



13 March 2025

PEER REVIEW CONFIRMS UP TO 61% LOWER CO₂ EMISSIONS FROM IONIC TECHNOLOGIES' MAGNET RECYCLING PROCESS

- **Peer review of Product Carbon Footprint Study completed by Minviro on Ionic Technologies' magnet recycling process shows dramatic emission reductions possible compared to the existing REO supply chain sourced from primary (mine) supply:**
 - **Up to 53% reduction in CO₂ emissions for Didymium oxide ((NdPr)₂O₃);**
 - **Up to 61% reduction in CO₂ emissions for Dysprosium oxide (Dy₂O₃);**
 - **Up to 61% reduction in CO₂ emissions per MW Direct Drive (in wind turbines using Rare Earth Permanent Magnets);**
- **Significant step change in CO₂ and subsequent Scope 3 emissions for OEMs adopting technology in their supply chain; and**
- **Ionic Rare Earths launches the MagNetZero™ supply chain initiative, recognising the Company's ability to drive towards reduced CO₂ footprint for permanent magnet customer base.**

Ionic Rare Earths Limited ("IonicRE" or the "Company") (ASX: IXR) wholly owned subsidiary Ionic Technologies has advanced net-zero supply chains for magnet rare earths production, following peer review of a Product Carbon Footprint analysis conducted by Minviro Ltd. for its planned Belfast magnet recycling plant. The final life cycle assessment (LCA) results show up to 61% lower CO₂ emissions, highlighting the made-in-Belfast technology's potential to dramatically lower scope 3 emissions for the OEM supply chain compared to the existing REO supply chain sourced from primary (mine) supply.

The LCA process required a thorough analysis of the CO₂ emission impact of the Ionic Technologies magnet recycling technology. The Functional Units selected for the study were Didymium oxide ((NdPr)₂O₃) and Dysprosium oxide (Dy₂O₃), reflecting the expected product mix from the Belfast commercial plant. The study incorporated an evaluation of the application of Ionic Technologies' magnet REO products in direct drive wind turbine generators, utilising Rare Earth Permanent Magnet (REPM) technology. The process also compared results with several conventional sources of REOs.



The final LCA results underwent peer review to ensure the highest standards of robustness and consistency. These results are a major boost for a more sustainable REE supply chain for the UK/Europe and global ex-China market, positioning Ionic Technologies as a global leader in reducing the CO₂ emission impact of goods containing REOs. Importantly, the LCA exercise allows REO consumers to make a like-for-like CO₂ emission impact, simply by selecting material manufactured by Ionic Technologies due to its capability in separating REOs.

The study was based on LCA methodology and was in compliance with ISO-14040:2006-07 and ISO-14067:2018-08 standards. It followed a successful Feasibility Study announced in November 2024 that demonstrated the financial and environmental sustainability of a commercial REO manufacturing facility in Belfast, UK.

Commenting on the results, IonicRE's Managing Director, Tim Harrison said: *"We are delighted an independent peer review has validated the findings of the LCA conducted by leading sector consultant Minviro, validating that the CO₂ reductions achieved by our process offer profound benefit to OEMs."*

"The benefits of Ionic Technologies' patented process based on Belfast know-how have again been demonstrated, showing how magnet recycling can not only supply the REOs critical for the defence, advanced manufacturing and renewables sectors, but also offer emission reduction benefits compared to conventional rare earths production."

"Ionic Technologies will now work with offtakers to quantify the CO₂ impact of our products, and how this can benefit their supply chains and products. Unlike other magnet recyclers, we produce separated REOs, which are of equivalent quality to primary REO materials."

"Now we can quantify exactly how much CO₂ that our customers can expect to eliminate through inclusion of our products in the supply chain – an invaluable source of data for manufacturers seeking to quantify and actively manage their emissions."

Significant Reduction in Carbon Dioxide

A key finding from the ISO-14040:2006-07 and ISO-14067:2018-08 compliant study was the benefit CO₂ reduction demonstrated when comparing Ionic Technologies' process to conventional REO sources.

When considering Didymium oxide ((NdPr)₂O₃), Ionic Technologie's process was observed to represent a 53% reduction in CO₂, when compared to product sourced in Inner Mongolia, and 28% when compared to product sourced via Australia / Malaysia.

When considering Dysprosium oxide (Dy₂O₃), Ionic Technologie's process was observed to represent a 61% reduction in CO₂, when compared to global averages for product sourced from Ionic Absorption Clays.

