

California Lithium-ion Car Battery Recycling Advisory Group Meeting #1 Minutes

Call to Order, Roll Call, and Establishment of Quorum

CG: Thank you to the everyone on the Advisory Board for joining us and I will take roll.

Roll is Taken

Steve Henderson from Ford, Mark Caffarey from Umicore USA, and Alisa Reinhardt from the California New Car Dealers Association are absent

CG: My name is Caroline Godkin, Deputy Secretary for Environmental Policy at CalEPA

Housekeeping items and emergency procedures are discussed

CG: Thank UCD Staff and Mohammed from DTSC for hard work putting this advisory committee together

Participants

Nick Lapis – Californians Against Waste, working on recycling and waste reduction policy. Cost is incorporated into initial purchase price of vehicles, so it's not left to taxpayers at the end of the day.

Lou Ramondetta – Reuse company (Surplus Service), frustrated that there're no viable options and that we are "behind the ball." Interested in aggressive alternatives for recycling and reuse of batteries.

Jon Weisman – Tesla, in charge of global battery recycling program. Goal is to reuse and get as much recycled content into our batteries. Collaborate on end of life policies.

Dan Bowerson – Director for Vehicle Electrification & Fuels Alliance of Automobile Manufacturers, representing car and light duty truck manufacturers. Looking to do our part to make electric vehicles truly sustainable. Need to also make sure that we aren't developing a policy that could negatively impact a still very young EV market.

Alison Linder – Southern California Association of Governments, transportation planning agency. Facilitating communities in installing EV charging. Promote proliferation of EV.

Ana-Maria Stoian-Chu – Manager of E-waste Recycling program within CalRecycle. Promote and advance reuse and recycling of EV batteries while properly managing end of life. [Note: sitting in for Teresa Bui, the official CalRecycle representative to the Advisory Group. Teresa is the Special Advisor to the Director of CalRecycle]

Mohammed Omer – Hazardous Substances Engineer with DTSC. Trying to get ahead of a future waste stream.

Caroline Godkin – Deputy Secretary for Environmental Policy and Emergency Response, CalEPA

Perry Gottesfeld – Occupational Knowledge International, focused on occupational and environmental health. Explore opportunities to look at relatively new industry. Recognizes the challenges, watching US and abroad.

Jennifer Krill – Executive Director of Earthworks, reduce adverse impacts of extracted industries. Plug in America, speeds uptake of electric vehicles. Interested in end of life issues and make sure manufacturing maximizes recyclability and minimize toxicity.

Todd Coy - Executive VP of KBI, facility in SoCal specializing in management of batteries. Cochair of battery recycling committee. BOD of ISRI, interested in Battery End of Life management

Terry Adams – SA Recycling and Chairman of Retrieval Technologies, lithium-ion recycling facility

George Kerchner – Executive Director PRBA –The Rechargeable Battery Association. Membership interested in direction CA goes on this.

Geoff Niswander – Household hazardous waste industry. Wants to see material reused and recycled as much as possible.

Bernie Kotler – Executive Director, Energy Solutions, on board of CalCharge. Advance the recycling and most effective use of batteries, reduce greenhouse gases and advance state energy policies.

CG: This is the first meeting of this Advisory Group. This group is to develop policy recommendations to the legislature to ensure that as much material as possible is recycled. Recommendations due in 2022 to legislature. Today we will discuss the running of this group, additional background of AB 2832 and a presentation of the Bagley-Keene Open Meeting Act.

Bagley-Keene Open Meeting Act, Salwa Bojack, Attorney, CalEPA

- Open to public with advance notice and agenda of items.
- Meeting is any congregation of majority of members to discuss topics.
- A majority is more than half (quorum)
- A quorum of this body will be 10 members
- Be aware of non-conventional meetings (social media)
- 10-day notice is required, and the agenda and location of the meeting must be posted at the 10-day notice.
- Only topics on the Agenda can be discussed at the meeting.
- Members can meet via teleconference however, the teleconference location must be notices and accessible to the public.

