with VAC represents an enormous opportunity for all involved to show how Western rare earth supply chain partners can deliver cohesively, meeting the demands of the energy transition, advanced manufacturing, and defence.

“The commercialisation of our recycling technology is moving rapidly, highlighting the strategic importance of the Belfast Demonstration Plant. Our supply chain partners have expressed significant interest in procuring REOs from secondary sources, and with this announcement, we are excited to deliver a full schedule of magnet recycling through to mid-2025. We are continuing to produce Light REOs and Heavy REOs in Belfast, constantly optimising the performance of the process for greater efficiencies.”

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Mr Harrison added: *“Once again, the UK Government has recognised the role that Ionic Technologies’ patented, leading edge magnet recycling technology has not only in establishing critical minerals supply chains in the UK, but also directly into Western markets. By supporting this progressive collaboration between UK and EU-based rare earth supply chain businesses, the UK Government is facilitating supply chain partners to establish strategically significant collaborations, underpinned with demonstrator projects.*

“Demand for secondary REOs through recycling is accelerating to align with global policy priorities and offtaker objectives to enter key markets. This is being driven by global policy, such as the European Union Critical Raw Materials Act and the US Inflation Reduction Act.

“IonicRE aims to progress the technology with the deployment of modular recycling initiatives in Western markets looking to develop domestic, secure, and sustainable supply chains to address strategic supply and sovereign security, placing IonicRE at the epicentre of near term, deployable rare earth recycling.”

LCM’s General Manager Aaron Riley said: *“LCM is proud to be leading this project in partnership with Ionic Rare Earths. By advancing a fully traceable, circular supply chain, we are not only addressing the growing demand for rare earths driven by clean energy technologies, but also exploring an alternative route for sustainability in the industry.”*

Manu Kaimanikal, Senior Metallurgist and Project lead at LCM added: *“The REEValue project is an exciting initiative aiming to convert industrial NdFeB scrap into high-quality valuable REOs for magnets. This will be achieved by combining Ionic Technologies’ hydrometallurgical methods with LCM’s established metallothermic and electrolysis processes.*

“This closed-loop rare earth project is set to drive the establishment of a sustainable circular supply chain of REE’s, offering material-specific recycling, cost and waste reduction, and ensuring traceability, transparency, and regulatory compliance.”



Figure 2: Ionic Technologies’ Demonstration Plant (Belfast, UK).

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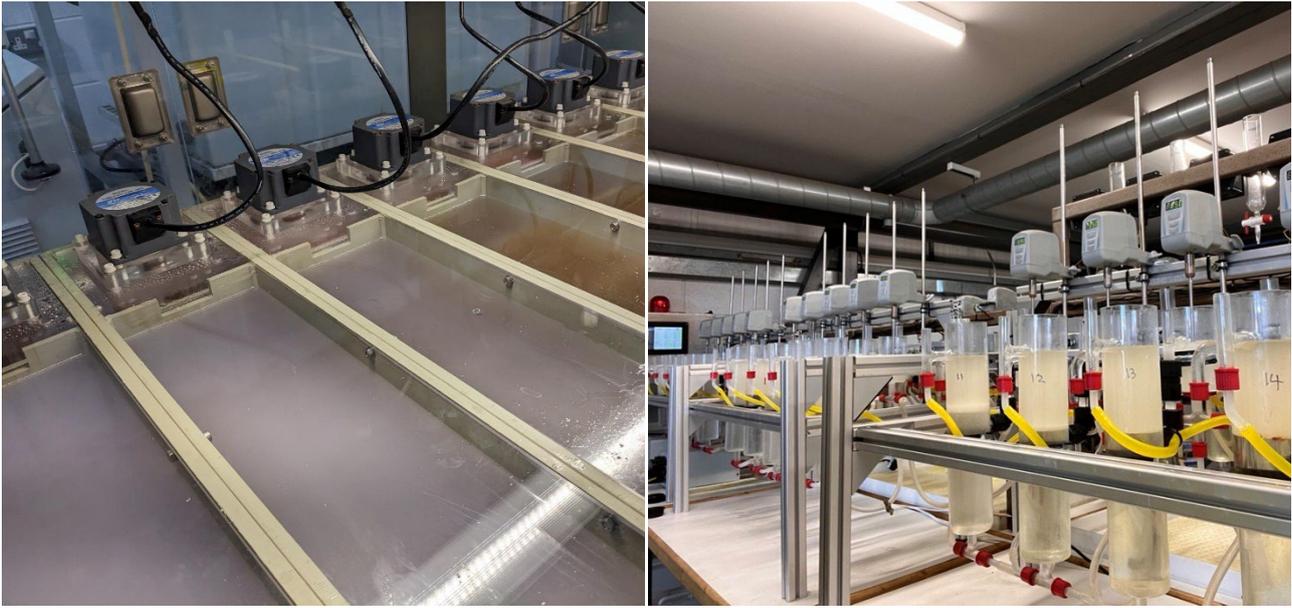


