

**Electric Vehicle Battery Recycling and Reuse
Working Group Meeting Minutes**

Date: October 16, 2025

Time: 9:00 AM

Location: Hawai'i State Energy Office and Zoom

Members Present

Hawai'i State Energy Office:

- Mark Glick, Chief Energy Officer
- Monique Zanfes, Managing Director of Energy Efficiency and Renewable Energy (Co-Chair)
- Jon Chin, Manager of Resilience, Clean Transportation, and Analytics
- Munashe Silverberg, Renewable Energy Analyst
- Nicole Cernohorsky, Transportation Energy Specialist
- Steven Le, Intern

Hawai'i Department of Health:

- Lene Ichinotsubo, Acting Branch Chief, Solid and Hazardous Waste Branch
- Kelly Ann Lee, Project Specialist, Solid and Hazardous Waste Branch
- Rebekah Morales, Environmental Health Specialist

Working Group Representatives:

- Carlton Yamada, Honolulu Fire Department
- Daniel Zotos, Redwood Materials
- Danielle Spalding, Cirba Solutions
- Darla Arians, Product Stewardship Institute
- Ed Washburn, Pasha Hawai'i
- Eric Frederickson, Call2Recycle
- Hannah Lesiak, Hawai'i Automobile Dealers Association
- Henry Gabriel, City and County of Honolulu

- Jaclyn Chong, Hawai‘i Department of Transportation
- John Redman, General Motors
- Jordan Brandt, Voltek Hybrid and EV Repair
- Marc Boolish, PRBA (Rechargeable Battery Association)
- Michael Cooney, Hawai‘i Natural Energy Institute
- Mike Gaffney, Pasha Hawai‘i
- Nikolas Nikolaidis, TNN Computer Recycling Services/Electronic Recycling Pacific
- Robert Potter, Synapse LLC
- Tiffany Yajima, Alliance for Automotive Innovation

Meeting Overview: Introduction to End-of-Life Comments

The second meeting of the Electric Vehicle Battery Recycling and Reuse Working Group focused on establishing clear definitions, understanding battery demand and chemistries, and exploring repair and reuse opportunities. The group reached consensus on aligning with federal definitions for electric vehicles to ensure consistency with international transportation regulations, while recognizing that once batteries are removed from vehicles, they all face similar management challenges. Discussions on battery chemistries emphasized the importance of avoiding overly prescriptive regulations given rapid technology evolution, with industry experts confirming that recyclers can adapt to handle various lithium-ion chemistries including the growing LFP lithium iron phosphate (LFP) market. Jordan Brandt from Voltek Hybrid and EV Repair delivered a comprehensive presentation on repair, reuse, and repurposing operations, highlighting the critical shortage of qualified technicians in Hawai‘i, the environmental and economic benefits of extending vehicle life, and practical challenges, including companies opting out of accepting hybrid or EV cars. Discussion focused on the challenges of navigating safety requirements and liability concerns during repair and repurposing. The need for proper UN38.3 certification was emphasized during the meeting, along with the recognition that Extended Producer Responsibility (EPR) laws alone cannot address batteries flowing through secondary markets and repair channels.

Definitions for Electric Vehicle

The working group discussed aligning Hawai‘i’s electric vehicle definition with federal standards, which classify hybrids as internal combustion engine (ICE) vehicles since their batteries support rather than drive the vehicle. However, experts noted that once batteries are removed from any vehicle—whether fully electric or hybrid—they all become UN3480 lithium-ion batteries subject to the same dangerous goods regulations and face identical stranding

challenges in Hawai'i. Discussion considered the vehicle definition to be less important than the battery definition for end-of-life management purposes. The group agreed to keep definitions broad to capture all battery types while allowing for different management approaches based on specific battery characteristics, aligning with Act 209's focus on battery management rather than vehicle classification.

John Redman recommended aligning with the federal definition because it's based on the United Nations model regulations incorporated into international air and ocean regulations. Confirmed that e-bikes and e-scooters fall under the EV definitions, and weight or watt thresholds can be used to separate. Add Hybrid vehicle discussion, vehicle w/battery and battery outside vehicle.

Eric Frederickson noted that electric vehicles with battery intact have UN classification 3171 and are broadly exempt from dangerous goods regulations. However, once batteries are removed from any vehicle, they become UN3480 lithium-ion batteries subject to full regulations. He later explained that, in the context of EPR laws, vehicle batteries can be easier traced to original equipment manufacturers (OEMs). Whereas with tracing OEMs is harder for scooter batteries – making prepaid models the preference regarding management practices. Add discussion on Hawai'i specific and stranded battery discussion. Once battery removed ...

Lene Ichinotsubo stated that Act 209's intent is really about EV batteries, not just vehicles, and suggested keeping definitions as broad as possible while addressing special management needs for different battery types, based on chemistries. Broader definition of EV is better

Daniel Zotos noted that EV end-of-life management schemes have differed significantly from medium format batteries due to existing professional ecosystems. Li-ion and hybrid battery are same for material recovery for Redwood.

Nikolas Nikolaidis agreed with separating battery management by size for management and collection and financial aspect for each type.

Include Eric's discussion on scooter batteries

Definitions for Battery Management

There was general group consensus regarding aligning definitions with CALEPA and U.S. EPA.

Presented definitions adapted from CalEPA and U.S. EPA below:

- **Reuse:** Reusing a lithium-ion battery in an EV for the same intended purpose
- **Repurposing:** Using a lithium-ion battery for another purpose, such as stationary storage
- **Recycling:** Collecting and processing EV battery materials and turning them into new products

John Redman volunteered to present on UN38.3 certification requirements for lithium-ion batteries at a future meeting to provide information on proper repair, reuse, and repurposing of EV batteries.

