Lithium Universe
LIMITED
Building a Lithium Future

ASX ANNOUNCEMENT AND MEDIA RELEASE

17 June 2026

LU7 GOLD & COPPER EXTRACTION FROM E-WASTE PROCESS FLOW SHEET COMPLETION

Highlights

- Flow sheet and block diagram completed
- Preliminary process description completed
- Conceptual demonstration plant designed
- Exclusive global licence from the University of Edinburgh
- Innovative low-temperature hydrometallurgical recovery process
- Selective gold precipitation using reusable diamide ligand
- Copper recovery using 2,3-PDCA reagent
- Lower energy requirements than conventional smelting
- Strong commercial potential within the circular economy sector

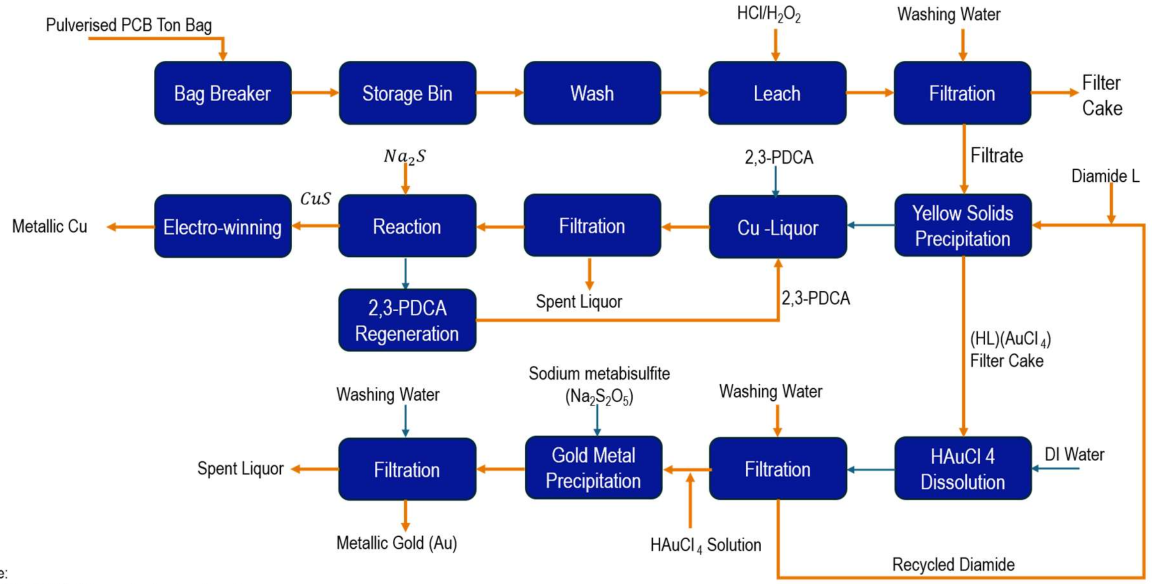
Lithium Universe Limited (ASX: LU7) ("Lithium Universe" or "the Company") is pleased to announce that following the acquisition of the exclusive global licence from the University of Edinburgh for a breakthrough technology to recover gold and copper from E-waste, a process flow design has been established by Chief Technical Officer, Dr Jingyuan Liu.

Developed by the University of Edinburgh's School of Chemistry with support from Edinburgh Innovations, the Gold Copper Diamide Extraction (GCDE) process is an innovative hydrometallurgical technology designed to recover gold and copper from electronic waste using selective, reusable organic reagents. The process uses a diamide compound to selectively precipitate gold from acidic leach solutions, followed by copper recovery using pyrazine-2,3-dicarboxylic acid (PDCA). Unlike conventional smelting and pyrolysis, the technology avoids high-temperature, energy-intensive processing, offering potential environmental and cost advantages. The process is suited to smaller-scale applications with lower capital intensity and supports growing demand for sustainable e-waste recycling as global e-waste generation continues increasing rapidly. The development work program is as follows:

PROCESS DESCRIPTION FOR SELECTIVE GOLD AND COPPER RECOVERY

1. GOLD (AU) RECOVERY PROCESS

The recovery of gold is achieved through a multi-step hydrometallurgical sequence involving mechanical preprocessing, leaching, highly selective precipitation, aqueous stripping, and final reduction.



