Iondrive Techno-Economic Evaluation Indicates Positive Economics for IONSolv™ Modular REE Recycling

Highlights

- Phase 1 of a Techno-Economic Evaluation for a 2ktpa commercial modular processing plant to recover Rare Earth Elements (REEs) from spent permanent magnets has been completed.
- Study confirms the IONSolv™ process can generate meaningful value from waste magnets, transforming an expensive disposal problem into a domestic U.S. source of critical minerals.
- Results support a scalable modular rollout strategy, enabling multiple units to be deployed across U.S. magnet-waste hubs.
- Economic modelling for one single modular unit indicates:
  - Post-tax NPV (10 % real): US $7M
  - Post-tax IRR: 46 %
  - Payback: 2.6 years
  - Initial CAPEX: ~US $4.6M
  - Sustaining CAPEX: ~US $2.3M
  - Total OPEX: ~US $44.3 M over project life (single module)
  - EBITDA margin: ~38 %
  - Average annual production from each module: ~115 t of mixed rare-earth oxides
  - 10-year life (+1 yr construction)
  - Revenue dominated by neodymium (Nd), praseodymium (Pr) and dysprosium (Dy)
- Study validates the commercial viability of urban-mined REEs, offering a pathway to reduce North America's dependence on imported separated oxides and China-controlled supply chains.
- Phase 2 laboratory validation program underway to confirm reagent use and solvent recoveries and re-use, and process efficiency assumptions.

Iondrive Limited (ASX: ION) ("Iondrive" or "the Company") has completed a *Phase 1* techno-economic evaluation for its IONSolv™ technology platform, for a 2ktpa modular rare earth elements (REE) recycling plant. The economic modelling was based on current available process design data and engineering assumptions. The results demonstrated strong base-case financial outcomes and supports, subject to the Phase 2 laboratory validation program currently underway, a planned rollout of modular processing plants in the United States to process end-of-life permanent magnets to recover REEs. The *Phase 2 laboratory testing is to confirm process assumptions and validate key technical parameters* – as inputs to further refine the economic modelling prior to plant engineering.

Iondrive Limited CEO Dr Ebbe Dommisse commented:

"While this initial techno-economic evaluation reflects our best current engineering assumptions, we've already begun Phase 2 laboratory validation to test and refine key parameters. This work will feed directly into plant design and ensure a robust, scalable basis for commercial deployment across multiple U.S. sites. The recovery of REEs is an important commercialisation milestone to demonstrate the efficacy of our IONSolv™ process as a technology platform in the urban mining of critical minerals, complementing our advances in end-of-life battery recycling and solar panel recycling."

16 Anster Street
Adelaide SA 5000

PO Box 255
Kent Town SA 5071

E: info@Iondrive.com.au
W: Iondrive.com.au

P: 08 8368 8888
F: 08 8363 0697

Techno-Economic Assessment Summary

The Phase 1 Engineering program was delivered by ProProcess Engineering (Pty Ltd), who completed the Techno-Economic Assessment (TEA) of Iondrive's proprietary IONSolv™ Deep Eutectic Solvent (DES) process for recovery of rare-earth oxides (REOs) from NdFeB magnet waste. Economic modelling was subsequently completed by ModelAnswer Commercial Analytics Pty Ltd, using the mass- and energy-balance data and cost estimates provided by ProProcess Modular.

The model incorporates inputs across reagents consumption – including solvent recoveries and DES re-use cycles, and mechanical equipment sizing, consistent with the process design work completed to date. Operating costs were derived using updated reagent pricing, energy assumptions and labour estimates, while capital requirements include mechanical equipment, a 20 % civil-works allowance and 5 % contingency.

The assessment indicates an average annual production rate of approximately 115 tonnes of mixed rare-earth oxides over a ten-year operating life. Revenue is driven primarily by high-value oxides — neodymium, praseodymium, dysprosium which collectively represent much of the product value. Product pricing inputs were benchmarked against oxide values supplied by BMI 10th November 2025 and were incorporated directly into the economic model by ModelAnswer.

