

BatteREuse

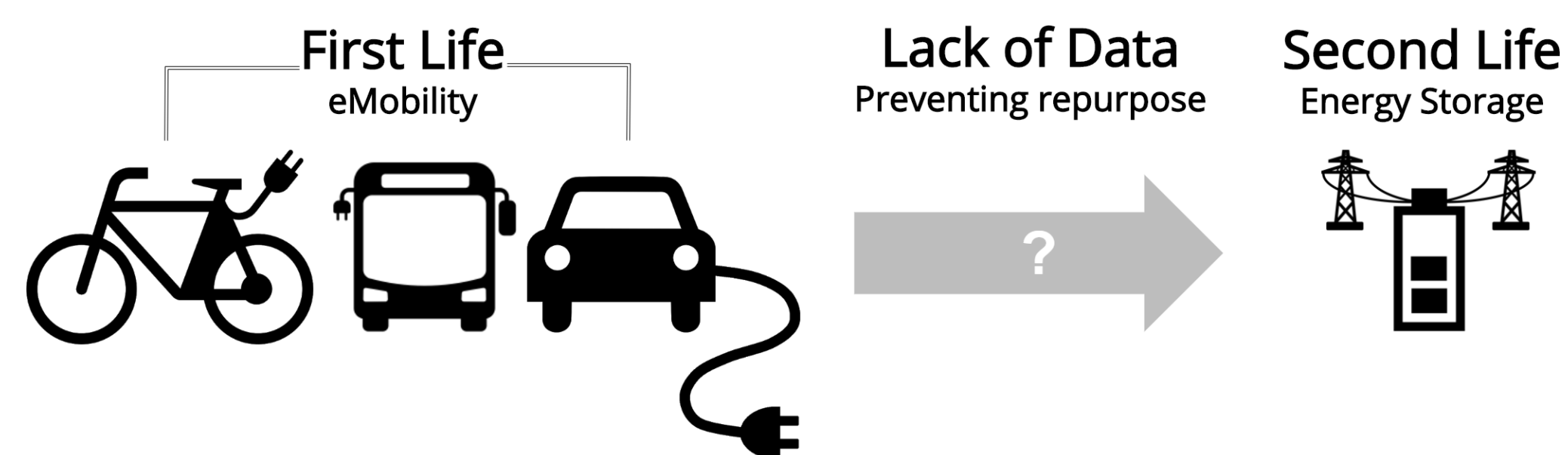


Facilitating a second life for batteries through data-driven insights.

