

Closing the Loop: A Clean Technology for Recovering Valuables from Waste Lithium-Ion Batteries

"Closing the Loop" is the University of Mindanao's groundbreaking initiative to address the growing environmental challenge of lithium-ion battery waste—a byproduct of modern life from mobile phones, laptops, and electric vehicles. These discarded batteries pose serious environmental hazards, while also containing valuable materials like lithium and cobalt that can be recovered and reused.

Since 2022, the initiative has not only advanced scientific innovation but has also influenced public policy, environmental education, and local governance practices, setting a national example for circular economy initiatives.



1 working prototype of the recovery system was successfully developed.

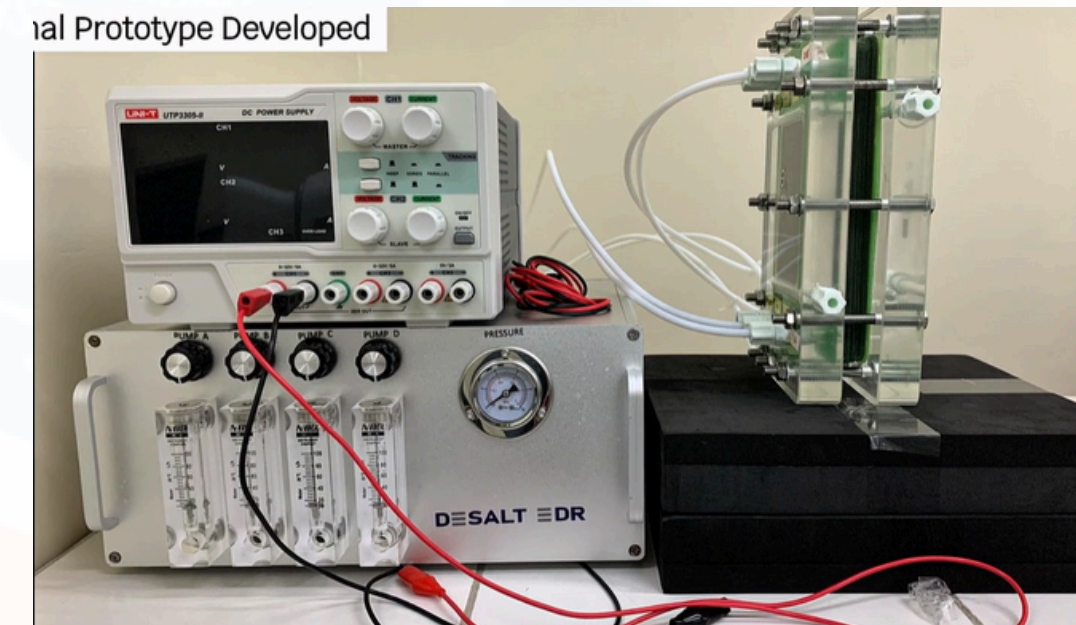
6 student researchers (5 undergraduate and 1 graduate student in Chemical Engineering) were supported through thesis and field research.

1 scientific article was published in a peer-reviewed journal, with 3 more manuscripts under review.

- A policy brief led to Resolution No. 5, adopted by the Regional Research, Development, and Innovation Council XI (RRDIC-XI), urging LGUs to establish local ordinances for safe battery disposal.
- Formal coordination has begun with the City Planning and Development Office of Davao to push for city-level policy integration.
- Industry partnerships were built with Radicor Metal Manufacturing and PC Bee Davao, with project funding from the Department of Science and Technology (DOST).

Through public awareness campaigns, policy presentations, and inter-agency dialogues, the project is expanding its reach beyond the lab—educating citizens, empowering students, and helping government agencies take informed action on e-waste.

ial Prototype Developed



The project has demonstrated a successful model for clean and sustainable recovery of cobalt and lithium from waste lithium-ion batteries, addressing both environmental and policy gaps. Major achievements include the development of an efficient electrodialysis system with bipolar membranes, support for 6 student research projects, publication of 1 peer-reviewed article with more in progress, and the endorsement of Resolution No.5 by RRDIC-XI. The components strengthen local governance while technology addresses critical gaps in waste management, resource recovery, and environmental protection.