Electric Vehicle Battery Recycling and Reuse Working Group
Meeting Minutes
Date: February 27, 2025
Time: 9:00 AM
Location: Department of Health and Zoom

Members Present

Hawai‘i State Energy Office:

- Mark Glick, Chief Energy Officer
- Monique Zanfes, Managing Director of Energy Efficiency and Renewable Energy
- Munashe Silverberg, Renewable Energy Analyst
- Kevin Moy, Energy Resilience Project Specialist

Hawai‘i Department of Health:

- Lene Ichinotsubo, Acting Branch Chief, Solid and Hazardous Waste Branch
- Lenora Mau, Engineer, Solid and Hazardous Waste Branch
- Kelly Ann Lee, Project Specialist, Solid and Hazardous Waste Branch
- Rebekah Morales, Environmental Health Specialist
- Michele Freitas, Hazardous Waste Program Supervisor
- Kolea Praywell, Planner
- Tracie Saito, Planner

Working Group Representatives:

- Aki Marceau, Hawaiian Electric
- Archibald Morgan, Matson
- Ashley Seaward, Redwood Materials
- Curt Augustine, Alliance for Automotive Innovation
- Dan Bowerson, Alliance for Automotive Innovation
- Daniel Zotos, Redwood Materials
- Danielle Spalding, Cirba Solutions
- Darla Arians, Product Stewardship Institute
- Ed Washburn, Pasha Hawai‘i
- Greg Jenkins, High Hazard Management LLC
- John Redman, General Motors
- Jordan Brandt, Voltek Hybrid and EV Repair
- Kevin Krick, Matson
- Laura Kaakua, Hawai‘i Department of Transportation
- Melissa Pavlicek, Hawai‘i Automobile Dealers Association
- Michael Cooney, Hawai‘i Natural Energy Institute, University of Hawai‘i

- Mike Gaffney, Pasha Hawai‘i
- Nick Garofalo, Radius Recycling
- Ricardo Yost, Honolulu Fire Department
- Robert Potter, Synapse LLC
- Sumreen Rattan, Moment Energy
- Thor Toma, ServCo Pacific
- Todd Coy, KBI Recycling
- Will Giese, Solaray Corp

Guest Presenters:

- Chris Myers, Federal On-Scene Coordinator, USEPA Region 9; Co-Chair, USEPA Emergency Response Lithium-Ion Battery Task Force
- Liz Galvez, Hawai‘i Department of Health, Hazard Evaluation and Emergency Response (HEER) Office
- Chris Wagner, County of Maui, Maui Emergency Management Agency (MEMA)

Meeting Overview

The February 27, 2025 meeting of the Electric Vehicle Battery Recycling and Reuse Working Group featured three major agenda items: a disclosure of a proposed Permitted Interaction Group (PIG) between the Hawai‘i State Energy Office (HSEO) and the Department of Health (DOH); two major presentations covering emergency response battery management from the Maui and Los Angeles wildfires and the Ukumehame Wildfire Risk Reduction Project; and an informational bulletin on EV towing and temporary storage practices. The meeting also included an update from Michael Cooney on the University of Hawai‘i Natural Energy Institute’s engagement with the California Product Stewardship Council (CPSC) to evaluate stewardship program models. Members discussed the practical and regulatory challenges of battery processing, the “Maui Method” for treating damaged lithium-ion batteries, and the urgent need for a comprehensive statewide solution for end-of-life EV battery management.

Permitted Interaction Group (PIG) Disclosure

Monique Zanfes presented a proposal from HSEO and DOH to establish a Permitted Interaction Group (PIG) as authorized under the Sunshine Law. The disclosure was made to the full working group, including the scope and proposed membership.

<u>Scope:</u>

The PIG will focus on battery flow through the waste hierarchy, management practices, and extended producer responsibility (EPR). Its purpose is to gather more detailed information on material flow and financial liability as the battery moves through the reverse supply chain—areas where the full working group discussions have not yet yielded sufficient detail, particularly around sensitive commercial information.