The application of Ionic Technologies' Didymium oxide ((NdPr)₂O₃) and Dysprosium oxide (Dy₂O₃) products in direct drive wind turbine generators utilising REPM technology yielded several potential combinations of comparator products, ranging from a 34-61% benefit in CO₂ impact.

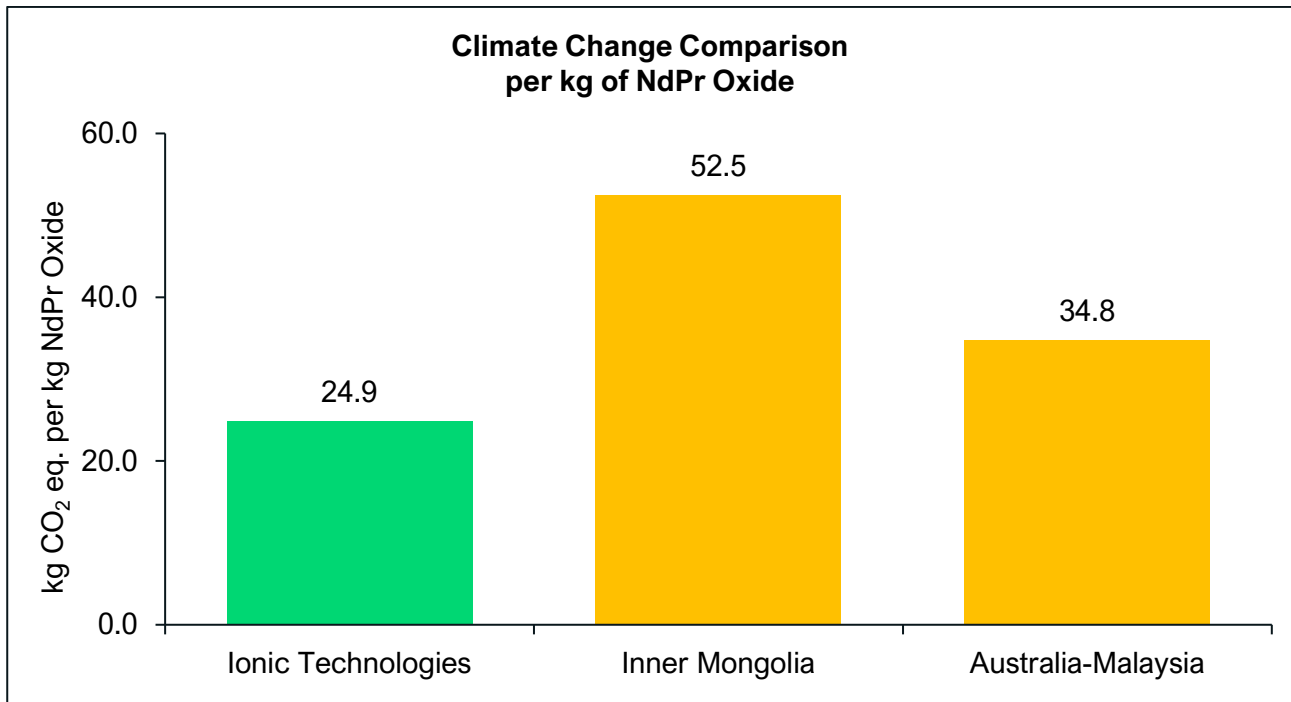


Figure 1: Climate Change Comparison per kg of Didymium Oxide, ((NdPr)₂O₃).