Figure 3: Ionic Technologies' demonstration scale solvent extraction (SX) circuit (left), and Ionic Technologies' Heavy REE SX circuit (right).



Figure 4: LCM's Ellesmere Port facility in the UK (Source: www.lesscommonmetals.com).

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Figure 5: LCM SmCo/Speciality Alloy Hall (Source: LCM)

Demagnetisation Technology Development – MAGNOSTIC Project

The UK Government has selected the MAGNOSTIC Project, led by Ionic Technologies, for further government funding as part of the latest round of Innovate UK ‘CLIMATES’ funding. The Project will draw upon Ionic Technologies’ project management and technical expertise in REE recovery, while implementing novel practices currently being piloted and tested by both MPI and Swansea University.

The Project is expected to determine efficient methods for demagnetising end-of-life rare earth permanent magnets (REPMs), which can be scaled up to compliment Ionic Technologies’ patent magnet recycling process. Ionic Technologies will work closely with MPI, tasked with optimising material processing technologies, from its base in Teesside, UK, as well as Swansea University.

Mr Harrison commented: *“The MAGNOSTIC Project brings us a significant step closer to making commercial scale magnet recycling a reality. It is expected to provide efficient solutions to demagnetise magnets, prior to processing them through Ionic Technologies’ patented process. Solutions that enable rapid demagnetisation reduce the implications of handling high specification REPMs and thus reduce costs.*

“It is anticipated that significant volumes of end-of-life magnets will require demagnetisation and recycling across global markets in coming years. Ionic Technologies is seeking to provide viable solutions that enable this to happen effectively, positioning the Company to be at the forefront of commercialising opportunities in this field.”

He added: "MPI is a world-renowned RTO, with a comprehensive range of pilot equipment at their facilities in Teesside, UK. Our Ionic Technologies team will work with MPI to identify process efficiency and effectiveness, and ultimately scalability to commercialisation.

"Swansea University has a demonstrated track record as a centre of excellence in metals technologies, located in close proximity to the long-established steel manufacturers of South Wales, UK. We are excited to partner with these two organisations on such a strategically significant development project.

"We also appreciate the show of ongoing faith shown in Ionic Technologies by the UK Government, via Innovate UK CLIMATES support, to lead this project."

Ionic Rare Earths' Executive Chairman, Brett Lynch commented: "IonicRE has been focused on developing Ionic Technologies' magnet recycling technology, 'pioneering profit' by unlocking a new supply chain in the West. The formation of new partnerships backed by government support is integral in building this supply chain and I congratulate the team for their success in securing these valuable grants and support.

"The UK Government has yet again shown its strong support for Ionic Technologies, and I would like to thank Innovate UK and all other Government entities for delivering this important financial boost for the sector. These initiatives are putting the UK at the forefront of this emerging ex-China supply chain, and we are enormously excited by the opportunity to drive this forward, from our base in Belfast, UK across to Europe and beyond."