<u>Proposed PIG Members:</u>

- Alliance for Automotive Innovation
- General Motors
- Rechargeable Battery Association
- TNN Computer Recycling Services
- Radius Recycling
- Cirba Solutions
- Redwood Materials
- KBI Recycling
- High Hazard Management
- Moment Energy (battery repurposing)
- Voltek Hybrid and EV Repair (battery repair)
- Pasha Hawai‘i (transportation — added during meeting)

Process:

The PIG format allows for confidential interviews, site inspections, project demonstrations, and receipt of confidential information. HSEO and DOH are currently defining the scope; findings and recommendations will be presented to the full working group at the May 29, 2025 meeting, with any proposed policy decisions to follow at the August meeting.

Working Group Discussion:

Ed Washburn (via chat) raised a question about whether transportation was represented in the proposed PIG membership. The group agreed to add Ed Washburn of Pasha Hawai‘i to the PIG as a transportation sector representative.

Michael Cooney (via chat) asked whether the California Product Stewardship Council (CPSC) would be included in the PIG, referencing an email sent to HSEO earlier that morning. Monique Zanfes noted this would be discussed at the end of the meeting if time permitted. HSEO later clarified that as a non-member of the working group, CPSC could be consulted but not formally included as a PIG member.

Greg Jenkins (via chat) confirmed support, stating he concurred with the PIG proposal.

Todd Coy (via chat) confirmed KBI is supportive of the PIG.

Presentation 1: EPA Emergency Response, Lithium-Ion Battery Operations *Presented by Chris Myers, Federal On-Scene Coordinator, USEPA Region 9*

Chris Myers presented an overview of USEPA’s emergency response battery operations during the 2023 Maui wildfires and the 2025 Los Angeles wildfires, both of which were federally declared Stafford Act emergencies. USEPA and the U.S. Coast Guard served as lead agencies under Emergency Support Function 10 (ESF 10 – Oil and Hazardous Materials). The mission assignment for both events included household hazardous waste removal, with explicit inclusion of residential battery energy storage systems (ESS) and electric vehicles.

The Challenge of Island-Based Battery Management:

Myers described the central challenge in Maui: damaged, defective, or recalled (DDR) batteries classified as hazardous waste must be shipped to a disposal or recycling facility on the mainland,

but private maritime shipping companies are generally unwilling to accept DDR batteries regardless of packaging. This forced USEPA to develop an on-site treatment process to convert batteries into a non-hazardous, shippable material.

The Maui Method, De-Energizing and Crushing:

Myers explained the multi-step "Maui Method" developed for field battery treatment:

- Battery Harvest and Staging: Specialized crews with electricians and hazmat personnel harvested batteries from disaster sites and transported them to a staging area.
- De-Energizing via Brine Immersion: Batteries were submerged in a sodium chloride and sodium bicarbonate solution for approximately 72 hours until voltage dropped below 1 volt. This process was selected for its scalability and the ready availability of common table salt and baking soda.
- Crushing: Once de-energized, batteries were physically crushed to permanently damage the casing and circuit, removing the item from the regulatory definition of a "battery" under both 40 CFR (EPA) and 49 CFR (DOT). This also eliminated the potential for thermal runaway. In Maui, manual crushing was used. During the LA fires, metal shredders were sourced, reducing processing time from 30 to 45 minutes per 55-gallon drum to 3 to 8 minutes.
- Waste Determination: Post-processing material was tested and found not to meet the characteristics of a listed or characteristic hazardous waste under federal RCRA criteria (D001/D003 ignitable and reactive characteristics were eliminated). The material was described as "non-hazardous post-battery treated material" on a bill of lading, not a hazardous waste manifest.
- Shipping with Engineering Controls: Processed material was shipped in vented cubic yard boxes and open-top containers to allow hydrogen off-gassing. Tarp-top and ventilated containers were used, agreed upon with maritime carriers after transparent documentation of the process.