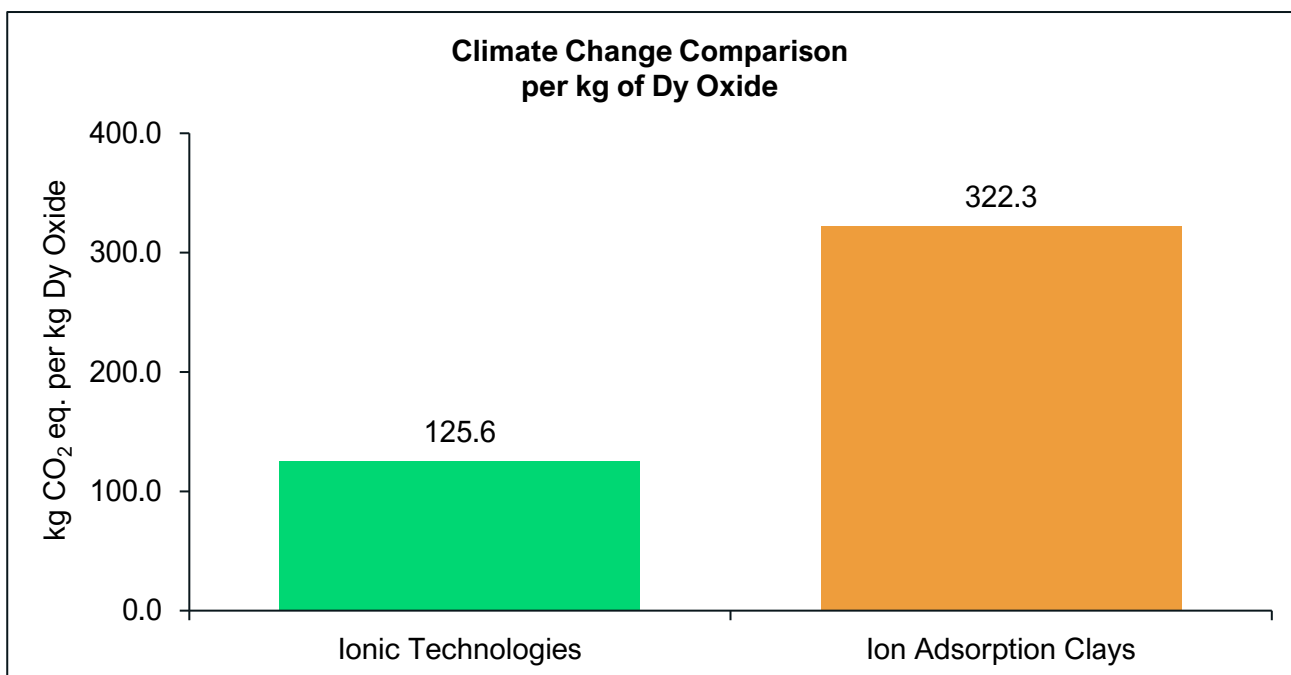


Figure 2: Climate Change Comparison per kg of Dysprosium Oxide, Dy₂O₃.

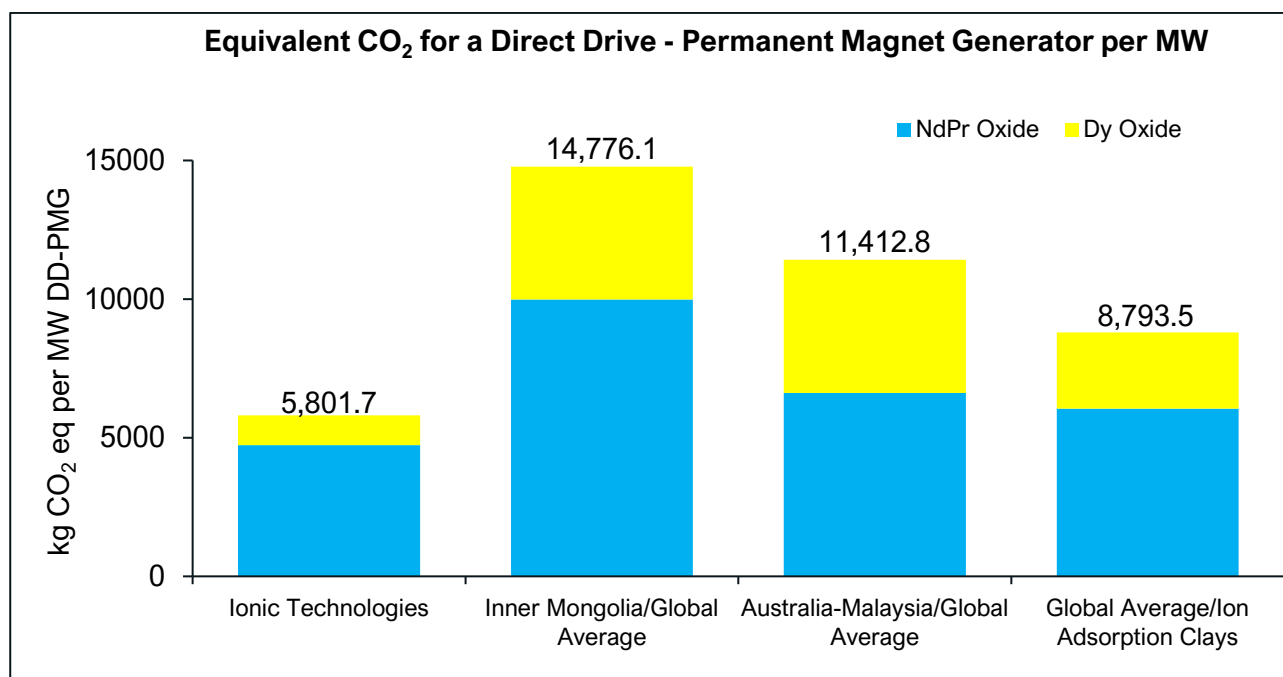


Figure 3: Climate Change Comparison for Didymium Oxide and Dysprosium Oxide deployed per MW of Direct Drive power in a wind turbine utilising Rare Earth Permanent Magnet Technology.

