Lithium Universe LIMITED
Building a Lithium Future

ASX ANNOUNCEMENT AND MEDIA RELEASE

14 July 2025

LU7 PV SOLAR CELL RECYCLING TECHNOLOGY TO TARGET SILVER EXTRACTION

Highlights

- Silver Extraction - First phase of critical metals PV recycling extraction
- Average solar panel contains around 20 grams of silver
- Silver demand is projected to reach a record 680 Mil oz in 2025[1]
- Industrial demand growing at 7% CAGR[1] - demand beginning to outpace supply
- Projected market deficit of around 117.6 Mil oz in 2025[1]
- Price of silver increased from US$15/oz in 2018 to US$34/oz in 2025[2], a 126% increase
- Dr. Binesh and Macquarie University team developed silver extraction technology
- LU7 acquired global rights to PV solar panel recycling technology
- "Microwave Joule Heating Technology" (MJHT) from Macquarie University
- A new silver extraction technology, distinct from MJHT, will be presented to LU7 once the patent is finalized
- 60-78 mt of waste photovoltaic (PV) modules are expected to accumulate by 2050[5]
- Only 15% of waste solar cells are recycled worldwide – rest in land fill
- Equivalent of A$154 billion of silver value in waste
- Discarded panels also contain silicon, gallium and indium, critical in advanced semiconductor and solar energy technologies

Lithium Universe Limited (referred to as "Lithium Universe" or the "Company," ASX: "LU7") is pleased to announce that, following discussions with Dr. Binesh Puthen Veetti and his team at Macquarie University, the first phase of critical metals extraction from photovoltaic (PV) solar panel recycling technology will focus on **silver metal**. Silver is primarily used in photovoltaic (PV) solar cells as a key material for the **electrical contacts** that allow the flow of electricity generated by the solar panel. The average solar panel contains around 20 grams (0.7 oz) of silver, worth about A$36 per panel at today's silver prices.

1. World Silver Survey 2025, published by the Silver Institute on April 16, 2025
2. https://tradingeconomics.com/commodity/silver

USE OF SILVER IN PV SOLAR CELLS

1. **Conductive Paste**: Silver is mixed with other materials to create a **conductive** paste, which is applied to the solar cells' surface. The paste is then baked onto the cells, forming silver contacts that help conduct the electricity generated by the solar panel.
2. **Electrical Conductivity**: Silver is known for its **excellent electrical conductivity**, making it an ideal material for transferring electricity from the solar cell to the external circuit. The metal forms the "fingers" (thin lines) and "busbars" (thicker lines) on the surface of the solar cells, which collect and transport the generated electrical current (see Figure 1).

Figure 1 – Silver fingers and busbars on a solar panel transport electricity

DEMAND FOR SILVER

The average solar panel is often reported to contain around 20 grams (0.7 oz) of silver, with some sources indicating a range of 3.2 to 8 grams per square meter. The value of silver in each panel is in the region of A$36 per panel (USD$34/oz) at today's price. The demand for silver in the solar industry is rising rapidly, driven by the global expansion of solar panel installations. In Australia, the goal of achieving 82% renewable energy by 2030 and a 43% reduction in carbon emissions is fuelling the growth of solar panel installations.

In recent years, photovoltaics have accounted for a significant share of total silver consumption, and this trend is expected to continue. In 2025, silver demand is projected to reach a **record 680 million ounces**[1], fuelled by a 7% increase in industrial demand, as shown in Figure 2. This growth is largely driven by the increasing use of silver in various industries, with photovoltaics and AI emerging as the fastest-growing sectors.

Silver is both expensive and relatively scarce. Its extraction primarily involves mining ores such as argentite, which are then processed through smelting or chemical methods. As demand for solar energy and electronics continues to rise, silver supply is struggling to keep up. This ongoing imbalance between supply and demand is expected to result in a **market deficit of around 117.6 million**[1] ounces in 2025[1]. Such deficits have been a recurring trend in recent years, contributing to upward pressure on silver prices. This trend has already been reflected in the price of silver, which has risen from **US$15/oz in 2018 to US$34/oz in 2025**[2], marking a 126% increase over that period, as shown in Figure 2.