Operational Scale:

Maui processed approximately 30 tons over 90 days across roughly 400 targets (EVs and ESS). The 2025 Southern California wildfires involved approximately 500 tons across 18,000 properties and more than 5,000 targets, completed in 28 days using nearly 2,000 personnel. For the LA fires, cost comparison showed Subtitle C disposal was approximately 350% cheaper than recycling at that volume.

Regulatory Context:

Myers emphasized that USEPA's authority to treat hazardous waste on-site without permits derives from CERCLA authority, which provides a blanket authorization during declared federal emergencies. He stressed that this streamlined process is not available to standard commercial or state operations, which would require formal permitting under RCRA to conduct equivalent on-site treatment.

Working Group Discussion:

Albert Hahn (via chat) asked two questions: (1) how long battery fragments continue to off-gas hydrogen after processing, and (2) whether battery fragments can truly be considered non-hazardous given that hydrogen is a highly reactive element. Myers responded that the processed

material was evaluated against the UN N-5 test for reactivity, which requires generation of at least one liter per kilogram per hour of flammable gas to be considered characteristic of reactivity. The processed material fell below that threshold. Myers compared the situation to polymeric beads, which also off-gas after manufacture and are transported in ventilated containers using similar engineering controls.

Greg Jenkins (via chat) added important technical clarification on the off-gassing question: there is no specific quantitative timeframe for hydrogen generation as long as material remains in contact with moisture, residual electrolyte, or conditions that support hydrolysis or electrolysis. He emphasized that the approach is to quantitatively characterize the presence of constituents and then apply qualitative engineering controls accordingly, referencing the UN N-5 test criteria as the applicable standard. He also noted that as the material is not regulated under 49 CFR, shipping descriptions such as "battery debris" or "former battery debris" have been used. Depending on the state, additional information may be added to shipping papers. He clarified that the material moves on a non-hazardous waste manifest for tracking purposes, as well as regular shipping papers such as a multimodal dangerous goods form.

Todd Coy (via chat) asked what material description and shipping document were used in each of the wildfire incidents. Myers confirmed that processed material was shipped as "non-hazardous post-battery treated material" on a bill of lading. In California, the material carried two California hazardous waste codes (181 and 612 for household waste) and was profiled as scrap metal with the disposal facility.

Michael Cooney provided important context on throughput: the Maui method achieved approximately 12 kilograms per hour on a 24-hour basis—equivalent to about three e-bike batteries per hour—which is not sufficient for a commercial facility handling Hawai‘i's projected battery volumes. He recommended wet shredding, which is the industry standard for mid-to-large commercial facilities (such as Ecobat in Arizona, which processes approximately 3,000 tons per year), as it operates at significantly higher throughput, reduces the need for pre-discharge, and better manages off-gassing.

Greg Jenkins agreed with Dr. Cooney that wet shredding warrants serious consideration, and added that the Maui Method should be understood as a risk mitigation methodology—not a step-by-step recipe—focused on reducing hazards and exposure in field conditions. He noted that the operation's true efficiency must account for reconnaissance, recovery, and staging time, not just crush time. Myers endorsed Greg Jenkins' expertise, noting Jenkins has been a USEPA contractor throughout both the Maui and LA wildfire battery operations.

Presentation 2: Ukumehame Wildfire Risk Reduction Project, Maui Battery Response
Presented by Liz Galvez, DOH HEER Office, and Chris Wagner, County of Maui / Maui Emergency Management Agency (MEMA)

Liz Galvez and Chris Wagner presented on the Ukumehame Wildfire Risk Reduction Project, a state- and county-led battery remediation effort conducted at a 42-acre site in Maui. The project originated as a wildfire risk reduction effort in an area with dense invasive vegetation along the Honoapiilani Highway—the sole transportation artery connecting central and West Maui. During site assessment, the area was found to contain an illegal chop shop with approximately 150

vehicles, including approximately 31 electric vehicles and large quantities of automotive batteries.

