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ASX Announcement

25 March 2024

IONIC TECHNOLOGIES COMMENCES FULL SCALE MAGNET RARE EARTH OXIDE PRODUCTION AT BELFAST DEMONSTRATION FACILTY

- **Magnet recycling Demonstration Plant achieves continuous production of magnet Rare Earth Oxides (REOs) at Ionic Technologies' technical facility in Belfast, UK;**
- **11.5 kg of 99.8% grade of Didymium (Neodymium-Praseodymium, NdPr) Oxide produced;**
- **Throughput ramping up to name plate capacity, approximately 10 tonnes REO per annum;**
- **Dysprosium/Holmium (Dy/Ho) strip liquor produced ready to undergo separation to produce high purity Dy_2O_3 and Ho_2O_3 products;**
- **Continuous production demonstrates capability, as part of a UK Government supported demonstrator program in collaboration with Ford Motor Company and Less Common Metals (LCM), and supports completion of the Feasibility Study for a commercial plant in Belfast;**
- **Success supports further opportunities for commercialisation globally with several discussions underway indicating a full operational plan for the Demonstration plant through to mid 2025; and**
- **Ionic Technologies has "first mover" advantage in the recycling of separated magnet Rare Earth Oxides and is exploring opportunities to advance UK and EU market presence.**

The Board of Ionic Rare Earths Limited ("IonicRE" or the "Company") (ASX: IXR) is very pleased to advise that continuous production of high purity, recycled magnet rare earth oxides (REOs) has commenced at scale on the Demonstration Plant at Ionic Technologies International Ltd's ("Ionic Technologies") Belfast facility in the UK.

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.

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Ionic Technologies is now a producer of a suite of magnet REOs including neodymium oxide (Nd_2O_3) didymium oxide (NdPr oxide), dysprosium oxide (Dy_2O_3) and terbium oxide (Tb_4O_7) and is the first to produce such high-quality REO products in the UK.

Figure 1: First NdPr oxide (>99.8% grade) production achieved from continuous operations at Ionic Technologies' Belfast Demonstration Plant.

Ionic Rare Earths' Managing Director, Mr Tim Harrison, commented on another major milestone achieved by the company towards the development of a Western supply chain to support the energy transition: *"Our Belfast facility is key to us harnessing our technology to accelerate our mining, refining and recycling of magnets and heavy rare earths which are critical for the energy transition, advanced manufacturing, and defence,"*

"The commercialisation of our recycling technology is moving rapidly, and the Board of IonicRE is pleased to announce that Demonstration scale production of NdPr oxides have commenced. It is an important milestone, which exhibits our readiness to supply recycled magnet REOs into the market.

"Our supply chain partners have expressed significant interest in procuring REOs from secondary sources, and with this milestone, we are confident in delivering a full schedule of magnet recycling campaigns through to mid-2025."

The Belfast facility is expected to receive a steady supply in magnets to be recycled from sources such as swarf from existing manufactures of metals alloys and magnets, plus end-of-life turbines from

grid scale wind farms, and magnets and components from used electric vehicles (EVs) and other industries.

Mr Harrison commented further that "*demand for material of recycled origin is accelerating to align with global policy priorities and off-taker objectives in order to enter these 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 rare earth element recycling".

Continuous Production Achieved

Ionic Technologies commenced operations processing an end of life (EOL) permanent magnet from a decommissioned wind turbine generator. The permanent magnet composition included 26.7% neodymium (Nd), 5.4% praseodymium (Pr), 1.0% dysprosium (Dy) and 1.4% holmium (Ho).

Following the completion of process commissioning, Ionic Technologies has successfully separated NdPr from heavy rare earth elements (REE) DyHo (see Figure 3) which will undergo further separation to produce high purity Dy_2O_3 and Ho_2O_3 product.