Christopher Smith, MPI's Critical Raw Materials Group Leader commented in relation to the Project;

"The UK is rapidly developing leadership in magnet recycling technologies, including the demagnetisation of end-of-life REPMs. We look forward to collaborating with Ionic Technologies and Swansea University on this important initiative, drawing upon our world-leading facilities in Teesside."

Professor Ian Mabbet, Swansea University's Deputy Pro Vice Chancellor for Research Culture added:

"This is an exciting project that will maintain UK leadership in the development of a circular economy for critical raw materials with applications in energy and transport. MPI and Ionic Technologies are both at the cutting-edge of this field and we are keen to apply our complementary scientific expertise in metals technologies to deliver successful outcomes, ultimately paving the way to commercialisation."



Figure 6: MPI Microwave Rotary Furnace (Source: www.mpiuk.com)



Figure 7: Swansea University Pilot Line Manufacturing Centre.

About the production of REOs at Ionic Technologies

Owned 100% by IonicRE, Ionic Technologies has developed rare earth element separation and refining technology and applied this to the recycling of spent permanent Neodymium-Iron-Boron (NdFeB) magnets.

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The process uses a hydrometallurgical process to extract the rare earth elements (REE), then separate the individual magnet REEs within –Nd, Pr, Dy and Tb – and finally refine to high purity individual magnet rare earths oxides (REO).

In September 2022, IonicTech was awarded a grant of £1.72 million (approximately A\$2.9 million) from the UK Government's Innovate UK Automotive Transformation Fund Scale-up Readiness Validation (SuRV) program. This is a significant step towards securing the UK supply of critical rare earth metals for EV manufacture.

In September 2023, Ionic Technologies announced it had successfully secured additional funding for two Innovate UK CLIMATES grants totalling £2 million (A\$3.90 million). The successful grant funding submissions centred on two CLIMATES projects:

1. in partnership with Less Common Metals (LCM) and Ford Technologies, Ionic Technologies will develop a traceable, circular supply chain of rare earths for application in EV motors within the UK; and
2. in partnership with the British Geological Survey, Ionic Technologies has commenced a feasibility study for a commercial magnet recycling plant in Belfast, UK.

The magnet recycling Demonstration Plant will provide the data for the development of commercial facilities.

