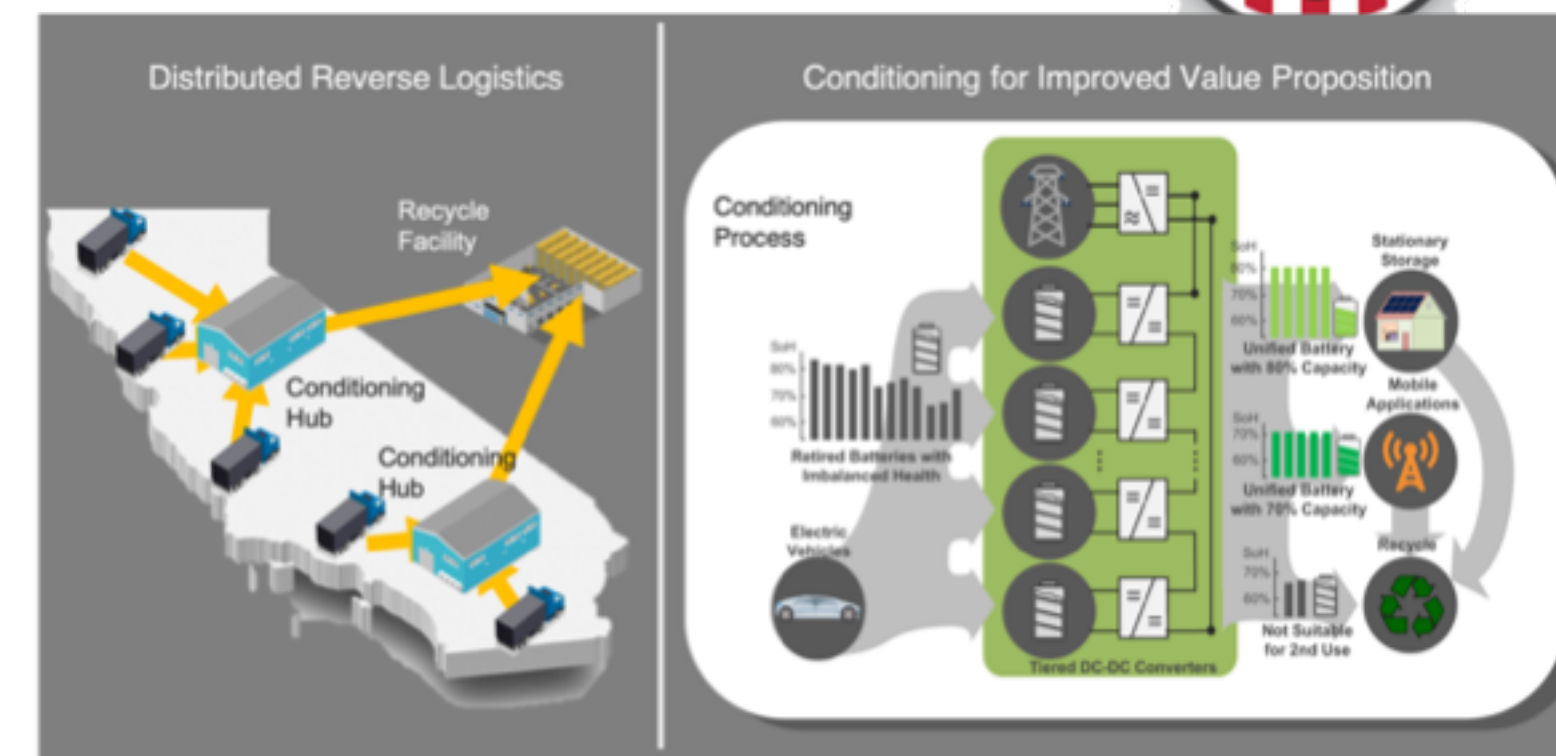


LITHIUM-ION BATTERY RECYCLING PRIZE



| | |
|--|--------------------------------------|
| Team Name: | Smartville |
| Primary Submitter Name: | Mike Ferry |
| City and State: | San Diego, California |
| Member Names (including partners and affiliates): | University of California, San Diego |
| Submission Title: | Distributed Battery Conditioning Hub |
| Submission Track: | Track 4, Reverse Logistics |



Concept

- Smartville is proposing to address the challenge of reverse logistics in battery recycling by developing distributed battery conditioning “HUBs,” or Heterogenous Unifying Battery facilities. HUB facilities will both reduce transportation costs and create additional value in the reverse logistics supply chain. A distributed system of HUB facilities will enable economically-viable aggregation, sorting, and distribution of used batteries from diverse locations before being processed and transported to more centralized recycling locations, resulting in optimization of transport and supply-chain logistics, helping to achieve a 90% or greater recycling rate.

Approach

- Smartville will design battery conditioning HUBs that are strategically located in areas of high electric vehicle concentration, collecting and aggregating retired batteries for proper evaluation, sorting, and shipment. Critical to the HUB concept is Smartville’s unique power electronics and advanced controls within each HUB that conditions batteries of mismatched health to a state of uniformity in order to direct battery modules to recycling, ‘second-life’ applications, or both. Simultaneously, the HUBs will be connected to the electrical grid as an energy storage resource and provide services with very low cost and reliable cycle performance, adding value to the overall reverse logistics system.

Potential Impact

- Over 50% of today's lithium-ion battery production capacity was dedicated for electric vehicles, and the EV market share will grow to absorb as much as over 90% of battery production by 2025 according to BNEF.
- Address the recycling and possible reuse of retired EV batteries as key to achieve >90% recycling rate of lithium-ion batteries.
- Estimated energy capacity from retired EV is over 200GWh by 2025. To avoid used batteries becoming economic and environmental liabilities, potential revenue from reuse and grid services will significantly contribute to the overall reverse logistics and recycling economics.