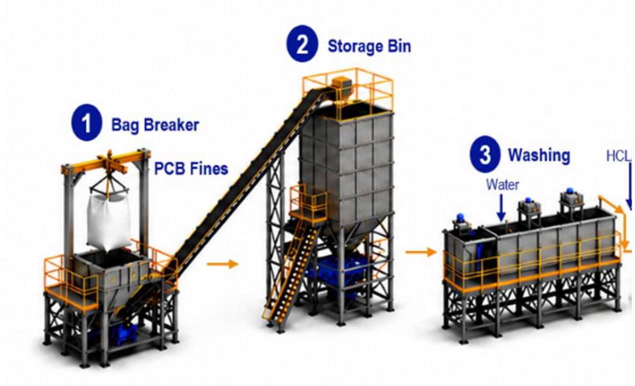
Note:
1. (2,3-PDCA); 2,3-pyrazinedicarboxylic acid

Figure 1 – GCDE Process Block Diagram

1.1 Feed Preprocessing and Washing

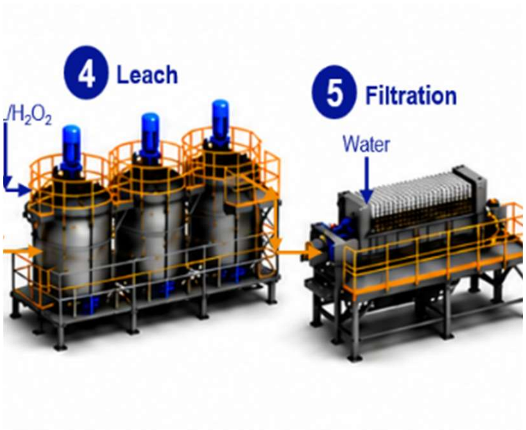
Prior to chemical leaching, the e-waste feed material undergoes a series of mechanical preparation and purification steps to optimise downstream metal recovery performance.

Material Handling: E-waste feed containing gold and copper, typically in the form of printed circuit board (PCB) powder, is delivered in bulk tonnage bags and transferred via a bag breaker and conveyor system into a dedicated storage bin for controlled processing.



Washing and Pre-Treatment: The PCB powder is subsequently washed to remove soluble impurities and residual contaminants. This important pre-treatment stage minimises unnecessary consumption of leaching reagents and reduces the potential for interference with downstream hydrometallurgical precipitation and metal recovery processes.

1.2 Co-Leaching of Gold, Copper, and Base Metals



Following the washing stage, the prepared e-waste powder is transferred from the storage bin into an aqueous chloride leaching solution. During this hydrometallurgical leaching process, gold (Au) is dissolved together with significant quantities of copper (Cu), along with smaller concentrations of other base and critical metals including iron, tin, zinc and nickel. The primary objective of the leaching stage is to oxidise metallic gold and convert it into the soluble square-planar tetrachloroaurate complex ($AuCl_4^-$), which serves as the target species for the downstream selective ligand precipitation process. At the same time, copper and other associated metals are converted into soluble ionic forms, predominantly as Cu(II) chloride complexes, enabling subsequent selective metal recovery and purification stages.

1.3 Leaching Options

Two alternative chloride leaching systems may be utilised for the dissolution of gold and associated metals from the prepared e-waste feed material.

Option A – Hydrochloric Acid / Hydrogen Peroxide Leach (HCl + H_2O_2):
An oxidative chloride leach employing approximately 2M hydrochloric acid (HCl) in combination with hydrogen peroxide (H_2O_2) may be used. In this system, hydrogen peroxide acts as a strong and relatively environmentally benign oxidising agent, while hydrochloric acid supplies the chloride ions required to stabilise dissolved metal complexes. Under these conditions, gold is oxidised and converted into soluble tetrachloroaurate complexes ($AuCl_4^-$), while copper and other metals are dissolved as chloride-based ionic species. Research indicates that the downstream selective precipitation process remains effective across a broad range of acidic chloride leaching environments.