There is no standardised or exchange-traded market for mixed rare-earth oxide (REO) bundles. Independent market research indicates that mixed REO products are typically sold through negotiated contracts between refiners and downstream processors, with pricing referenced to separated oxide values and adjusted for a bundle discount using 80% of individual REO payables.[i] The pricing used in the TEA reflects these indicative commercial ranges.

Beyond its economic outcomes, the study highlights Iondrive's potential role in strengthening North American critical-mineral supply chains by recovering strategic REEs from domestic magnet waste and reducing reliance on imported feedstocks.

Key Parameters

- Feed composition: Nd 19.5 %, Pr 5.5 %, Dy 2.7 %, Ho 2.9 %, Gd 1.2 %.
- Recovered REO bundle: Nd 67.9 %, Pr 18.51 %, Dy 3.14 %, Ho 2.69 %, Gd 1.02 %.
- Recovery rates: Nd 94.5 %, Pr 91.1 %, Dy 32.1 %, Ho 25.6 %, Gd 23.2 %.
- Yield: 0.27 – 0.30 of a tonne REO per tonne of magnet feed.
- Reference REO pricing@80% Payables[ii]: Nd and Pr both benchmarked at approximately US $64,000/t, Dy at US $168,000/t and Co priced at approximately US $32,000/t per tonne
- Economic basis: AACE Class 5 cost estimate (-50/+100%) using publicly available indices for reagents, power and labour.

Base Case Economic Outcomes

- Capital expenditure: within the lower range of comparable hydrometallurgical benchmarks.
- Operating cost: competitive on a per-tonne REO basis, supported by lower reagent usage and high solvent-recovery potential.
- Base-case NPV: positive across the modelled REO price range.
- IRR: consistent with a commercially viable outcome, subject to validation of reagent-reuse and recovery performance.
- Sensitivity: model remains economically resilient at solvent recovery ≥ 80 % and DES reuse > 10 cycles.

Phase 2 Validation Program

Phase 2 work has commenced to independently validate the key assumptions used in the ProProcess ModelAnswer Techno-Economic Assessment and to progress the study toward PFS-level quality. The laboratory program started and is expected to run for approximately 16 weeks, which indicates completion is most likely early Q2 CY2026. This phase will focus on an independent laboratory generating controlled data for IONSolv™ rare-earth recovery, DES reuse efficiency and caustic recovery rates, with the results to be used to refine process design and update cost inputs. Following completion of the laboratory work, ProProcess will undertake the required engineering and economic revisions to bring the assessment to a Project Feasibility Standard (PFS)-standard. Iondrive will provide a further update once validated results and revised economic metrics become available.

Further Information

Dr Ebbe Dommisse
Chief Executive Officer
08 8368 888
info@iondrive.com.au

Aiden Bradley
Investor and Media Relations
+61 (0) 414 348 666
aiden@nwrcommunications.com.au

About Iondrive

Iondrive is developing an innovative metal extraction process using Deep Eutectic Solvent technology (DES). Its initial business case is focussed on battery recycling where the proprietary method is designed to efficiently recover critical metals, including nickel, cobalt, lithium, and manganese, from black mass in a closed-loop, environmentally friendly process. Unlike conventional hydrometallurgical and pyrometallurgical approaches, Iondrive's DES technology operates at lower temperatures, eliminates the need for aggressive acids, and offers a tuneable chemistry that can selectively extract individual metals. Whilst progressing the battery recycling application for its DES technology, Iondrive is actively seeking to expand the commercialisation opportunities into other markets, including mineral processing and Urban mining of e-waste.

[i] Sources: Adamas Intelligence – *Rare Earth Market Outlook*; USGS – *Mineral Commodity Summaries: Rare Earths*; Roskill/Wood Mackenzie – *Rare Earths Market Report*

[ii] Sources: BMI email 12/11/25 Nd oxide: $80,000/t, Pr oxide: $80,000/t, Dy oxide: $210,000/t, Co oxide: $40,000/tonne