ReJoule's challenge details for challenge: Solar Prize Round 6

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Explanation

ReJoule's innovation makes it possible to convert an increasingly prevalent source of hazardous waste into storage for solar energy.

The source of that waste is an unfortunate consequence of the clean transportation revolution. The lithium batteries that power electric vehicles have a finite life: in the years to come, millions of them will need to be decommissioned. The relevance of this to solar is that, even when no longer able to offer the range or acceleration required on the road, retired lithium batteries can still meet the less stressful demands of stationary storage. In other words, they can store solar energy and provide resilient, clean, and affordable power for our homes, businesses, and grid for years to come. Rather than prematurely recycling them, decommissioned electric vehicle batteries — which typically retain about 80% of their initial capacity — can be repurposed for stationary storage.

For a battery to be repurposed, it must first be accurately tested for safety and state of health (SOH). The principal technological challenge holding back the industry is that today's battery diagnostics and grading are prohibitively slow, expensive, and environmentally punishing. With commercially available technology, battery packs must be shipped to a central location and then cycled on expensive machinery. We eliminate those emissions, because our suitcase-size device, BattScan, can be dispatched to wherever used batteries are found. Furthermore, cycling large batteries can take more than 10 hours following UL 1974 standards. ReJoule's technology achieves comparable results in as little as 30 seconds, allowing for widespread cost-effective battery evaluation.

The technical assistance we are requesting is two-fold. One area directly focuses on our production and performance of our rapid testing BattScan unit. As we develop new models in the product line suitable for higher voltage batteries, we are looking to verify their expected performance. The second assistance area regards improving pathways for second-life EV battery commercialization, specific to UL standards. There are many regulatory hurdles for second-life battery deployment with many institutions following and requesting UL certifications for all installed energy storage systems such as UL 9540. We want to evaluate these standards to allow for the utmost safety and simplest integration of second-life batteries within an American battery circular economy to support national solar adoption. For these areas we would like to work with partners who can help us to:

- Perform verification testing of ReJoule's BattScan device used to determine battery state-of-health
- Assist in the development of a single-score evaluative framework for used EV batteries
- Create a gap-analysis of UL certifications for batteries intended for battery storage and electric vehicles to meet UL 9540 requirements for energy storage systems.
- Complete an analysis of UL1974 and identify steps and procedures for ReJoule to gain the facility certification.
- Develop a pathway to propose UL 1974 Equivalency using ReJoule's BattScan device.

In addition, we would like to continue our JEDI goals by partnering with development specialists in order to:

- Create 'green' opportunities for American workers with barriers to entry in the technical workforce.
- Develop prioritization frameworks for identifying disadvantaged populations and critical infrastructure that would benefit from long duration energy storage using second-life EV batteries and solar power.

Key Needs

- Testing and Validation (5 / 5): ReJoule's primary focus is developing proprietary hardware and specialized methodologies to replace extensive conventional practices for testing used EV batteries. We seek to validate our next-gen hardware's accuracy with an accredited third party.
- Product Development (4 / 5): ReJoule has developed numerous products suitable for a variety of

battery packs and sizes but needs to identify pathways to certifying them to different standards.

- Manufacturing (3 / 5): We aim to move from hand-built prototypes to low-rate initial manufacturing with a focus on quality control and cost-reductions.
- Technical Analysis (4 / 5): We have developed fire safety evaluations and battery control technologies for the safe deployment of our systems but need to identify solutions to technical regulatory hurdles limiting commercialization.

Matches

1. Center for Future Energy Systems (CFES) at Rensselaer: 87.55%
2. GoSun: 87.54%
3. BlochSoft Technologies Inc: 87.53%
4. Larta Institute: 87.53%
5. Lawrence Berkeley National Laboratory: 87.53%
6. Filtration Energy Solutions Inc: 87.53%
7. Membrane Development Specialists: 87.53%
8. Georgia Institute of Technology: 87.52%
9. Solar Inventions: 87.52%
10. New Mexico Clean Energy Resilience and Growth: 87.52%