The first production from continuous Demonstration Plant activity has produced approximately 11.5 kg of NdPr oxide grading greater than 99.8% NdPr oxide (total REO content of 99.99%). The production of NdPr oxide at Demonstration Scale follows previous successful production of maiden Nd_2O_3 grading 99.7% and Dy_2O_3 grading 99.8% (ASX: 12 June 2023), and Tb_4O_7 grading > 99.5% (ASX: 19 March 2024).

Initial production of NdPr oxide, and subsequent Dy_2O_3 and Tb_4O_7 to be produced, supports our collaboration with partners Less Common Metals (LCM) and Ford Technologies. Ionic Technologies will supply REOs to LCM, who will produce alloys for magnet production to be developed in Europe, with the sintered magnets to be supplied to Ford Technologies in Halewood, UK, to produce electric motors for evaluation, demonstrating a UK magnet rare earth supply chain as part of a UK Government sponsored CLIMATES initiative (ASX: 12 September 2023).

Following the successful commissioning and first continuous production from the Demonstration Plant, Ionic Technologies is now entering late-stage negotiations in relation to strategically significant production campaigns, with a view to progressing towards commercial agreements to roll the technology out to western end users.

The continuous Demonstration Plant will also support the completion of a Feasibility Study into a commercial scale facility, expected by mid-2024 (ASX: 6 December 2023).

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Figure 2: NdPr oxalate product produced post separation (left), and calcination feed (right).

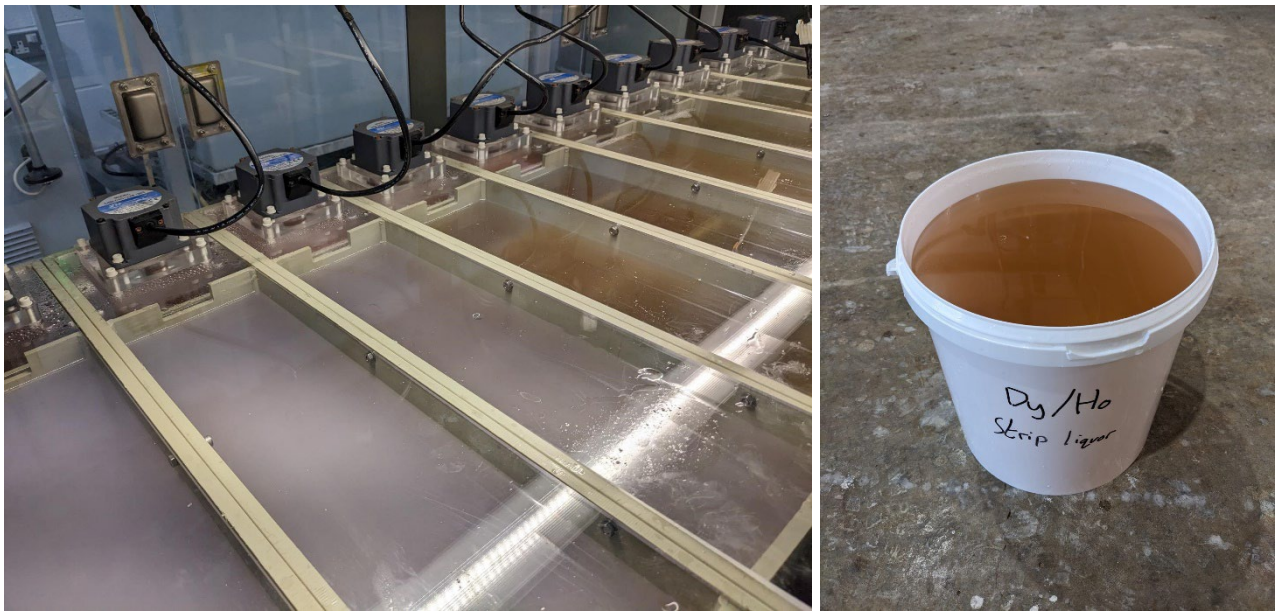

Figure 3: Separation circuit showing extraction gradient advancing to the right with DyHo (orange organic) being extracted from NdPr rich feed stream (pink) (left), and the right image showing DyHo strip liquor accumulating for heavy REE separation.