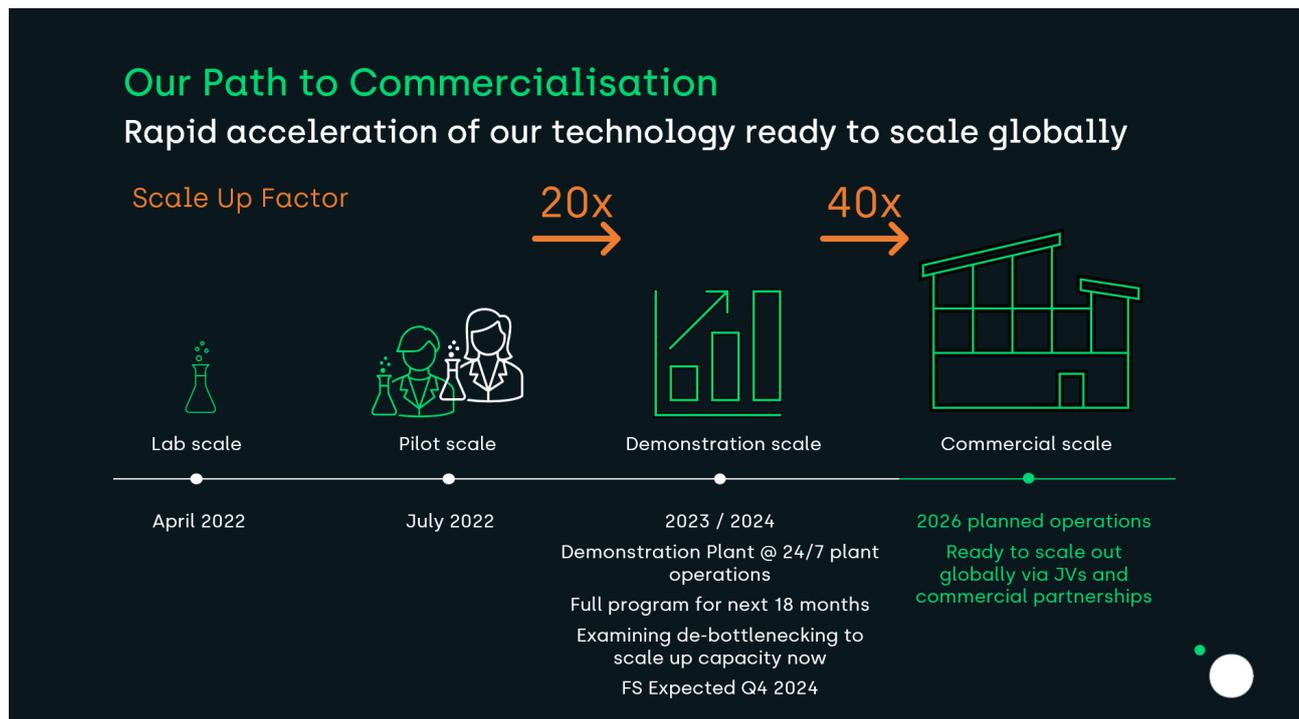


Figure 8: Ionic Technologies' path to production and scale up from laboratory towards commercial operations.

The Ionic Technologies magnet recycling process is agnostic on magnet quality, can process oxidised magnets, and can also manage coatings and films, to produce individually separated and refined high purity REOs.

Technology Overview

Since its founding in 2015, as a spinout from Queens University Belfast (QUB), Ionic Technologies has developed processes for the separation and recovery of REEs from mining ore concentrates and waste permanent magnets.

The technology developed is a step up in efficient, non-hazardous, and economically viable processing with minimal environmental footprint.

Ionic Technologies has demonstrated capability for REEs to achieve near complete extraction of REO's from lower quality spent magnets and waste (swarf) to a recovery of high value magnet REO product quality exceeding 99.9% REO.

Ionic Technologies now has "first mover" advantage in the industrial elemental extraction of separated REOs from spent magnets and waste, enabling near term magnet REO production capability to satisfy growing demand from the energy transition, advanced manufacturing, and defence.

Ionic Technologies proprietary technology provides a universal method for the recovery of high purity REEs from lower quality and variable grade magnets, to be used in the manufacture of modern, high-performance and high specification REPMs required to support substantial growth in both electric vehicle (EV) and wind turbine deployment.

