CRITICAL RESOURCES AND CSIRO TO COLLABORATE ON DSD BATTERY TECHNOLOGY

Collaborative research project with Australia's national science agency CSIRO to support the development, optimisation, and scale-up of the DSD battery technology.

- **Collaborative research project with CSIRO:** Critical Resources has entered into a collaborative research project with CSIRO to support the optimisation and scale-up of the Company's Dry Supersonic Deposition (**DSD**) battery technology, co-funded through CSIRO's Kick-Start program.

- **DSD developed with South Dakota Mines:** The DSD process is being developed at the South Dakota School of Mines & Technology (**SDM**) within the US National Science Foundation-supported Centre for Solid-State Electric Power Storage (**CEPS**).

- **Specialist capability applied to CRR technology:** The project will be undertaken by CSIRO researchers at **Lab22**, CSIRO's advanced additive and robotic manufacturing facility in Clayton, Victoria, drawing on more than 30 years of CSIRO experience in the field and applying CSIRO's **digital modelling capability** to the optimisation of the DSD process and the development of a scale-up pathway.

- **Strengthening the development pathway:** Independent modelling is intended to de-risk the process, deepen the Company's intellectual property position, and deliver technical recommendations for **process optimisation and scale-up,** and support potential engagement with cell and component manufacturers.

- **Australian sovereign capability:** The engagement of CSIRO strengthens the solid-state lithium battery program's technical capability alongside the Company's United States research base at the South Dakota School of Mines & Technology (**SDM**), building Australian capability in advanced battery manufacturing processes.

- **Foundational Collaboration:** The CSIRO Kick-Start program is structured as a foundational collaboration program. The Company intends to use the outcomes of this project to scope a subsequent, larger program of work with CSIRO.

- **Manufacturability, not just safety, is the real advantage:** Sulphur-based solid-state electrolytes perform well but are toxic and costly to manufacture. CRR's sulphur-free electrolytes show performance that is achievable without either drawbacks, opening a cleaner and potentially cheaper manufacturing pathway with DSD.

- **Strategic positioning across the battery value chain:** Critical Resources holds interests in both lithium resources (Mavis Lake Lithium Project) and next-generation battery technology IP — advancing independently, but together broadening the Company's optionality across future partnerships, licensing and commercial pathways.

Critical Resources Limited ('**Critical Resources**' or the '**Company**', **ASX:CRR**) is pleased to advise that it has received co-funding under the CSIRO Kick-Start program to support a collaborative research project with the Commonwealth Scientific and Industrial Research Organisation (**CSIRO**), Australia's national science agency.

The project is directed at the optimisation and scaling of the Company's solvent and binder-free Dry Supersonic Deposition (DSD) manufacturing process which sits at the centre of CRR's licensable battery manufacturing intellectual property. CSIRO will apply its Digital Twin capability to optimise and de-risk that process and to deliver technical recommendations for further optimisation, development and, if successful, the scale-up of the process.

CSIRO KICK-START PROJECT OVERVIEW

The project will use CSIRO's modelling capability to visualise, analyse and optimise the supersonic deposition process CRR is developing for battery cathode and electrolyte manufacture. Simulations will be generated from the Company's own process parameters, including multiple process variables for the DSD process.

Under the project, CSIRO will undertake:

- **Digital twin construction and visualisation:** build a three-dimensional virtual model of the spray nozzle assembly and deposition environment, and simulate gas flow behaviour, particle trajectories, particle velocity and temperature distributions, and supersonic shock wave locations.

- **Powder and particle size distribution assessment:** integrate CRR's particle size distribution data into the digital twin framework, analyse particle velocity across the size range, visualise impact conditions, estimate deposition efficiency and assess particle-size-dependent bonding behaviour.

- **Advanced analytics and defect-mechanism work:** identify conditions contributing to defect formation, cracking or poor inter-particle bonding, and run hypothetical simulations to evaluate potential process improvements.

- **Recommendations and reporting:** deliver technical recommendations for future optimisation, experimental validation and scale-up, together with a comprehensive final report.

***Figure 1** – Project workflow. CRR's deposition parameters are modelled using CSIRO's Digital Twin capability at Lab22, producing technical recommendations for process optimisation and scale-up. Illustrative process flow only — not actual project results.*

The project will be led by Dr Saden Zahiri of CSIRO's Advanced Manufacturing program, within the Lab22 and Advanced Manufacturing and Metals Group at Clayton, Victoria. He has led research in robotic cold spray additive manufacturing since 2004 and has been at the forefront of developing digital twin frameworks for solid-state supersonic deposition. He currently leads CSIRO's Robotic Additive Manufacturing Team and holds an Adjunct Professorship at Swinburne University of Technology. Lab22 is CSIRO's advanced and additive manufacturing facility and is among a small number of centres internationally with a developed digital twin simulation capability.