Option B – Aqua Regia Leach (HNO_3 + HCl):
Alternatively, the e-waste material may be treated using aqua regia, typically consisting of a 1:3 mixture of nitric acid (HNO_3) and hydrochloric acid (HCl). The feed material is immersed in the solution for an extended leaching period, generally around 24 hours. In this process, nitric acid acts as the primary oxidising agent responsible for dissolving gold and base metals, while hydrochloric acid provides the chloride ions necessary for the formation of soluble chloridometalate complexes, including tetrachloroaurate ($AuCl_4^-$). This approach

enables effective dissolution of precious and base metals into solution for subsequent selective recovery stages.

1.4 Dilution / Acidity Adjustment

Following metal dissolution, the complex mixed-metal leachate is diluted with deionised water to adjust the solution chemistry for the downstream selective gold precipitation stage. Where aqua regia has been utilised as the leaching medium, the solution is typically diluted to approximately 40% aqua regia strength.

The principal objective of this conditioning step is to achieve a solution environment functionally equivalent to an approximately 2 M hydrochloric acid (HCl) matrix. This acidity range represents the optimal thermodynamic condition for the highly selective precipitation of gold-bearing tetrachloroaurate complexes during the subsequent ligand-based recovery process. Proper control of acidity and chloride concentration is critical to maximising gold selectivity while minimising co-precipitation of copper and other dissolved base metals.

1.5 Gold Selection Precipitation Process

Following leaching, a solid tertiary diamide ligand is added directly to the acidic chloride solution containing dissolved gold. The ligand is typically introduced at approximately stoichiometric proportions relative to the dissolved gold concentration, maximising reagent efficiency while maintaining high selectivity for gold recovery. Once added, the solution is agitated under controlled conditions to promote ligand dissolution and facilitate the selective formation of a gold-bearing precipitate. Laboratory studies have demonstrated effective operation at ambient temperature (~20°C) with moderate agitation for approximately one hour, although final operating conditions for commercial application will be established through future optimisation and pilot plant programs.

Within the acidic chloride environment, the diamide ligand becomes protonated, forming positively charged species that self-assemble into organised supramolecular structures. These structures contain specific binding cavities that selectively recognise and capture tetrachloroaurate ions ($AuCl_4^-$), the dissolved gold species present in solution. This highly targeted molecular recognition mechanism allows gold to be selectively removed while leaving all base metals dissolved in the liquor.

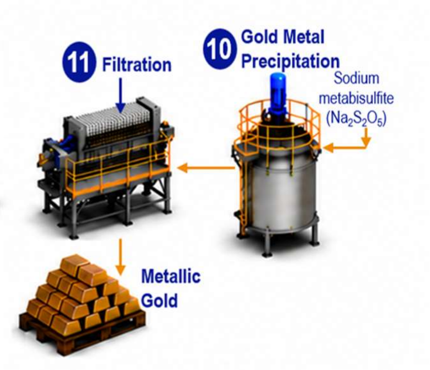
The exceptional selectivity of the process is further enhanced by favourable thermodynamic interactions within the precipitated gold complex. These include hydrogen bonding, C–H···Au interactions and halogen-halogen interactions between neighbouring species. Together, these interactions stabilise the gold complex and provide the process with a strong affinity for dissolved gold, enabling highly selective and efficient gold recovery from complex e-waste leach solutions. The core stage of the process involves the highly selective separation and recovery of gold from the complex multi-metal chloride leach solution using a proprietary tertiary diamide ligand system.

1.6 Ligand Stripping and Recycling

Following selective gold precipitation, the gold-bearing diamide complex undergoes a stripping and regeneration stage designed to recover dissolved gold and enable reuse of the ligand. The isolated precipitate is contacted with dilute NaOH solution under agitation for approximately 15 minutes. Under these low-acidity conditions, the protonated ligand loses stability, and the supramolecular gold complex dissociates. As the structure breaks down, gold is released back into solution as soluble tetrachloroauric acid ($HAuCl_4$), while the diamide ligand reverts to its neutral, insoluble form. This allows the ligand to be readily separated from the gold-bearing solution through conventional solid-liquid separation methods such as filtration or centrifugation.