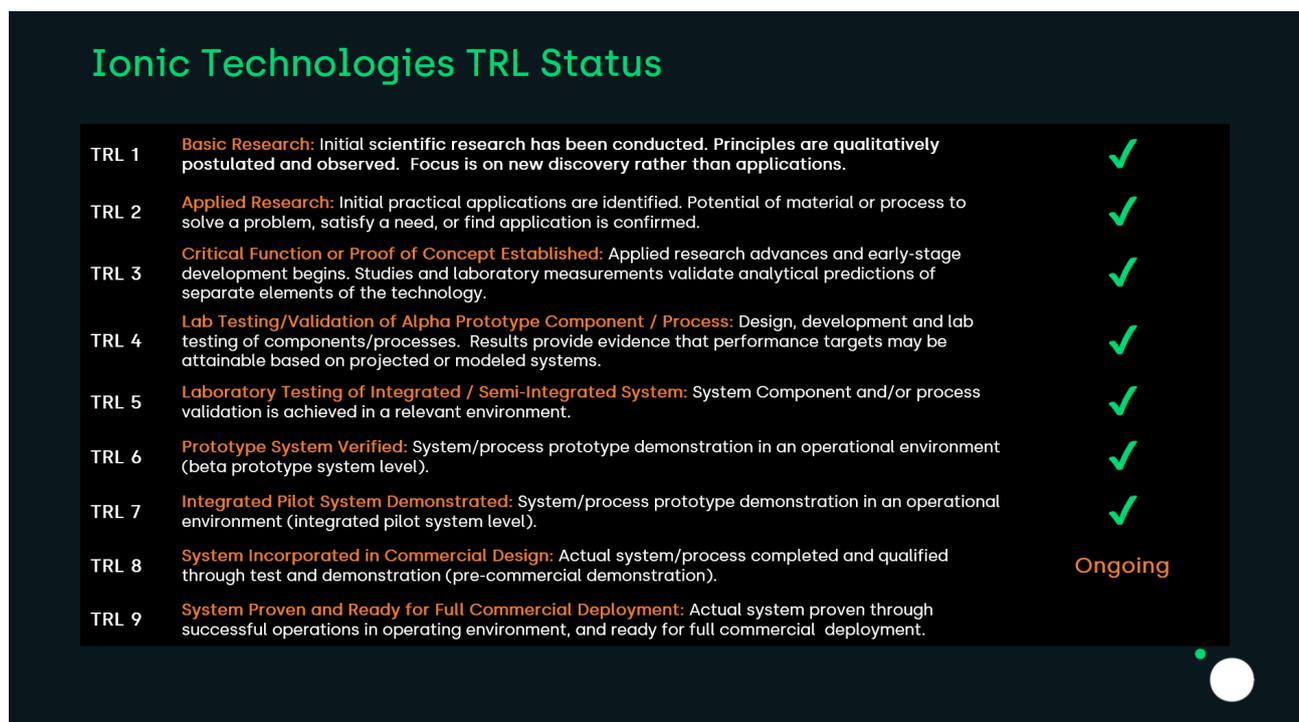


Figure 9: Ionic Technologies' progress through Technology Readiness Levels (TRLs) towards commercialisation.

About Ionic Technologies

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, independent of variability in composition of magnet feedstock.

Ionic Technologies is 100% owned by Australian rare earth resources company **Ionic Rare Earths Limited** (ASX: IXR).

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.



Magnet crushing / grinding



Digestion



Separate base metals (Fe, Mn, Al, Ni, Cu, B)



Nd, Pr, Dy, Tb solvent separation (15 stages)



Individual oxides precipitation

Figure 10: Ionic Technologies technology overview.

For more information about IonicRE and its operations, please visit www.ionicre.com.

Authorised for release by the Board.

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About Ionic Rare Earths Ltd

Ionic Rare Earths Limited (ASX: IXR or IonicRE) is an emerging miner, refiner and recycler of sustainable and traceable magnet and heavy rare earths needed to develop net-zero carbon technologies.

Ionic Technologies International Limited (“Ionic Technologies”), a 100% owned UK subsidiary, has developed processes for the separation and recovery of rare earth elements (REE) from mining ore concentrates and recycled permanent magnets. Ionic Technologies is focusing on the commercialisation of the technology to achieve near complete extraction from end of life / spent magnets and waste (swarf) to high value, separated and traceable magnet rare earth products with grades exceeding 99.9% rare earth oxide (REO).

In June 2023, Ionic Technologies announced initial production of high purity magnet REOs from its newly commissioned Demonstration Plant and moved to continuous production in March 2024, providing a first mover advantage in the industrial elemental extraction of REEs from recycling. In September 2023, Ionic Technologies announced collaboration partnerships with Ford Technologies, Less Common Metals (LCM) and the British Geological Survey (BGS) to build a domestic UK supply chain, from recycled REOs to metals, alloys and magnets and supplying UK based electric vehicles (EV) manufacturing, with potential to replicate across other key markets.

The Makuutu Rare Earths Project in Uganda, 60% owned by IonicRE, moving to 94% ownership) is well-supported by existing tier-one infrastructure and is on track to become a long-life, low Capex, scalable and sustainable supplier of high-value magnet and heavy REO. In March 2023, IonicRE announced a positive stage 1 Definitive Feasibility Study (DFS) for the first of six tenements to progress to a mining licence, which was awarded in January 2024. Makuutu is now producing mixed rare earth carbonate (MREC) from a Demonstration Plant on site to advance offtake negotiations.