The Company is progressing both workstreams at once: CSIRO's modelling and simulation work refines the DSD process digitally, while the Company's existing evaluation program with SDM continues in parallel —

running experimental deposition trials and electrochemical testing independently. Together, the two programs are intended to accelerate the pace of process validation.

DSD DEVELOPMENT PATHWAY

Battery manufacturing conventionally relies on a wet slurry process where active materials, mixed with a polymer binder and a toxic solvent, are coated onto foil and then dried in high-temperature ovens. The solvent, binder and drying step together add significant cost, energy, capital and environmental burden to every cell produced. Because the binder itself is electrically insulating, its presence also reduces conductivity within the electrode. Accordingly, removing these components is one of the most valuable unsolved problems in battery manufacturing.

Critical Resources' DSD process, being developed with the South Dakota School of Mines & Technology, removes all three. Cathode and/or electrolyte materials are accelerated to supersonic velocity and deposited dry, in a single step — no solvent, no binder, no drying oven.

An independent peer-reviewed publication announced on 2 July 2026 confirmed the formation mechanism of that dry-deposited cathode and reported, from a first and unoptimised set of trials in coin cell format on a liquid-electrolyte reference, approximately 154 mAh/g at low rate and retention of approximately 85% of capacity over 500 cycles at 1C with coulombic efficiency above 99.5%.

Peer review has established that the process works. Scaling up presents a different set of challenges, and answering them by physical experiment alone is slow and expensive — every iteration consumes specialist powder and external facility time. The digital twin has been designed to address these challenges. Applying CSIRO's Digital Twin capability allows the Company to see inside the process to:

- **Understand the mechanism:** why a given parameter set produces a given deposit
- **Identify defect causes:** the mechanisms behind defects and inconsistencies
- **Derive recommendations** for optimisation and scale-up

The output is intended to provide the technical substance of a licensable manufacturing package, and is directly additive to the value and defensibility of the underlying intellectual property.

The Company's current strategy is to commercialise its battery materials and manufacturing intellectual property through licensing rather than by building and funding cell manufacturing capacity. Under that model the asset is process knowledge: the patent position, the validated performance data and the engineering understanding required for a partner to implement the process at scale.

Each step that de-risks the DSD process — independent peer review, and now independent process modelling by Australia's national science agency — widens the Company's licensing and partnership opportunity and strengthens its position in discussions with potential cell and component manufacturers.

The solid-state lithium battery program is being conducted at the South Dakota School of Mines & Technology (**SDM**) within the US National Science Foundation (**NSF**) supported Centre for Solid-State Electric Power Storage (CEPS). The evaluation program is led at SDM by Dr Alevtina Smirnova, Director of CEPS and Technical Advisor to Critical Resources, whose research developed the solid-state battery IP over which the Company holds its exclusive option (refer ASX:CRR announcements 17 February 2026 and 18 November 2025).

The Company notes that this project is a research and modelling program. **No commercial agreement, licence, partnership or revenue arises from it**, and no such arrangement is currently the subject of a binding agreement.

WHERE THE CSIRO COLLABORATION SITS IN THE BATTERY EVALUATION PROGRAM

The CSIRO project is a manufacturing-process workstream. It sits alongside, and supports, the Company's existing materials and cell-development pathway with SDM under the National Science Foundation-supported Centre for Solid-State Electric Power Storage (CEPS).

Program Stage	Workstream	Status
Electrolyte material benchmarked (ionic conductivity, stability).	ASE (electrolyte)	**Completed**
Single-step composite layer deposited (cathode + electrolyte + conductor, solvent-free).	DSD (manufacturing)	**Completed**
Coin cell electrochemical baseline (charge/discharge vs. known reference).	DSD (manufacturing)	**Completed**
Independent peer-reviewed publication of the DSD cathode process (Electrochimica Acta, 2026).	DSD (manufacturing)	**Completed**
Digital Twin modelling and process optimisation of the DSD deposition process.	**DSD + CSIRO**	**Commencing**
Full-format pouch cell prototype — electrochemical baseline (charge/discharge vs. known reference).	DSD + benchmark electrolyte	Ongoing
Independent testing of DSD pouch cell prototype.	DSD + benchmark electrolyte	Next
FULL SOLID-STATE CELL: Solid-state ASE and HTE electrolytes integrated with DSD process.	**ASE + DSD**	Planned

As previously disclosed, the DSD cathode results reported to date were produced on a conventional liquid-electrolyte reference in coin cell format. The Company's sulphur-free Amorphous Solid-State Electrolyte (**ASE**) has been benchmarked at 3.2 mS cm^{-1} ionic conductivity and 0.27 eV activation energy (refer ASX:CRR announcement 28 May 2026) but has not yet been integrated with the DSD process into a complete cell. Integration of the solid electrolyte, and full-format pouch cell cycling, remain ongoing.