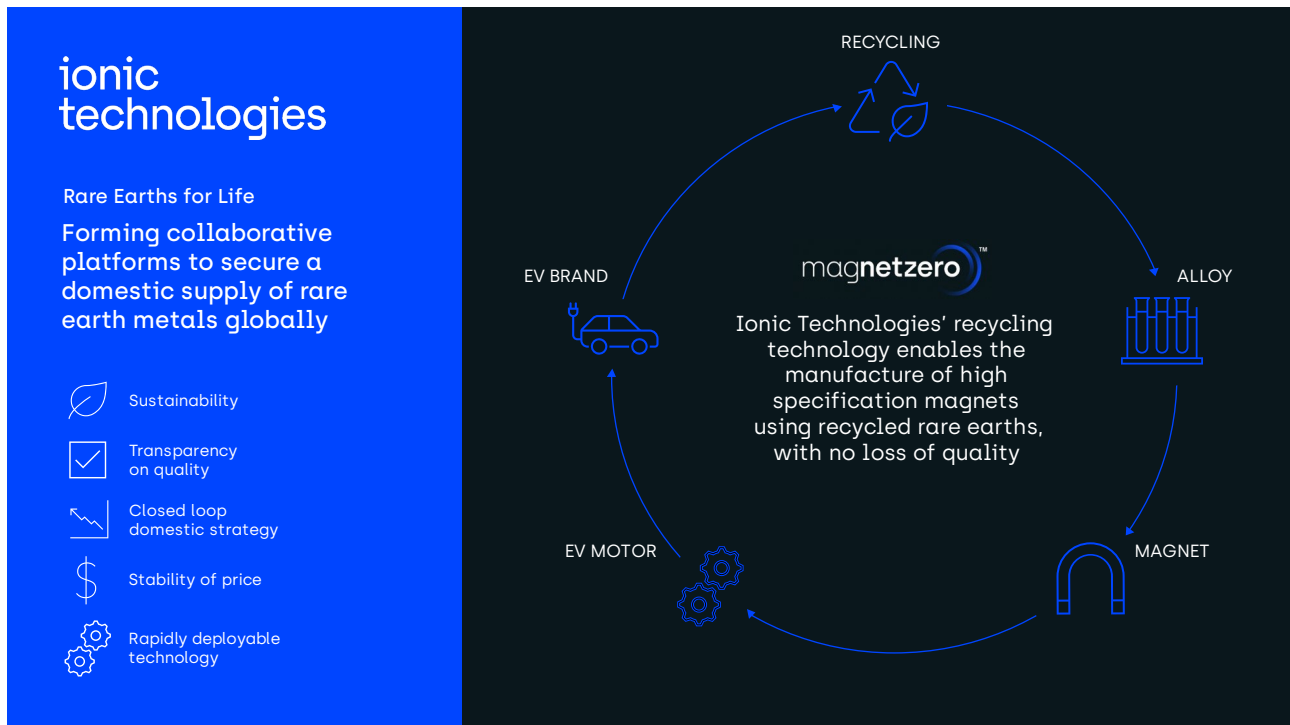
Direct Benefit for Customers – MagNetZero™

With the completion of the Product Carbon Footprint, Ionic Technologies is now able to quantify the impact on REE supply chains that its technology can deliver. Based on this achievement, the Company is now launching its MagNetZero™ brand, a collaborative platform for quantifying and controlling embedded carbon within magnet supply chains.

“MagNetZero™ highlights the contribution our made-in-Belfast technology can make towards achieving a sustainable and secure magnet rare earths ex-China supply chain based on magnet recycling,” Mr Harrison said.

“We will be working closely with our commercial partners, government, researchers and other stakeholders to maximise the potential of this technology for the benefit of all.”

IonicRE will further develop this new brand in collaboration with stakeholders, supporting knowledge sharing and sustainability across this key critical minerals industry.



Next Steps

IonicRE can now provide customers and investors with ISO certified CO₂ benefits through supply of its products.

IonicRE Executive Chairman, Brett Lynch commented: *"Ionic Technologies has now proven it can not only produce separated REOs through magnet recycling, but also offer sustainable carbon emission reduction benefits that are unavailable to conventional producers.*

"This sustainability together with security of supply offers a compelling solution for governments and businesses seeking an ex-China supply chain, whether in the UK, Europe, Brazil or Asia.