The recovered ligand is recycled back to the gold precipitation circuit for further use. Laboratory studies have demonstrated that the ligand maintains strong performance over multiple load-strip cycles, with consistently high recovery efficiencies after repeated reuse. This recyclability reduces reagent consumption, lowers operating costs, and enhances the overall sustainability and commercial attractiveness of the gold recovery process.

1.7 Gold Reduction

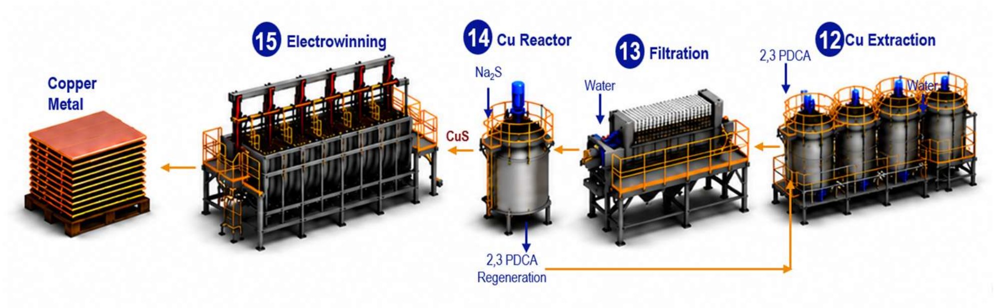


Following stripping and purification, sodium metabisulfite ($Na_2S_2O_5$) is added to the purified aqueous tetrachloroauric acid ($HAuCl_4$) solution to chemically reduce the dissolved gold species to metallic gold.

During this reduction process, gold precipitates from solution as a solid metallic product, which can subsequently be recovered through conventional solid-liquid separation methods such as filtration, washing and drying. Analytical characterisation of the recovered product has demonstrated that the process is capable of producing metallic gold with a purity of approximately better than 99%. The reduction stage represents the final gold recovery step within the process flowsheet and enables the production of a high-value precious metal product suitable for further refining or commercial sale.

2. Copper (Cu) Recovery and Separation

The copper recovery process commences directly from the liquid phase (liquor) obtained after the selective precipitation and separation of gold.



2.1 Isolation of Copper-Rich Process Liquor

During the selective gold precipitation stage, the tertiary diamide ligand (L) demonstrates a strong and highly selective affinity for the tetrachloroaurate anion ($AuCl_4^-$). Experimental studies have confirmed that copper, which exists predominantly as Cu(II) chloride species within the acidic chloride medium, does not possess the appropriate structural or thermodynamic characteristics required for strong interaction with the ligand system. Consequently, copper rejection during the gold precipitation phase is extremely high, with negligible co-precipitation observed. Following solid-liquid separation of the gold-bearing [HL][$AuCl_4$] precipitate by filtration or centrifugation, the remaining supernatant solution becomes a gold-depleted, copper-rich acidic liquor, typically maintained at approximately 2 M hydrochloric acid (HCl). In addition to dissolved copper, the solution also contains smaller concentrations of other co-leached base metals including aluminium, nickel, zinc, iron and tin.

2.2 Copper-2,3-PDCA Complex Recovery and Residual Liquor Management

Following removal of gold from the leach solution, pyrazine-2,3-dicarboxylic acid (2,3-PDCA) is added under controlled conditions to selectively recover dissolved copper. Within the acidic chloride solution, the 2,3-PDCA ligand coordinates with copper ions through its nitrogen and carboxylate donor groups, forming a highly stable copper-2,3-PDCA coordination complex. As the complex forms, its low solubility causes it to precipitate from solution as a distinctive blue solid. Process conditions including pH, reagent dosage, temperature and mixing intensity are controlled to maximise copper precipitation while minimising co-precipitation of other dissolved metals.