Project Structure and Permitting:

A key distinction from the federal wildfire responses was that the Ukumehame project was conducted under a formal temporary emergency hazardous waste permit issued by the Hawai‘i Department of Health—the first of its kind in the state. The permit was pursued intentionally by DOH and Maui County to build state capacity and set a regulatory precedent for future operations. USEPA participated in a technical advisory role. Galvez noted that DOH and state on-scene coordinators have similar authority to act without a permit during emergencies, but chose to go through the permitting process deliberately.

Operations:

The project used the Maui Method—brine immersion followed by crushing—and included approximately 30,000 pounds (roughly 13.6 tons) of batteries, split nearly equally between lithium-ion and nickel-metal hydride. Nickel-metal hydride batteries were shipped off-island via Matson in a 40-foot container and have since reached their final destination with Clean Harbors. Lithium-ion battery material is currently stored at the Central Maui Landfill while final disposal arrangements are finalized.

Site Setup and Safety:

Staging was conducted from September through December 2024. The site included brine tanks, a dedicated crush pad, a breathable-top 20-foot container for processed material, air monitoring (with equipment from both EPA and DOH), and 24-hour security. A windsock was used to maintain operator awareness of wind direction during processing. Workers were required to be HAZWOPER certified.

Ongoing Challenges:

- Disposal Availability: Clean Harbors and Clean Earth, which have previously accepted processed battery material, are currently declining to accept the remaining Ukumehame lithium-ion material, citing concerns about hydrogen off-gassing. DOH is continuing discussions with potential recipients.
- Shipping Barriers: Maritime carriers remain reluctant to accept battery material, even when processed. This continues to be a primary logistical barrier for the state.
- Accumulation on Outer Islands: Galvez reported that on Kaua‘i, abandoned EVs are being left on roadsides because owners and counties have no clear pathway for disposal. Maui County has three island jurisdictions (Maui, Moloka‘i, and Lāna‘i), each facing growing accumulation.
- Funding: The project required significant expenditure and costs are ongoing, with no clear long-term funding mechanism in place.
- Responsible Party: The individual responsible for the illegal chop shop has faced no legal repercussions and continues similar activities on Maui.
- Public Awareness: During a community volunteer cleanup, a battery component was discovered and moved 30 to 50 yards by an untrained individual who was unaware of the hazard it presented.

The Ukumehame video produced by Maui Emergency Management Agency was shared during the meeting and has since attracted international interest, including inquiries from other island nations facing similar challenges with high EV adoption and lithium-ion battery accumulation.

Working Group Discussion:

As the DOH/Maui County presentation was underway, a question directed to the prior presenter (Chris Myers) came in via chat:

John Redman (via chat) asked how DDR lithium batteries are transported off the islands for recycling—specifically whether vessel shipment is required. Myers responded via chat that on the mainland, DDR batteries can move by road using performance packaging and DOT special permits, but that maritime carriers are not accepting DDR material for vessel transport. This shipping barrier is precisely what drove USEPA to develop the on-site treatment process in the first place.

Following the conclusion of the Ukumehame presentation, a working group member asked whether cost estimates for disposal could be shared. Liz Galvez noted that Clean Harbors and Clean Earth had declined to provide quotes for this particular material. She shared that for recycling, an estimate of approximately $540 per pound had been referenced—noting this was a rough figure and excluded shipping. No final disposal contract has been executed; DOH continues to seek a willing recipient for the processed lithium-ion material currently stored at the Central Maui Landfill.

Presentation 3: DOH Informational Bulletin on EV Towing and Temporary Storage
Presented by Lenora Mau, Engineer, Solid and Hazardous Waste Branch, Hawai'i Department of Health

Lenora Mau presented on work conducted by an Oahu-focused subgroup of DOH to develop guidance on towing, temporary storage, and awareness for damaged or end-of-life electric vehicles. The informational bulletin was developed in collaboration with the City and County of Honolulu, including the fire department, police department, and Hawai'i DOT.

Background:

The subgroup was formed to address practical questions arising when EVs are involved in accidents, fires, or abandonment—situations for which no state-specific guidance previously existed. After reviewing national literature including NHTSA resources, the group focused on towing and temporary storage rather than disposal, as disposal was determined to be the domain of specialized salvagers.