Battery Chemistries

The working group reviewed battery chemistry trends showing significant growth across all types, particularly lithium iron phosphate (LFP), nickel manganese cobalt (NMC), and nickel cobalt aluminum oxide (NCA), with emerging chemistries like sodium-ion already appearing in the market. Experts unanimously cautioned against creating chemistry-specific regulations, emphasizing that UN transportation regulations are intentionally chemistry-agnostic and that battery adoption will continue to evolve rapidly based on market preferences. Major recyclers—including Redwood Materials, Cirba Solutions, and Call2Recycle’s network—confirmed their ability to adapt to handle whatever chemistries consumers and businesses adopt, noting the recycling industry has 150 years of history innovating to extract value from new materials.

Daniel Zotos explained that Redwood Materials, as the largest lithium-ion battery recycler in North America by market share, handles a wide range of lithium-ion chemistries. He acknowledged there hasn’t been a robust recycling ecosystem for lithium-ion batteries in the United States historically. Redwood can handle and process different li-ion battery chemistries.

Eric Frederickson explained Call2Recycle engages with multiple processors as a battery network. He emphasized the recycling industry will innovate to recycle anything with recoverable value, as recyclers have done for 150 years.

Danielle Spalding highlighted Cirba Solutions’ nearly 35 years of battery recycling experience, noting they adapt to whatever chemistries consumers and businesses adopt. She emphasized they’re unique in handling multiple battery chemistries including alkaline and are now accepting LFP (spell out LFP) batteries.

Michael Cooney reinforced the importance of not being prescriptive, noting batteries must be sorted during collection anyway. He emphasized the need for nimbleness since recyclers may only want certain chemistries and some recycling companies go out of business.

Voltek Hybrid Presentation: Battery Repair, Reuse, and Repurposing

Jordan Brandt delivered an extensive presentation emphasizing repair, reuse, and repurposing as critical first steps before recycling. Topics discussed include: service gap and barriers, workforce crisis, environmental and economic benefits, scrapyards challenges, rebuilding and repurposing operations, and liability and safety concerns.

Service Gap and Barriers

- One of only two independent hybrid repair shops in Hawai‘i with more work than can be handled

- Manufacturing/hardware barriers: difficult battery disassembly, undersized batteries that fail sooner, consumer products deprioritize serviceability when compared to commercial equipment (trucks, planes) built for durability and repairability
- Cost barriers: Post-warranty dealership costs prohibitively expensive for most consumers

Workforce Crisis

- Critical shortage of qualified technicians even at 10% EV adoption rates
- Workforce development essential for any end-of-life management solution

Environmental and Economic Benefits

- Important to prioritize extending vehicle life so environmental benefits can be realized, meaning vehicle maintenance is of critical importance
- Repair work makes EV technology accessible to lower-income residents, while keeping financial flows in Hawai'i's economy

Scrapyard Challenges

- Jordan reported scrapyards on Oahu have been overwhelmed with battery vehicles.
- He described seeing “perfectly good EVs getting scrapped” because battery replacement costs exceed vehicle resale values, even though other components (especially electric motors) have significant remaining life.

Rebuilding and Repurposing Operations

- Jordan explained his company's work in repair and reuse,
- He acknowledged repurposing requires significant labor, skill, and creativity working with different chemistries and configurations.
- He acknowledged liability and safety concerns, noting responsibility transfers to his company once batteries are modified, and emphasized the need for regulations and certification standards.

Working Group Members Discussion and Responses

Eric Frederickson strongly supported Jordan's work as representing the most environmentally advantageous approaches in the hierarchy of responsible end-of-life management, with repair and reuse far superior to recycling. However, he raised critical caveats: liability should transfer to repair and refurbishment as well; economic impact of more repair and reuse because entities taking on end-of-life liability must incorporate costs into business models.

John Redmond acknowledged good intentions but emphasized that the purpose of regulatory requirements is to protect people, quoting UN38.3 certification for transportation, energy storage system standards, and ECE/FMVSS codes for vehicles.

Jordan Brandt agreed with concerns about liability transfer and safety, acknowledging that once he modifies batteries, responsibility becomes his. He clarified most of his work involves stable nickel metal hydride batteries in original configurations. For lithium batteries, he focuses more

on keeping vehicles operational (often with new batteries) rather than extensive battery modification. He referenced airbag procedures as a potential model, noting there are established protocols for deactivating hazardous components (deployed airbags are no longer hazardous), which could parallel battery discharge and deactivation processes.

Michael Cooney provided extensive context on systemic challenges, how EPR/a stewardship program could alleviate management problems, but is not the only solution. Policy would need to consider ways to cover batteries after liability transfers from OEMs to repair shops for example.

Daniel Zotos acknowledged valuable discussion but suggested the working group differentiate between repair/reuse conversations and commercial repurposing. He revealed Redwood Materials, known as a battery recycler, is now one of the largest repurposers of EV batteries, owning and operating the largest microgrid in North America using all repurposed EV batteries at their Northern Nevada site. When batteries are repurposed, responsibility should shift to the repurposer. Commercial repurposing requires NFPA codes and UL standards compliance, providing safety frameworks. He suggested limiting repair/reuse discussions to responsibility and liability questions while giving more attention to commercial repurposing opportunities.

Future Meeting Schedule

Monique Zanfes outlined upcoming meetings:

- **November 21, 2025:** Next meeting (before Thanksgiving)
- **December 18, 2025:** Following meeting (before Christmas) (updated)
- **February 27, 2026:** May need flexibility due to legislative session
- **May 29, 2026:** Focus on recycling options

Public Comment

Adjournment