The silver market is experiencing a shortfall, which is putting upward pressure on prices, underscoring the increasing importance of silver recovery through recycling. As traditional mining struggles to meet demand, recycling will play an increasingly vital role in securing the supply of this critical metal. The continued expansion of industries reliant on silver, coupled with supply constraints, suggests that silver's value will likely remain high in the coming years.

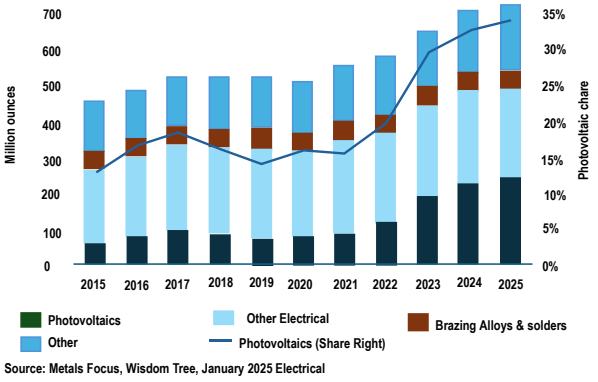

Figure 2 – Silver Demand Driven by PV Cells

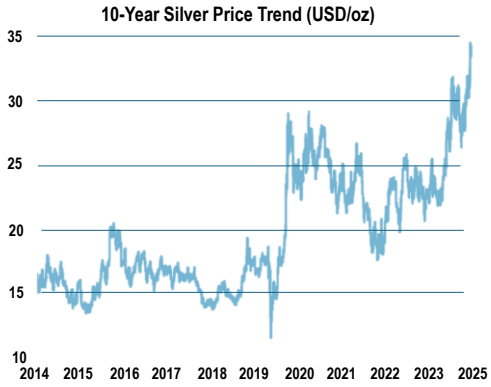

Figure 3 – Silver 10-Year Price Trend

POTENTIAL SILVER EXTRACTION TECHNOLOGY

In June 2025, Lithium Universe entered into an exclusive licensing agreement ("Licensing Agreement") to acquire Macquarie University's Microwave Joule Heating Technology (MJHT). The platform is based on microwave technology, which selectively heats silicon wafers to soften the Ethylene Vinyl Acetate (EVA) thermoplastic encapsulant in solar panels, facilitating easy delamination and enabling the potential recovery of valuable materials at room temperature. This innovative approach eliminates the need for extreme heat (1400°C) typically required to separate materials like glass and silicon, as well as the use of expensive and hazardous chemicals in traditional methods. Delamination allows for selective material separation without mechanical crushing, which often results in cross-contaminated materials and reduced recovery rates.

Following the focus on silver extraction, Dr. Binesh and his team have informed the Company that they have developed a **complementary silver extraction technology** for delaminated silicon wafers from the microwave delamination process. The technology is currently in the patent submission stage, and the **license will be made available** to Lithium Universe once it is ready. The Company has not yet evaluated the proposed technology. However, Lithium Universe has already begun independent research and patent searches to identify the most effective methods for extracting silver from discarded PV solar panels.

WHY RECYCLING OF SILVER IS LUCRATIVE

A report from the International Energy Agency (IEA) projects that global waste from PV solar panels will reach up to 8.0 million tonnes by 2030 and 60–78 million tonnes by 2050[5]. By 2035, Australia is expected to accumulate 1 million tonnes of solar panel waste, valued at over A$1 billion (about 50 panels weigh about 1 tonne)[4]. Despite

the growing challenge, only 15% of used PV cells are currently recycled, with the rest ending up in landfills. This low recycling rate is due to complex processes, high-temperature furnaces, and toxic chemicals, leading to poor recovery yields.