The solid blue copper-2,3-PDCA coordination complex formed during the selective precipitation stage is recovered from the process slurry using conventional solid-liquid separation methods such as filtration or centrifugation. Following removal of the copper precipitate, the remaining filtrate is substantially depleted of both gold and copper and primarily contains residual dissolved base metals including nickel, iron, zinc, aluminium and tin.

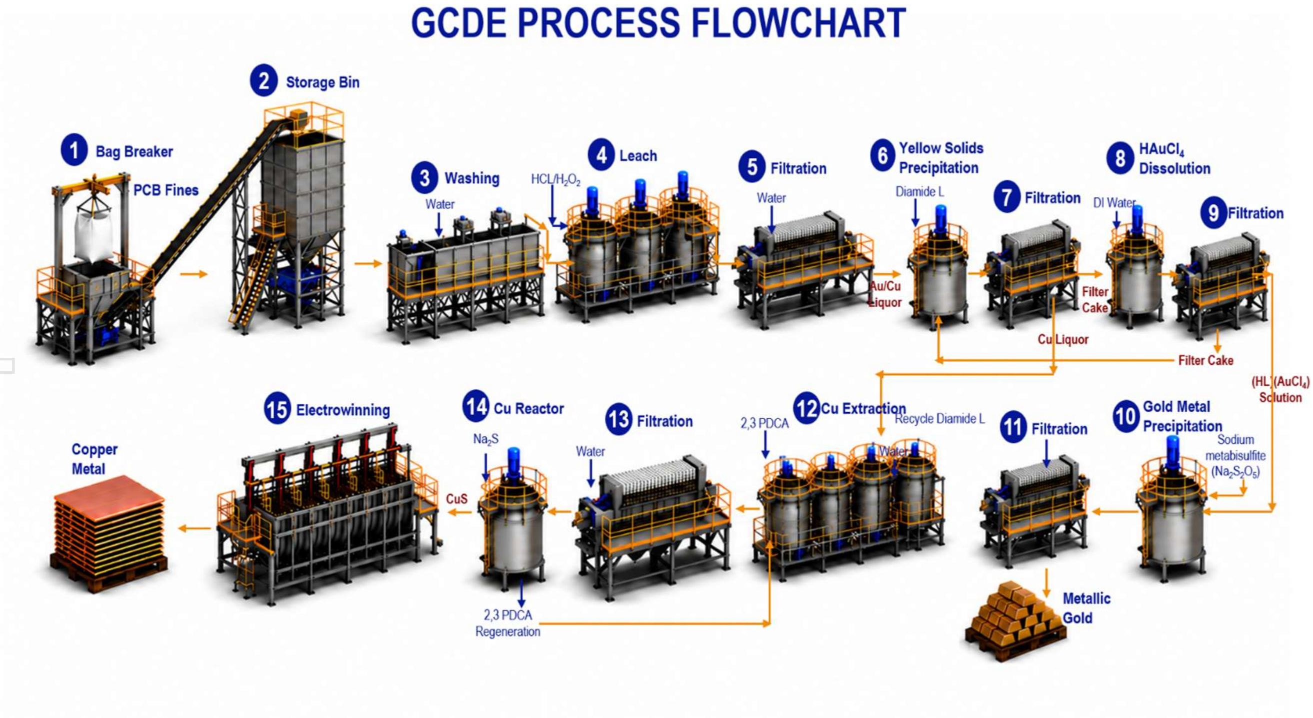
Depending on overall process design and economic considerations, this residual liquor may undergo additional metal recovery, reagent recycling or neutralisation stages prior to final treatment and disposal. Any remaining process solutions and residues would be managed in accordance with applicable environmental regulations and waste management standards to minimise environmental impact and support sustainable operation of the recycling process.

2.3 Metal Recovery and Reagent Regeneration

To convert the precipitated copper complex into a recoverable copper product and regenerate the 2,3-PDCA ligand for reuse, the isolated copper-2,3-PDCA complex undergoes a secondary treatment and recovery process. In one recovery pathway, the copper complex is treated with sodium sulfide (Na_2S), resulting in the formation of copper sulfide (CuS) precipitate while simultaneously releasing the 2,3-PDCA ligand back into the aqueous phase as the soluble sodium salt Na_2(2,3-PDCA). The regenerated ligand solution may then be recycled back into the copper precipitation circuit for reuse in subsequent processing cycles, supporting reagent recovery and reducing operating costs.

