Lithium Universe LIMITED
Building a Lithium Future

ASX ANNOUNCEMENT AND MEDIA RELEASE

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LU7 AND MACQUARIE UNIVERSITY REPORT AN 83% REDUCTION IN ACID CONSUMPTION IN SILVER RECYCLING TESTS

Highlights

- **83% reduction in acid consumption** using only 12 wt% HNO_3 solution, slashing chemical costs and waste
- No $AgNO_3$ electrolyte or **sacrificial metals** required (Cu/Fe free system)
- No secondary heavy-metal effluents, simplifying wastewater management and reducing environmental liability
- Low-voltage (5 V) operation achieves > **95% silver recovery** within minutes under mild conditions
- Energy efficient current utilisation (> 87%) and high-purity (96%) Ag recovery confirmed
- Positive economic impact for industrial-scale PV recycling and circular-economy deployment
- **Industrial silver demand surges** from solar, electronics, EVs, and AI data centres, driving unprecedented market pressure
- **Record-breaking silver price of $US52 oz equates to A$56 of silver per panel**

Lithium Universe Limited (ASX: LU7, "Lithium Universe" or "the Company") in collaboration with its research partner, Macquarie University today announces a breakthrough that fundamentally improves the economic and environmental viability of solar panel recycling. The Jet Electrochemical Siver Extraction (JESE) recycling technology has been scientifically verified to achieve an **83 percent reduction in acid consumption**, while completely eliminating the need for costly additives and sacrificial metals. This finding fundamentally reshapes the chemistry and cost base of metal recovery from end-of-life silicon solar cells.

Whereas conventional hydrometallurgical routes consume highly concentrated nitric acid solutions (up to 70 wt% HNO_3) and require up to 48 hours of treatment, the new JESE process operates efficiently using only a **dilute 12 wt% HNO_3 solution at 5 V**. Within seven minutes, over 90 percent of surface-metallised silver is selectively dissolved, reaching near-complete **recovery (> 95%)** with extended operation times of thirty minutes. The chemical efficiency achieved under such mild conditions confirms the JESE system as a next-generation electrochemical platform that minimises reagent use, energy input, and secondary waste.

THE SCIENCE BEHIND THE 83% ACID REDUCTION

The JESE system represents a fundamental departure from conventional leaching methods. Rather than immersing the entire solar cell in an acid bath, JESE directs a high-velocity micro-jet of electrolyte precisely onto a small target zone of the silver pad. This focused jet generates intense local mass-transfer conditions, dramatically accelerating reaction kinetics while restricting acid use to the active interface. Because the electrolyte is **continuously recirculated and regenerated, acid consumption is reduced by approximately 83 percent** compared with bulk immersion processes.

At the same time, the system's sharp-cone cathode geometry concentrates the electric field inside the jet, enabling efficient silver oxidation and dissolution without auxiliary oxidants or salts. This unique "field–fluid synergy" underpins the chemical efficiency of the JESE process, achieving exceptional selectivity while eliminating the need for sacrificial metals.

The resulting Ag^+-rich electrolyte is then transferred directly into a reverse-JESE deposition unit, where silver ions are electrochemically reduced and plated onto an aluminium substrate as a high-purity metallic layer. The cycle operates entirely within a closed loop, **requiring no replenishment of acid** or metal feedstock, and establishing JESE as a true circular-economy solution for photovoltaic recycling.

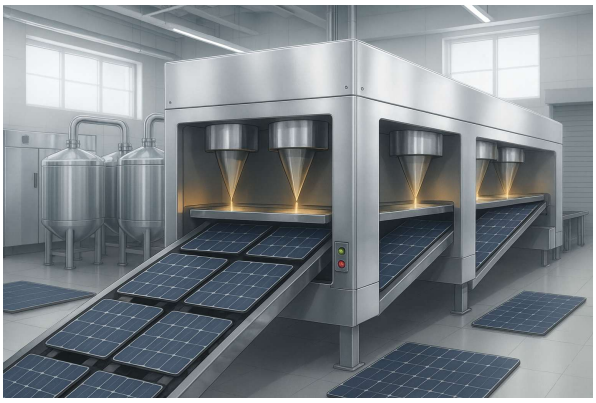
WHY ACID REDUCTION MATTERS

Nitric acid represents both a significant cost driver and a key environmental liability in conventional metal-leaching processes. Traditional solar cell recycling methods typically employ high-strength acid lixiviants, consuming around 5 mol/L HNO_3 to achieve full silver removal. This aggressive approach generates **large volumes of metal-laden waste acid**, requiring extensive neutralisation, precipitation, and post-treatment before disposal, steps that substantially increase operating costs and expand the carbon footprint of the process.

In contrast, the JESE system operates effectively with a **mild, 12 wt% nitric acid solution**, achieving equivalent metal recovery while reducing total acid consumption by over 80 percent compared to the high concentration used in the industrial process. This drastic reduction cuts both procurement and neutralisation costs, lowers corrosion risk for process equipment, and enhances operator safety, making JESE particularly suitable for industrial-scale implementation.