ABOUT THE CSIRO KICK-START PROGRAM

The CSIRO Kick-Start program provides matched co-funding to eligible Australian small and medium enterprises to undertake collaborative research with CSIRO. The program is designed as an entry point to CSIRO's research capability, with successful projects frequently forming the basis of larger, longer-term research programs. The total project budget is $100,000, with CSIRO contributing up to $50,000 under the Kick-Start program with Critical Resources co-funding the balance. The project is scheduled to commence in September 2026 over a period of up to twelve months.

Under the project arrangements, the simulation outputs, analysis and final report produced by CSIRO will be the intellectual property of Critical Resources. CSIRO retains ownership of its underlying Digital Twin methodologies and meshing know-how, which are excluded from the project deliverables.

The DSD process is the subject of a lodged provisional patent application over which CRR holds an exclusive option, and the Company's current strategy is to commercialise its battery materials and manufacturing intellectual property through licensing.

Critical Resources Managing Director, Tim Wither, commented: *'The battery industry has no shortage of promising chemistry. What it is short of is chemistry that can be manufactured at cost, at scale and repeatably — and that, more than materials performance, is what holds solid-state battery architecture back. With South Dakota Mines and now CSIRO we are finding solutions on both sides: the materials and the manufacturing.*

'Our focus at this stage is to develop the process knowledge: the patent position, the data, and the engineering understanding a potential cell manufacturer needs to run it. Peer review has established that DSD works. What comes next is knowing where the operating window sits, what causes defects, and how the process behaves at scale. CSIRO's digital twin capability answers those questions by modelling rather than by spending money and time on trial after trial, and it brings world-class expertise and facilities to the DSD process.

'This remains early-stage work and we will keep reporting it that way. But the direction is consistent: build a defensible position, do it capital-effective, and let independent institutions validate each step. This project also builds an Australian technical base alongside the outstanding progress of Dr Smirnova and her team at South Dakota Mines. Kick-Start is deliberately our first project with CSIRO — our intention is that it is not the last.'

NEXT STEPS

- Commence digital twin construction and simulation of the DSD nozzle assembly and deposition environment. This will include defining current parameters, material classification and analysis of existing results.

- Continue the parallel SDM evaluation program, including full-format pouch cell testing, independent third-party electrochemical validation, and integration of the ASE solid electrolyte with the DSD process.

- Use the resulting process understanding to support the Company's licensing and partnering discussions.

The Company's approach across both its battery and thermal management technology programs remains capital-light, milestone-gated and evidence-led, with each stage validated before the next is committed.

This announcement has been approved for release by the Board of Directors of Critical Resources.

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ABOUT CRITICAL RESOURCES LIMITED

Critical Resources Limited (ASX:CRR) is an Australian mining and technology company focused on the discovery and development of critical metals and next-generation technologies essential to a sustainable future. The Company holds a diversified portfolio including the Mavis Lake Lithium Project in Ontario, Canada, the Halls Peak Base Metals Project in New South Wales, and a growing gold portfolio in New Zealand.

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TECHNICAL INFORMATION
The scientific and technical information in this announcement relating to the DSD cathode technology is drawn from peer-reviewed research published in Electrochimica Acta (Rodmyre et al., 2026) and was previously reported in the Company's ASX announcement of 2 July 2026. The Company is not aware of any new information or data that materially affects the information included in that announcement.

FORWARD LOOKING STATEMENTS
This announcement may contain certain forward-looking statements and projections. This announcement also contains forward-looking statements regarding the Company's battery technology and intellectual property programs, the scope, timing, conduct and outcomes of the CSIRO research project, and the optimisation, development, scale-up, and potential licensing of the DSD manufacturing process. The CSIRO project is a modelling and simulation program and there can be no assurance that it will identify process improvements, that any such improvements will be realised experimentally, that a subsequent stage of work with CSIRO will be agreed or funded, that ongoing optimisation will achieve improved or commercially viable results, that the Company's battery technology will be successfully developed, scaled or commercialised, or that any intellectual property option held by the Company will be exercised or prove valuable. The laboratory results referred to in this announcement are early-stage and are not indicative of commercial performance. Statements regarding CRR's plans with respect to its mineral properties and programs are forward-looking statements. Such forward-looking statements/projections are estimates for discussion purposes only and should not be relied upon. Forward-looking statements/projections are inherently uncertain and may therefore differ materially from results ultimately achieved. There can be no assurance that CRR's plans for development of its mineral properties will proceed as currently expected. There can also be no assurance that CRR will be able to confirm the presence of additional mineral resources, that any mineralisation will prove to be economic or that a mine will successfully be developed on any of CRR's mineral properties. Critical Resources Limited does not make any representations and provides no warranties concerning the accuracy of the projections and disclaims any obligation to update or revise any forward-looking statements/projections based on new information, future events or otherwise, except to the extent required by applicable laws. While the information contained in this report has been prepared in good faith, neither Critical Resources Limited nor any of its directors, officers, agents, employees or advisors give any representation or warranty, express or implied, as to the fairness, accuracy, completeness or correctness of the information, opinions and conclusions contained in this announcement.