

How Robots Will Dismantle All Our Products from CIRCULAR REPUBLIC FESTIVAL 2025

Key Learnings

Design Creates Recycling Barriers

Current design choices in products such as batteries and solar panels make disassembly nearly impossible. Adhesives and multi-material components prevent recovery and drive up costs during production and end of life. Regulation and rising recycling costs are beginning to push OEMs toward design-for-disassembly, but progress remains limited. Companies that integrate disassembly criteria into product specifications now will avoid long-term recycling and liability costs.

Shredding Destroys Material Value

Dominant recycling methods such as shredding and sorting destroy the integrity of valuable materials like silicon, tantalum, and rare earths. Only selective disassembly enables their recovery at scale. This makes automation not just an efficiency gain but a structural necessity for material sovereignty. Companies that reassess reliance on shredding and explore selective disassembly partnerships will unlock higher-value recovery.

Data and Integration Enable Scalable Automation

Recyclers need structured disassembly data to reduce engineering costs and enable automation at scale. Standardized digital product passports with dismantling instructions can turn automation from a compliance burden into a profitable solution. To capture this potential, companies also need to bridge IT capabilities (AI, data, simulation) with OT systems (robotics, industrial controls). Without both reliable data and IT-OT integration, recycling systems remain too rigid and costly to handle diverse end-of-life products.

Automation Delivers Fast ROI

Robotic disassembly plants already demonstrate strong returns, with payback periods of 1-2 years and doubled recovery revenues compared to conventional recycling. Beyond labour savings, automation increases the value of recovered materials, strengthening the investment case. Building ROI models that include both cost reductions and higher material recovery revenues provides a solid basis for adoption.

Listen to the full episode here:

<https://circularity.fm/how-robots-will-dismantle-all-our-products/>