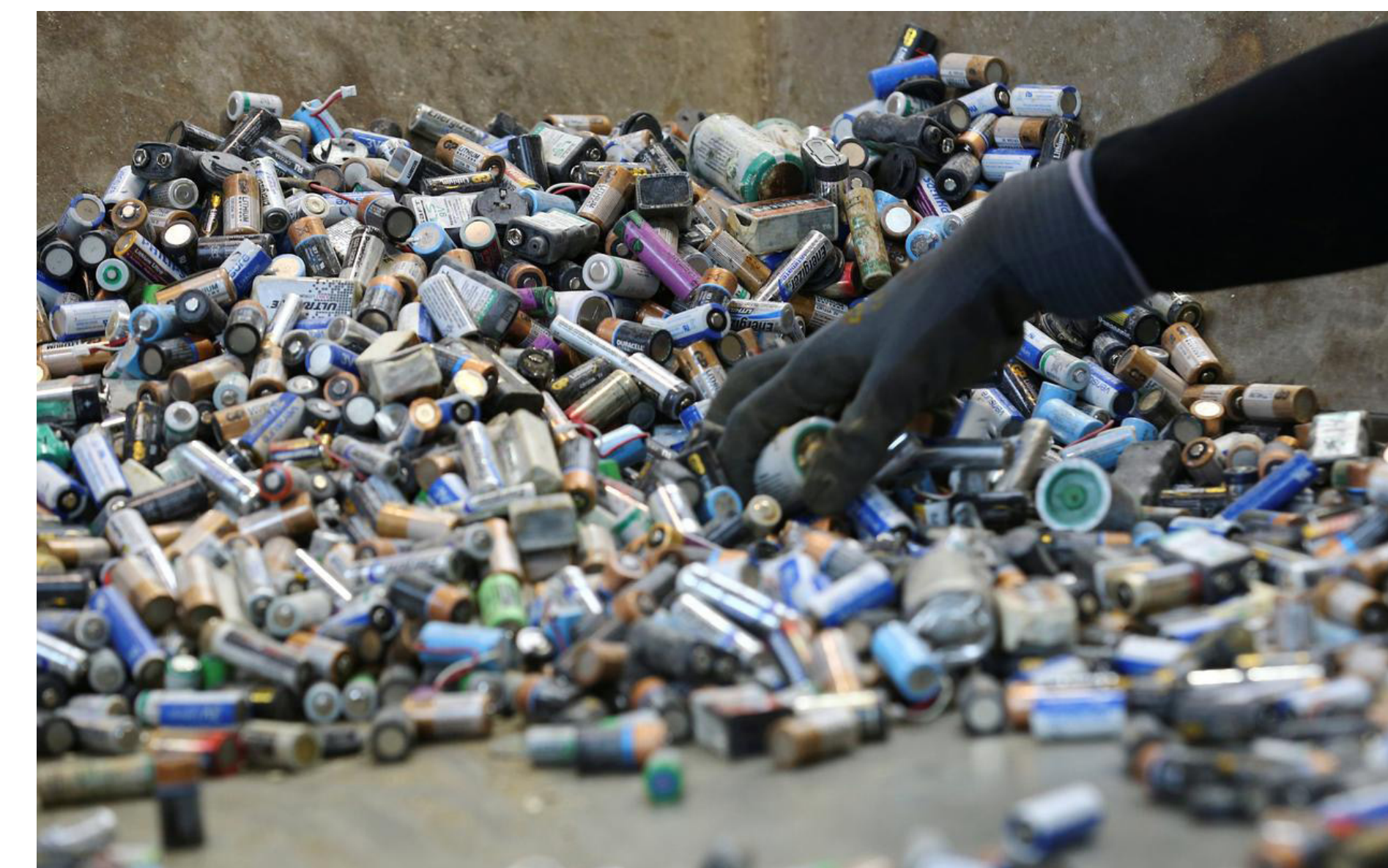
Problem

Global efforts to mitigate climate change through both e-mobility and energy storage are curtailed by hidden costs associated with Lithium-ion (Li-ion) batteries: high energy intensity, limited cycle life, and disposal barriers. This project facilitates a circular economy for Li-ion batteries by linking the transportation and energy distribution sectors, specifically by repurposing retired hybrid bus batteries into second-life energy storage systems (ESS).

Significant uncertainty remains regarding the performance and projected lifespan of these systems. Collecting accurate data on historical usage & degradation is key to enable confidence for second life ESS deployments.



After their first life, EV batteries can be repurposed to store energy for 10 more years.

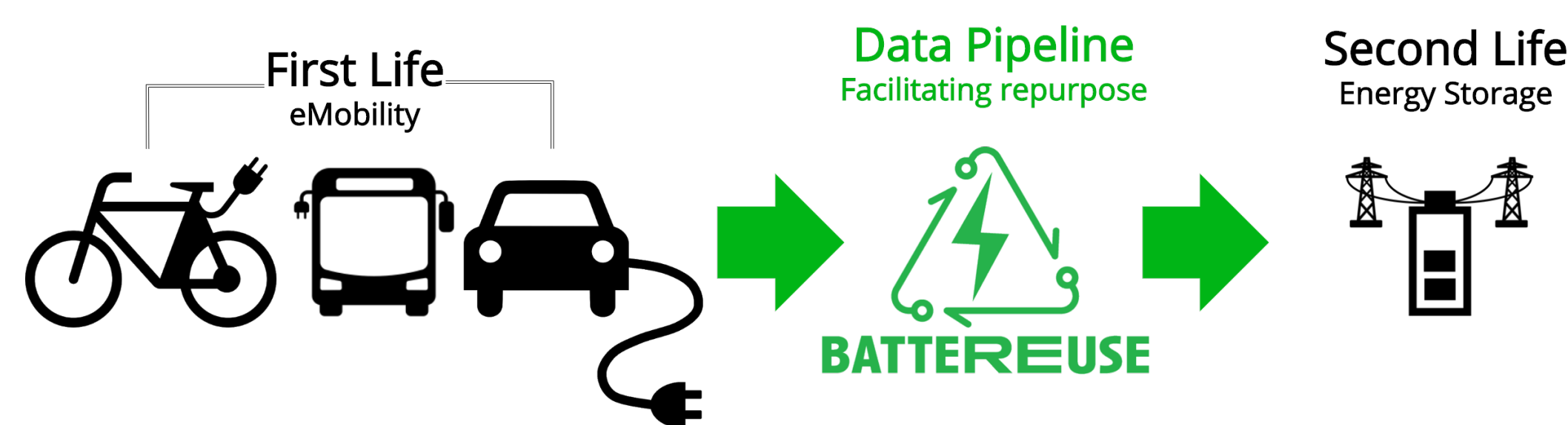


Only 5% of lithium-ion batteries in the United States are recycled.