"Notably, the UK and Europe's drive to enhance defence production, as shown by the 1.6 billion UK pound investment in Thales' Belfast missile factory, only further highlights the need for sovereign rare earths supply.*

"Belfast is becoming a key part of the UK/European defence industry and Ionic Technologies is located at the heart of this critically important sector, delivering new jobs and investment for Belfast while strengthening the UK and Europe's security amid an increasingly uncertain strategic environment."

* Source: <https://www.bbc.com/news/articles/c74knzk9x8zo>

About the production of REOs at Ionic Technologies

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

The process uses a hydrometallurgical process to extract the REEs, then separate the individual magnet REEs within – Neodymium, Praseodymium, Dysprosium and Terbium – and finally refine to high purity individual magnet REO.

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.

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. 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 is currently collaborating with UK-based metals and alloy manufacturer, Less Common Metals and Ford Technologies with the aim of developing a UK supply chain for recycled magnets, backed by UK Government support. Under the agreement, magnets produced from recycled REOs will be delivered to Ford's EV drive train production facility in Halewood, supporting the US automaker's European EV drive.

Together with this commercial drive, regulatory and political moves in the UK, Europe and the United States are also supporting IonicRE's growth plans, with the Belfast plant strategically located to access both UK and European markets for rare earths.

Significantly, Ionic Technologies' Belfast plant is currently the first producer of recycled, individually separated magnet REOs in the Western world, with the Company moving rapidly to commercialise rare earth separation, refining and recycling.

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.

Ionic Technologies gained further UK Government support in September 2024, via its CLIMATES funding programme to demonstrate a circular supply chain for pre-consumer NdFeB magnet scrap (swarf) in partnership with LCM and Vacuumschmelze. The business also benefited from support from the UK Government to develop magnet demagnetisation and comminution processes in partnership with Materials Processing Institute (MPI) and Swansea University.

In November 2024, IonicRE released a Feasibility Study showing the strong potential for a profitable and unique commercial REO manufacturing facility in Belfast, UK, recycling pre-consumer rare earth magnet scrap and end-of-life magnets, delivering sovereign capability to the UK and supporting regional investment in Northern Ireland.

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.

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

About Minviro

Minviro is a globally recognised leader in Life Cycle Assessment (LCA), specialising in the raw materials and technology sectors serving businesses in the energy transition through consultancy, software and data. Their expertise spans from EV, batteries and electronics to renewables and circular economy strategies, helping companies navigate sustainability challenges, regulatory compliance, and decarbonisation pathways. With hundreds of LCAs completed for leading companies like Tesla, Rio Tinto, Stellantis, Freyr, and CMOC through a 4x award winning team, Minviro continues to set the standard for science-based environmental impact assessment in critical materials supply chains.

Minviro has extensive experience with rare earth sustainability, having developed Product Category Rules (PCRs) for rare earth magnets, setting the global standard for LCAs in the sector. As a key partner in multi-year UK and EU-funded consortia (CSyARES, MineMT), they have advanced magnet, motor, and supply chain environmental analysis. Their team has delivered ISO-compliant LCAs for a range of rare earth companies, making it one of our largest commodity sectors they serve. With offices in the UK, China, and Australia, their team of scientists and engineers have spoken at leading rare earth and magnet conferences, shaping best practices in sustainability and impact reduction. Their research and consulting have driven carbon footprint reductions, supply chain transparency, and regulatory compliance, including alignment with EU Battery Regulations.

To find out more, visit <https://www.minviro.com/>

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

- *Magnet recycling life cycle assessment indicates revolutionary 30-50% lower CO2 footprint compared with existing global primary REO producers – 18 February 2025*

- *IonicRE signs MOU with Korea's DNA Link to spur international expansion – 13 February 2025*
- *Life Cycle Assessment to Show Ionic Technologies' Carbon Benefits – 5 February 2025*
- *December Quarterly Activities & Cash Flow Report – 31 January 2025*
- *UK govt grant application lodged for magnet recycling plant – 5 December 2024*
- *Feasibility Study demonstrates profitable magnet REO business case – 18 November 2024*
- *Ionic Technologies secures UK funding for recycled rare earth permanent magnets partnership – 1 October 2024*
- *IXR and LCM advance rare earth supply chain collaboration – 27 May 2024*
- *Life Cycle Assessment to Show Ionic Technologies' CO2 footprint benefit – 05 February 2025*

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.