Key Findings and Guidance Points:

- Towing Assessment: Tow truck drivers need guidance on how to assess battery condition before towing, how to recognize signs of instability (such as bulging or noises), and what to do if a vehicle becomes active during transport.
- Towing Method: Each vehicle make and model has unique design considerations. The guidance emphasizes the use of flatbed towing to avoid back-wheel rotation, which can regenerate charge in the battery. The Automakers' Emergency Response Guide was identified as the most helpful resource for tow companies.

- Temporary Storage: Vehicles awaiting salvage determination should maintain a minimum 50-foot clearance from structures and other vehicles to mitigate fire spread risk in the event of thermal runaway. Many tow lots on O‘ahu and neighbor islands cannot accommodate this requirement due to space constraints.
- Salvager Availability: No salvagers in the state are currently accepting damaged EVs, as they have no means to remove the vehicle from the island. This creates a dead end in the disposition process.

Status:

The informational bulletin has been shared with the other counties for comment. DOH invited working group members to submit feedback to help refine and improve the guidance. The subgroup plans to continue working with each county to adapt the guidance to their specific constraints.

Working Group Discussion:

Monique Zanfes opened the floor for questions on both the towing informational sheet and the prior DOH presentations. No questions or comments were raised by working group members.

Update: HNEI Engagement of California Product Stewardship Council (CPSC)

Michael Cooney provided an update on the University of Hawai‘i Natural Energy Institute’s (HNEI) award of a research contract to the California Product Stewardship Council (CPSC) to evaluate extended producer responsibility (EPR) and stewardship program models for Hawai‘i’s battery management needs.

Background:

The engagement grew from HNEI’s fourth report, which identified two core components needed for a statewide solution: (1) a centralized processing facility capable of wet shredding batteries at commercial scale, and (2) a legally-enacted stewardship structure—a non-governmental, government-audited producer responsibility organization—to fund and operate a comprehensive battery collection system across all formats and scales. Dr. Cooney noted that without such a structure, accumulation will continue, as there is no viable mechanism for individuals or businesses to responsibly dispose of batteries.

Scope of CPSC Work:

CPSC will evaluate three primary models implemented in other U.S. states and Canada: a pure EPR model, a centralized government-run model, and a hybrid model. The analysis will assess each model’s pros, cons, and applicability to the Hawai‘i context. Dr. Cooney emphasized that CPSC’s findings are intended to feed directly into this working group’s deliberations, not to operate as an independent effort.

HSEO/DOH Disclosure:

Monique Zanfes disclosed that HSEO and DOH intend to meet with CPSC consultants to provide context and input for their analysis. The working group was asked whether there were any objections; none were raised.

Working Group Discussion:

Greg Jenkins offered comments on stewardship programs generally, drawing on his experience with non-profit producer responsibility organizations in other jurisdictions. He expressed concern about conflicts of interest and safety failures that have occurred when stewardship programs are managed by private entities without sufficient government oversight. He recommended that the working group and the legislature consider a government public trust oversight model as a primary framework, prioritizing effectiveness for health, safety, and environmental protection before efficiency. He also noted the importance of ensuring that this effort does not conflict with legislative initiatives being considered during the current session.

Michael Cooney agreed with Jenkins' points, noting that none of the three models under review is without flaws, but that a well-designed stewardship structure is preferable to a fragmented, self-organized approach—particularly given Hawai‘i's dependence on ocean shipping. He invited Jenkins and other working group members to engage directly with CPSC consultants.

Aki Marceau noted familiarity with CPSC from prior work, describing the organization as knowledgeable, approachable, and experienced in stewardship program design across multiple states.

Monique Zanfes noted that the PIG proposed earlier in the meeting has overlapping scope with the CPSC engagement, and that coordination and alignment between these parallel efforts will be important as the working group moves toward its final recommendations.

Public Comment

Public comment period was held. No public comments were recorded.

Closing Remarks

The meeting adjourned.