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Based upon magnet recycling progress, and given the footprint being established in the UK and Europe, the Company has also initiated investigating opportunities to advance UK and EU investment market presence, where sentiment and support from the UK government has been very strong.

About the production of REOs at Ionic Technology

Ionic Technologies is a 100% owned subsidiary of IonicRE, based in Belfast UK, which the Company acquired in H1 2022. 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.

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.

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 grade rare earth elements from lower quality and variable grade magnets, to be used in the manufacture of modern high-performance and high specification permanent magnets required to support substantial growth in both electric vehicle (EV) and wind turbine deployment.

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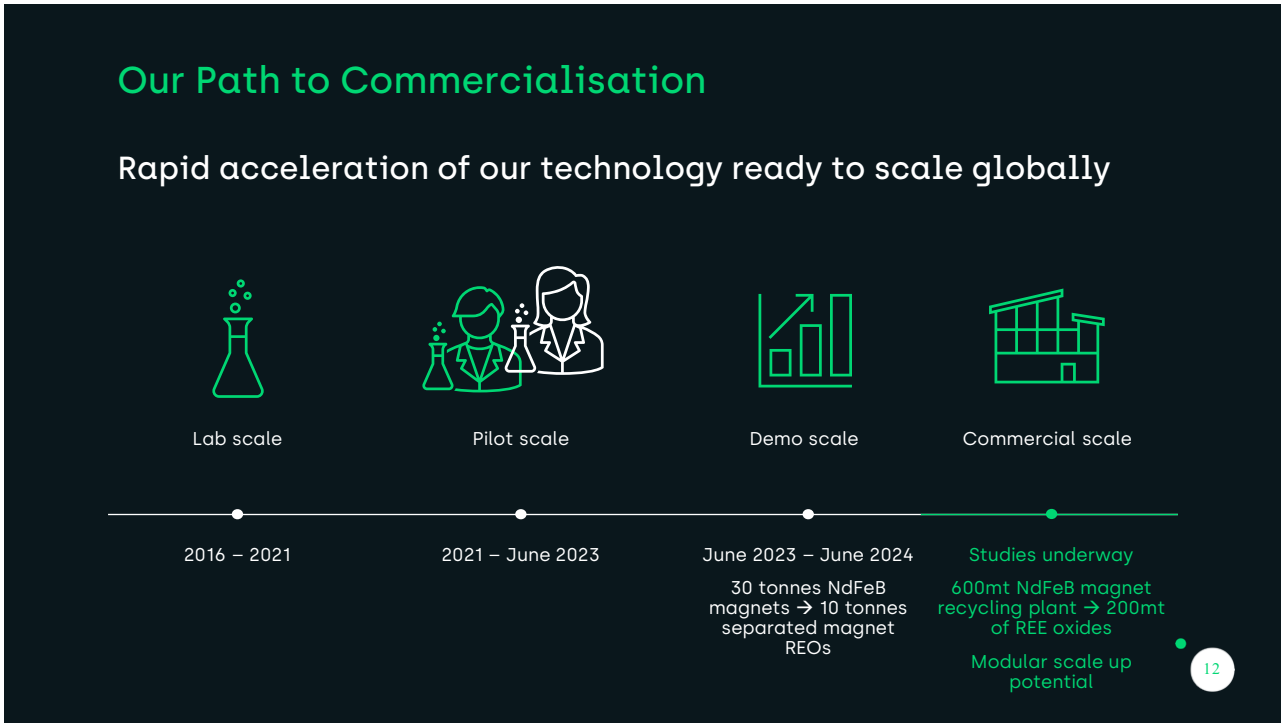

Figure 4: Ionic Technologies path to production.