Alternatively, the copper-bearing complex may be dissolved in a more concentrated acidic medium, such as sulphuric acid, to produce a purified copper-rich electrolyte solution. This solution can subsequently undergo electrowinning, where dissolved copper ions are electrochemically reduced and deposited as high-purity metallic copper onto cathode surfaces.

These recovery pathways provide flexibility for producing either copper sulfide intermediates or refined metallic copper products, depending on downstream processing requirements and commercial objectives.



CHIEF EXECUTIVE OFFICER COMMENT

"The completion of the GCDE process flowsheet marks an important milestone for Lithium Universe as we expand into sustainable e-waste recycling and critical minerals recovery. The University of Edinburgh technology provides an innovative low-temperature hydrometallurgical process capable of selectively recovering gold and copper using reusable organic reagents. The process has demonstrated high recovery and selectivity while potentially reducing energy usage and environmental impact compared to conventional smelting methods. With global e-waste volumes continuing to rise rapidly, we believe this technology has strong long-term commercial potential within the growing circular economy sector."

Watch the GCDE Explainer
https://youtu.be/O__fW8jLzLU

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About Lithium Universe Limited (LU7)

Lithium Universe (ASX: LU7) is an emerging lithium development company focused on building a fully integrated lithium supply chain in North America. The company's flagship asset is the Bécancour Lithium Refinery project in Québec. LU7 is led by a world-class team with extensive experience in lithium refining, project delivery, and global supply chain integration.

Authorised by the Chairman of Lithium Universe Limited

Lithium Universe Interactive Investor Hub

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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 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) ("Lithium Universe" or "the Company") 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.

SILVER EXTRACTION - PV SOLAR PANEL RECYCLING STRATEGY

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. Silver is essential for solar panels, electronics, and electric vehicles due to its unmatched electrical conductivity. Industrial demand has surged, especially from photovoltaics and AI technologies, creating a global supply deficit. With production lagging, silver prices have soared, reinforcing the economic importance of efficient recycling.

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. The first stage, developed by Macquarie University, is Microwave Joule Heating Technology (MJHT), a process that uses microwave energy to selectively heat silicon cells softening the ethylene vinyl acetate (EVA) encapsulant that binds a solar panel's layers. This enables room-temperature delamination of glass, silicon, and metal layers without crushing, furnaces, or toxic chemicals. The result is a clean separation of materials, drastically reducing energy use, emissions, and chemical waste while preserving the integrity of high-value silicon and silver components. Following delamination, Lithium Universe applies its Jet Electrochemical Silver Extraction (JESE) process, a micro-jet electrochemical system that directs a fine stream of dilute nitric electrolyte onto the silver pads of solar cells. This method achieves over 95% silver recovery at 96% purity, while using 83% less acid and no chemical additives. The process operates at just 5 volts, recycles its electrolyte, and produces zero heavy-metal waste, establishing a true closed-loop recycling system. Together, MJHT and JESE form a sustainable, scalable recycling platform that converts discarded solar panels into a renewable source of silver, silicon, and other critical materials, a vital step toward circularity in the global clean-energy supply chain.

LITHIUM DIVISION

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 planning to build 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.

Second Refinery Strategy

Lithium Universe Limited has launched a second lithium refinery strategy in the Port of Brownsville, Texas, complementing its planned flagship Bécancour project in Québec. The initiative creates a binational refining platform to address North America's lithium conversion shortage and strengthen supply chain resilience. Strategically located near the Port of Brownsville, the site offers deep-water access, low labour costs, and streamlined permitting within one of the U.S.'s most business-friendly regions. Leveraging a "copy and paste" design from the proven Bécancour refinery, the Texas project can be rapidly deployed to serve nearby gigafactories, aligning with U.S. policy incentives under the Inflation Reduction Act.