IonicRE has also executed a transformational 50/50 joint venture refinery and magnet recycling facility in Brazil with Viridis Mining and Minerals Limited (ASX: VMM) to separate high value magnet and heavy rare earths from the Colossus Project’s full spectrum of REOs.

This integrated strategy completes the circular economy of sustainable and traceable magnet and heavy rare earth products needed to supply applications critical to EVs, offshore wind turbines, communication, and key defence initiatives.

IonicRE is a Participant of the UN Global Compact and adheres to its principles-based approach to responsible business.

For more information about IonicRE and its operations, please visit www.ionicre.com.

About Less Common Metals Limited

Less Common Metals Limited (LCM) is a UK-based, privately-owned company and a world leader in the manufacture and supply of rare earth-based metals and alloys. Its primary markets include the global permanent magnet industry, hydrogen storage alloys, specialist master alloy consumers, and producers of functional materials that utilise rare earth-containing alloys.

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With extensive experience in the production and characterisation of materials to tight compositional tolerances and controlled microstructures, LCM adopts an innovative and highly flexible approach to a wide range of material requirements. The company excels in delivering bespoke solutions, supported by its ISO 9001 certified facility, which provides high-quality rare earth metals and alloys, alongside comprehensive casting and testing services to meet the most demanding specifications.

Find out more at www.lesscommonmetals.com.

About Vacuumschmelze

Vacuumschmelze (VAC) is a leading global producer of advanced magnetic solutions, rare earth permanent magnets, and inductive components. With extensive application know-how and over 100 years of experience in material science and product development, VAC designs and manufactures mission critical solutions for a wide variety of industries, including renewable energy, e-mobility, automotive, industrial automation, medical, aerospace and defence.

VAC's unique ability to develop and manufacture from base elements through final products enables us to provide customers optimal form factors and performance, generating best in class efficient solutions in an environmentally conscious manner. VAC is a portfolio company of Ara Partners, a global private equity firm that is decarbonising the industrial economy.

More information is available at www.vacuumschmelze.com.

About Materials Processing Institute

The Materials Processing Institute (MPI) is an independent, not for profit, research technology organisation, with expertise in pilot-scale metal processing. The Institute has 75-year track record in developing and scaling up new materials, processes and technologies; focusing across four key pillars: Advanced Materials, Industrial Decarbonisation, Circular Economy supported by the latest Digital Technologies. The Institute actively supports the foundation industries and is a member of the Foundation Industries Sustainability Consortium (FISC).

More information is available at www.mpiuk.com.

About Swansea University

Swansea University is a research-led university that has been making a difference since 1920. Founded by industry, for industry, the University community thrives on exploration and discovery with a focus on delivering impact. Swansea University is home to the Queen's anniversary prize winning SPECIFIC innovation and knowledge centre with expertise in scale up of processes for energy materials, the Steels and Metals Institute, the SUSTAIN manufacturing hub with its focus on collaboration for cleaner, greener, smarter steel making. The university also helps with industry and workforces access skills, training and innovation activities through the South Wales Transition from Carbon (SWITCH) programme and the Circular Economy Innovation Communities (CEIC) network.

More information is available at www.swansea.ac.uk.

Forward Looking Statements

This announcement has been prepared by Ionic Rare Earths Limited and may include forward-looking statements. Forward-looking statements are only predictions and are subject to risks, uncertainties and assumptions which are outside the control of Ionic Rare Earths Limited. Actual values, results or events may be materially different to those expressed or implied in this document. Given these uncertainties, recipients are cautioned not to place reliance on forward looking statements. Any forward-looking statements in this document speak only at the date of issue of this document. Subject to any continuing obligations under applicable law and the ASX Listing Rules, Ionic Rare Earths Limited does not undertake any obligation to update or revise any information or any of the forward-looking statements in this document or any changes in events, conditions, or circumstances on which any such forward looking statement is based.

References to Previous ASX Releases

- *Company Update – 16 September 2024*
- *IXR and LCM advance rare earth supply chain collaboration – 27 May 2024*

The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcement and all material assumptions and technical parameters continue to apply and have not materially changed.