Solution

To address this problem, the team built a scalable framework to collect battery usage data & provide actionable repurposing insights. This involved the development of an ESS, data collection pipeline, configurable dashboard UI & battery management system (BMS). The BMS incorporates BattGenie's novel physics-based battery control algorithm, which provides accurate parameter estimation and lifespan extension compared to industry standards.

The GIX launch project is extensible to a second-life energy storage deployment, and may power the data collection for an ESS to be used in a load levelling & demand reduction for a local utility.



Our hardware-agnostic data pipeline facilitates the repurposing of second-life ESS.



Repurposing EV batteries in renewable ESS doubles initial CO2 benefits.

Process/Approach

The GIX team partnered with UW-spinoff BattGenie to develop a use-case & market entry point for the nascent technology. Extensive market & user research narrowed the focus to second-life applications: repurposing from e-transit into ESS. A wide variety of applications were evaluated, first focusing on e-bikes, but ultimately leveraging a partnership with a transit agency.

The team performed 20+ subject matter expert interviews with a wide variety of stakeholders across the battery lifecycle, including: cell manufacturers, system integrators, fleet owners, energy storage experts, second life battery repurposers, utilities, and recyclers. Based on these insights, we refined business value proposition, and developed a customer-facing dashboard through two rounds of usability testing.