The 83 percent acid reduction, verified by Macquarie University's engineering team, stems directly from the **system's precise electric-field control,** which **confines electrochemical reactivity exclusively to silver-bearing zones on the solar cell surface**. This field-focused mechanism eliminates unnecessary bulk reactions, delivering a cleaner, safer, and more sustainable recycling pathway.

Artist Impression of Microwave Joule Heating Technology (MJHT)



Artist Impression of JESE Technology in a demonstration plant

ELIMINATION OF ADDITIVES AND SACRIFICIAL METALS

A defining advantage of the JESE process is its complete independence from chemical additives. Conventional electrochemical silver recovery systems frequently rely on silver nitrate ($AgNO_3$) electrolytes or sacrificial metal anodes such as copper or iron to promote redox exchange. Although these methods can achieve ion transfer, they inherently generate secondary heavy-metal effluents and drive up wastewater treatment and disposal costs.

By contrast, the JESE system requires **no external metal feedstock or auxiliary reagents**. Its localized micro-jet and intensified electric-field geometry enable silver atoms to transition naturally from Ag^0 to Ag^{3+}, sustaining the redox process without foreign oxidants or salts. This intrinsic electrochemical balance underpins a self-contained, closed-loop reaction pathway: **silver is selectively dissolved from the solar cell surface and immediately recovered as metallic silver through reverse-JESE electrodeposition**. The result is a zero-additive, zero-waste process—no toxic sludge, no sacrificial metals, and only minimal acidic effluent, delivering both economic efficiency and environmental integrity in silver recycling.

ENVIRONMENTAL AND REGULATORY BENEFITS

The JESE process achieves high-efficiency metal recovery using mild, recyclable acids, providing major advantages for industrial licensing and environmental compliance. Unlike conventional hydrometallurgical systems that generate complex acidic effluents requiring multi-stage neutralisation, JESE's dilute electrolyte contains only trace silver and aluminium ions, which can be directly recovered by electro-deposition. This creates a near closed-loop chemical system with minimal waste output. For operators, the result is a dramatic reduction in acid handling, chemical procurement, waste treatment, and storage costs, while also lowering the carbon footprint and removing the need for hazardous-material transport permits. From an ESG and circular-economy standpoint, JESE represents a step-change in sustainable metal recovery and responsible waste management.

TECHNICAL VALIDATION: FROM LAB TO INDUSTRY

The research team at Macquarie University — led by Dr. Binesh Puthen Veettil and Dr. David Payne — conducted a rigorous comparative study between traditional hydrometallurgical acid leaching and the new JESE method. Their work demonstrated the following key results:

1. **Selective Dissolution and Preserved Integrity** – Silver was dissolved with exceptional selectivity while underlying aluminium and silicon structures remained intact, enabling reuse of wafer substrates.
2. **Rapid Processing Time** – More than 90 percent of silver removed within seven minutes, compared to 24 hours for conventional acid leaching.
3. **Stable Low-Voltage Operation** – Effective metal recovery achieved at just 5 V, one-fifth of the power required for bulk electrolysis.
4. **High-Purity Output** – Recovered silver achieved 96 percent purity with low oxygen and aluminium impurities, consistent with Britannia-grade metal.
5. **No External Additives** – System functioned without $AgNO_3$, Cu, Fe or H_2O_2, reducing chemical procurement costs and operational complexity.
6. **High Current Efficiency** – Energy utilisation recorded at 87.4 percent for dissolution and 77 percent for recovery modes.

These performance metrics confirm that JESE recycling outperforms existing methods by a wide margin in both efficiency and sustainability.

ECONOMIC IMPLICATIONS FOR LARGE-SCALE PV RECYCLING

For commercial solar panel recyclers, acid procurement and neutralisation represent up to 35 percent of operating costs. By reducing acid usage by 83 percent, JESE recycling directly improves profit margins and shortens payback periods for new plants. Additionally, the removal of $AgNO_3$ and Cu additives lowers raw material costs by an estimated 15–20 percent per kilogram of silver produced. Because the JESE system runs at ambient temperature and pressure, it also reduces energy consumption relative to thermal or hydrometallurgical alternatives. Overall, the combined chemical and energy savings position JESE recycling as one of the most economically viable technologies for the emerging solar waste industry.

SILVER TOPS 45-YEAR RECORD HIGH

The recent surge in silver prices underscores the growing importance of sustainable recovery technologies such as JESE. On Tuesday, 14 October 2025, silver prices jumped 3.5 percent to a **record high of US$52.21 per ounce, surpassing the 45-year record** set during the 1980 bull market. Prices have risen 73 percent year-to-date, outpacing both gold's 56 percent gain and the S&P/ASX 200's 8.6 percent increase. Analysts attribute this rally to an emerging global silver supply shortfall, driven by rising industrial demand and growing concerns over monetary stability.