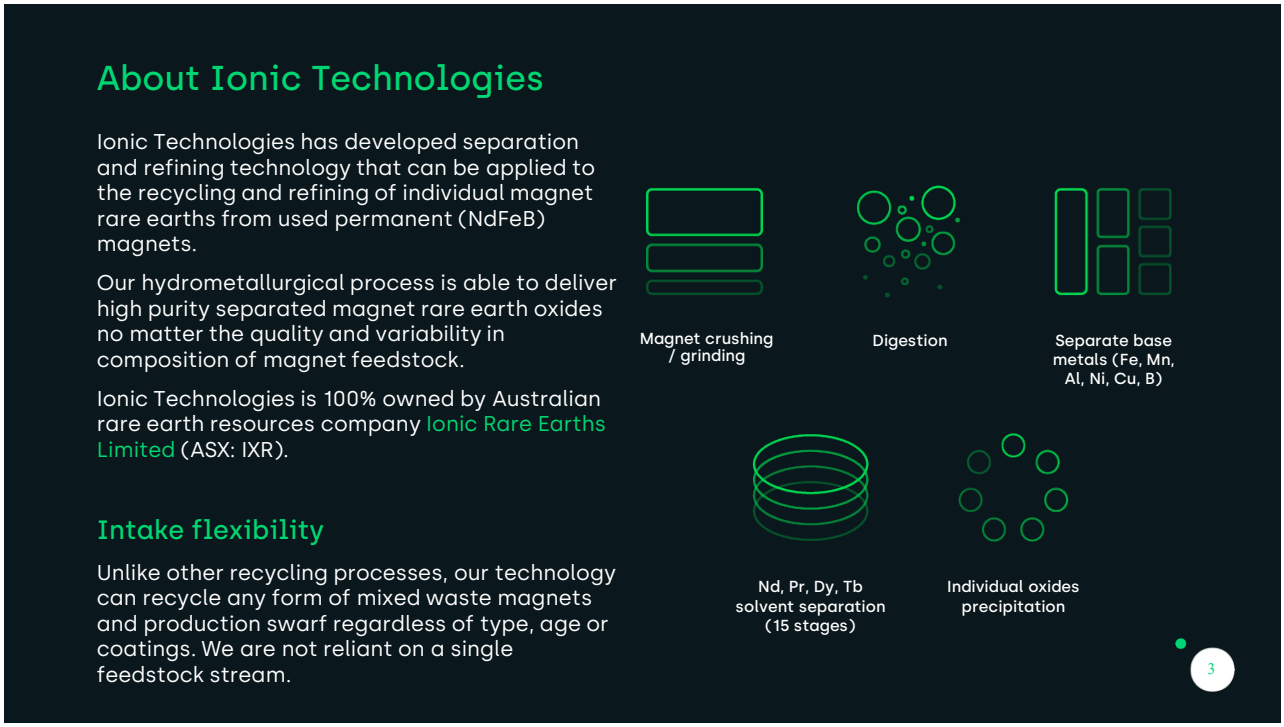

Figure 5: Ionic Technologies technology overview.

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

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Authorised for release by the Board.

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About Ionic Rare Earths Ltd

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

The Makuutu Rare Earths Project in Uganda, 60% owned by IonicRE, moving to 94% ownership in Q2 2024, 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 rare earths oxides (REO). In March 2023, IonicRE announced a positive stage 1 Definitive Feasibility Study (DFS) for the first of six (6) tenements to progress to a mining licence which was awarded in January 2024. The Makuutu Stage 1 DFS defined a 35-year life initial project producing a 71% rich magnet and heavy rare earth carbonate (MREC) product basket and the potential for significant potential and scale up through additional tenements.

Ionic Technologies International Limited ("Ionic Technologies"), a 100% owned UK subsidiary acquired in 2022, 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. This technology and operating Demonstration Plant provides first mover advantage in the industrial elemental extraction of REEs from recycling, enabling near term magnet REO production capability to support demand for early-stage alternative supply chains. In September 2023, Ionic Technologies announced with the support of the UK government, collaboration partnerships 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.

As part of an integrated strategy to create downstream supply chain value, IonicRE is also evaluating the development of its own magnet and heavy rare earth refinery, or hub, to separate the unique and high value magnet and heavy rare earths dominant Makuutu basket into the full spectrum of REOs plus scandium.

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.

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.

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