"In Fact, the Silver that's contained inside Solar Modules equates to in its totality, Australia's Biggest Silver Mine" (Australia Smart Energy Council)[5]

Recycling and extracting silver from solar panels presents a lucrative business opportunity for LU7 due to the substantial amount of silver in each panel—approximately 20 grams, equating to around A$36 in value. With the growing volume of solar panel waste, this offers a readily available cheap feedstock for recycling. As the demand for silver increases, especially in industries like electronics and renewable energy, recovering silver from end-of-life panels can become a valuable and sustainable revenue stream. The Company believes that the Macquarie University technology provides a more efficient recycling technology, positioning it to capitalize on this growing market while addressing environmental challenges.

EXTRACTION OF OTHER VALUABLE METALS

As part of the second phase, the Company will be investigating the extraction of other valuable metals in discarded PV solar panels such as silicon, gallium, and indium. These materials are not only essential to the clean energy transition but are also critical inputs in the **semiconductor industry**, where they are used in advanced electronics, power devices, and high-efficiency photovoltaic cells.

China is the dominant global supplier of both gallium and indium, producing around 80% of gallium and over 60% of indium. Gallium is primarily a by-product of aluminum production, while indium is extracted during zinc mining. Other notable gallium producers include Germany, Kazakhstan, and Ukraine, though their contributions are smaller. For indium, Canada and Peru are significant producers, with Japan and South Korea focusing on refining and processing. These metals are crucial for high-tech applications like semiconductors, solar panels, and electronics. However, their supply chains are concentrated in a few countries, especially China, making them vulnerable to supply disruptions.

Figure 4 - Global waste from PV solar panels will reach up to 60–78 million tonnes by 2050

3. Powerhouse Recycling – Solar Panel Composition - https://powerhouserecycling.com/solutions/solar-recycling/
4. ABS News - Solar waste problem looms following rooftop panel boom, with batteries to add to the pile
5. Smart Energy Council - https://smartenergy.org.au/

Executive Chairman, Iggy Tan stated, "*While solar panels contain many critical metals and minerals, the follow-up extraction of these materials needs to be prioritized. Due to the large volume of residual material, rising prices, and supply shortages, the Company plans to focus on silver extraction as the first phase. Once we address silver extraction, we can then explore the extraction and recovery of other critical metals like silicon, indium, and gallium—critical in advanced semiconductor and solar energy technologies.* "

Authorised by the Chairman of Lithium Universe Limited

Lithium Universe Interactive Investor Hub
Engage with Lithium Universe directly by asking questions, watching video summaries and seeing what other shareholders have to say about this, as well as past announcements, at our Investor Hub https://investorhub.lithiumuniverse.com/

For Information:

Iggy Tan
Executive Chairman
Lithium Universe Limited
Email: info@lithiumuniverse.com

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, the issue of solar panel waste has grown exponentially. With an estimated 60–78 million tonnes of solar panel waste expected by 2050, the need for efficient recycling solutions is more critical than ever. Lithium Universe has responded by acquiring the Microwave Joule Heating Technology (MJHT) from Macquarie University, a groundbreaking innovation for extracting valuable metals from discarded PV solar panels. The company's first focus is on the recovery of silver, a critical component in solar panel manufacturing. Silver's excellent electrical conductivity makes it indispensable in photovoltaic cells, where it forms the electrical contacts for electricity flow. The technology developed by LU7 enhances the extraction of silver, silicon, gallium, and indium, addressing a major gap in the recycling industry. With the price of silver soaring due to increasing demand in solar and electronics, LU7's efforts in silver recovery are timely and essential for sustaining the global clean energy supply chain. This breakthrough technology significantly reduces the environmental impact of solar panel waste by offering a more efficient, cost-effective, and environmentally friendly recycling solution. As the company progresses, it plans to expand its focus to other critical metals like copper and indium, ultimately contributing to 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.