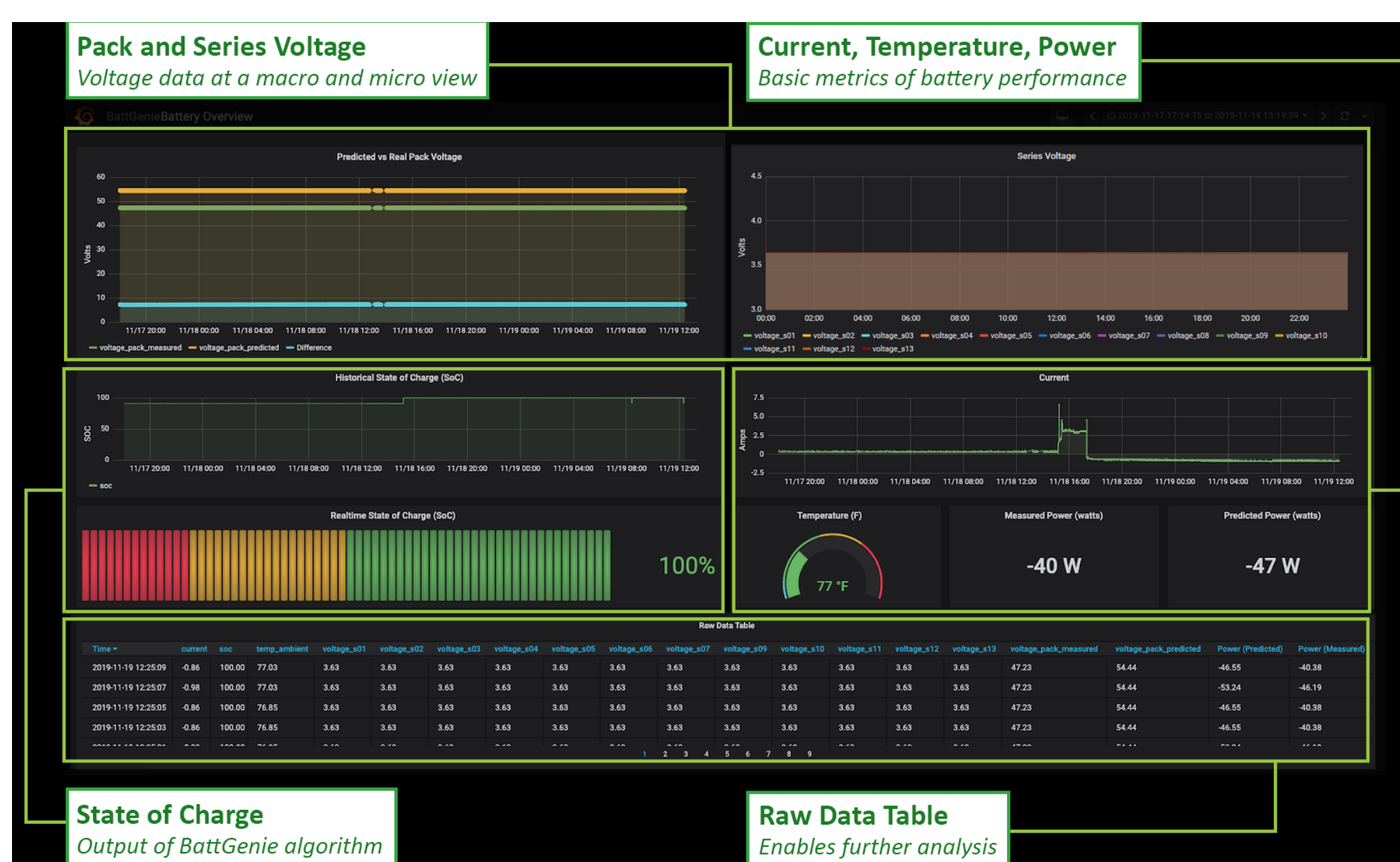


Diagram of our final data dashboard (BattGenie view).

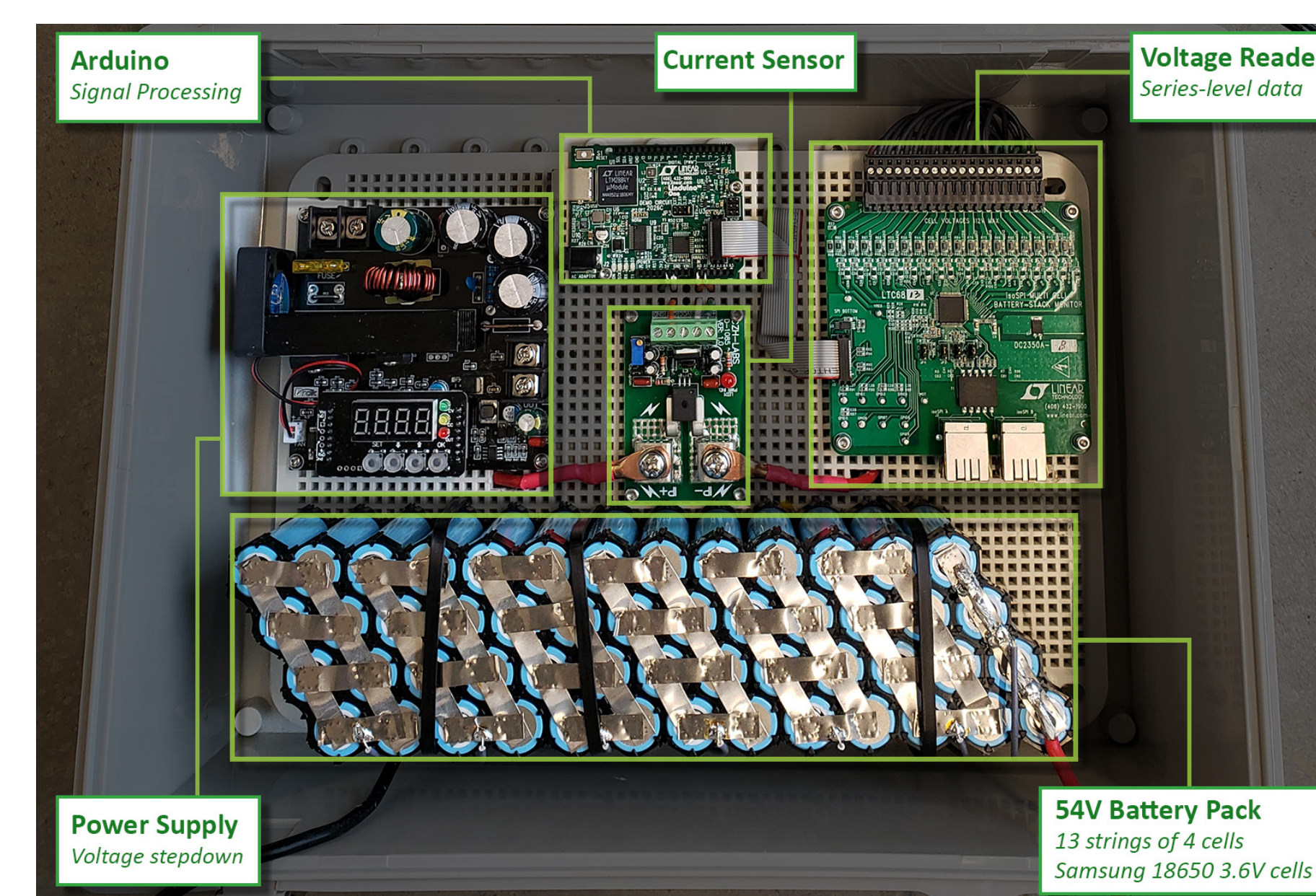


Diagram of our final hardware prototype.