At these price levels, each discarded photovoltaic (PV) solar panel contains approximately **A$56 worth of recoverable silver**—a value stream that is largely lost under current recycling practices. The JESE technology

directly addresses this opportunity by **enabling high-purity silver recovery using mild, recyclable acids in a closed-loop system**. By converting solar-waste liabilities into valuable metal feedstock, JESE transforms the economics of PV recycling and aligns perfectly with global trends toward resource circularity, supply-chain resilience, and environmental sustainability.

Authorised by the Chairman of Lithium Universe Limited

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Forward-looking Statements
This announcement contains forward-looking statements which are identified by words such as 'anticipates', 'forecasts', 'may', 'will', 'could', 'believes', 'estimates', 'targets', 'expects', 'plan' or 'intends' and other similar words that involve risks and uncertainties. Indications of, and guidelines or outlook on, future earnings, distributions or financial position or performance and targets, estimates and assumptions in respect of production, prices, operating costs, results, capital expenditures, reserves and resources are also forward-looking statements. These statements are based on an assessment of present economic and operating conditions, and on a number of assumptions and estimates regarding future events and actions that, while considered reasonable as of the date of this announcement and are expected to take place, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies. Such forward-looking statements are not guarantees of future performance and involve known and unknown risks, uncertainties, assumptions and other important factors, many of which are beyond the control of our Company, the Directors, and management. We cannot and do not give any assurance that the results, performance or achievements expressed or implied by the forward-looking statements contained in this announcement will occur and readers are cautioned not to place undue reliance on these forward-looking statements. These forward-looking statements are subject to various risk factors that could cause actual events or results to differ materially from the events or results estimated, expressed, or anticipated in these statements.

ABOUT LITHIUM UNIVERSE LIMITED

Lithium Universe Limited (ASX: LU7) is a forward-thinking company on a mission to close the "Lithium Conversion Gap" in North America and revolutionize the photovoltaic (PV) solar panel recycling sector. The company is dedicated to securing the future of green energy by addressing two major strategic initiatives: the development of a green, battery-grade lithium carbonate refinery in Québec, Canada, and pioneering the recycling of valuable metals, including silver, from discarded solar panels.

Lithium Strategy: Closing the Lithium Conversion Gap

Lithium Universe is at the forefront of efforts to meet the growing demand for lithium in North America. As electric vehicle (EV) battery manufacturers prepare to deploy an estimated 1,000 GW of battery capacity by 2028, the need for lithium is expected to rise dramatically. However, with only a fraction of the required lithium conversion capacity in North America, LU7 is determined to play a pivotal role in reducing dependence on foreign supply chains. The company is building a green, battery-grade lithium carbonate refinery in Bécancour, Québec, leveraging the proven technology developed at the Jiangsu Lithium Carbonate Plant. This refinery will produce up to 18,270 tonnes per year of lithium carbonate, focusing initially on the production of lithium carbonate for lithium iron phosphate (LFP) batteries. The refinery's smaller, off-the-shelf plant model ensures efficient operations and timely implementation, positioning LU7 as a key player in the emerging North American lithium market. With a strong leadership team, including industry pioneers like Chairman Iggy Tan, LU7 is well-positioned to deliver this transformative project. The company's strategy is counter-cyclical, designed to build through the market downturn and benefit from the inevitable recovery, ensuring sustained exposure to the growing lithium demand.

PV Solar Panel Recycling Strategy: Silver Extraction

As the global demand for solar energy expands, solar panel waste is projected to reach 60–78 million tonnes by 2050, making efficient recycling solutions critical. Lithium Universe has responded by acquiring Macquarie University's Microwave Joule Heating Technology (MJHT) and Jet Electrochemical Silver Extraction (JESE) method, a breakthrough in recovering valuable metals from end-of-life PV panels.

Recent laboratory trials confirmed JESE's exceptional efficiency, achieving more than 95% in 30 minutes, under mild conditions of 5 V and dilute nitric acid Crucially, the process preserves intact silicon wafers, creating secondary value streams for reuse in solar-grade or nano-silicon applications. Equally significant, JESE has demonstrated high-purity silver recovery. Tests yielded 95.95% silver purity within five minutes—comparable to Britannia-grade silver, a premium alloy above sterling (92.5%) and close to bullion standard (99.9%).

Impurities were limited to just 4.05%, with aluminium and oxygen as the main trace elements, far outperforming conventional bath recovery, which produced only 78.6% silver with over 21% impurities. With silver demand surging in solar and electronics, LU7's technology offers a timely, sustainable, and commercially attractive solution. Looking ahead, the Company plans to expand recovery to other critical metals, further strengthening its role in the global circular economy.

Lithium Universe is committed to ensuring that both its lithium and PV solar recycling strategies help meet the world's growing demand for clean energy, while offering a sustainable solution to the challenges of resource scarcity and waste management.