- Members may also attend “remotely” by law passed this year without disclosing location and public location with many other requirements and the 10-day notice must be posted for a public location for a quorum to meet.
- Serial meetings: majority of members communicating about the same matter. A series of communication of any kind to discuss or take actions such as series of telephone calls from one member to other 9 members which would create a quorum or such as forwarding emails which includes the chain of communication. Hub and spoke communication.
- Recognized meeting exceptions: where the group may gather but do not discuss topics of the body such as public meeting, conference or ceremonial meeting.
- Links to resources are provided for additional information
- Legal staff at CalEPA are available for questions
- Contact info is at end of Memo provided

Roles, Expectations and Procedures, Mohammed Omer

MO is facilitator, his role is to enable group to work effectively. Contribute structure and process so that we can function at a high level and make decisions. Encourage full participation in discussion and promote mutual understanding. Achieving consensus when disagreements occur. Distracting actions and behavior will be limited. Follow agreed upon agenda and keep a clear record. Everything will be recorded, via webcast or meeting minutes.

Chair will start meetings on time, make sure our work follows existing agenda, close our meetings on time, summarize and note achievements at meeting, provides authority over facilitator. Ensure public interface is connected.

Expectations: arrive on time, be ready to discuss agenda, phones are silent, minimize distractions, keep our commitments. These also apply to the public. Procedural workflow in between meetings so that everyone (including public) is aware of progress and updates.

Anyone watching remotely, send your questions to auditorium@calepa.ca.gov.

AB2832, EV Battery Recycling, Advisory Group Mission

400,000-500,000 EVs in California, 15% growth this year compared to last year. CA is leading the way in EV adoption and the responsible stewardship of these LIB is critical. Secretary of CalEPA convened this group, meet quarterly between now and April 1, 2022. Very diverse board. The stated goal of AB 2832 is to ensure that as close to 100 percent as possible of end-of-life electric vehicle batteries (lithium-ion) in the state are reused or recycled in a safe and cost-effective manner. We also will be consulting with universities that conduct research about on this issue. We will consider entire lifecycle

of batteries, looking at best management practices and effect of those on the environment.

Discussion regarding the bill:

DB: Any expectation of updates to legislature before April 2022?

CG: Great idea, we will consult with Sen. Dahle's office.

PG: Definition of motor vehicle – clarify is that limited to standard cars or does that include 2-wheelers, scooters etc that are also motorized?

CG: Same definition as section 415 of vehicle code.

NL: Motor vehicle is defined as self-propelled, only exception is wheelchair and other mobility devices.

Role of UC Davis:

Interagency agreement with CalEPA, CalRecycle and DTSC. Provide technical support in writing report. Take future meeting minutes, prepare background material and research on future agenda items.

Advisory Group Report

Provide policy recommendations that will enable as close to 100 percent as possible of end-of-life lithium-ion electric vehicle batteries in the state are reused or recycled in a safe and cost-effective manner. Consider global resources, environmental impact of disposal, beneficial framework of how public and private sectors may collaborate.

CG: If you were to list out the ideal contents of this report, what would it be?

LR: Options for reuse of batteries, recycling, hazardous material and contamination management. Concerned 2.5 years is not enough time, it's a daunting subject. What happens if we can't come up with a recommendation?

CG: It's a goal. Provide a picture to legislature for how to move forward. We should identify where we can make policy recommendations and identify where to continue research and looking forward.

BK: My concerns are with recycling and reuse (2nd and 3rd use). These issues are interrelated with production of greenhouse gases (GHG), the release of toxic materials, and ancillary issues. My interest to maximize the reuse and ability to extend the life of this battery. GHG production when manufactured, uses rare earth materials, toxic and produced in unfortunate circumstances. Minimize production of batteries.

GN: Concern about some material will cross into household waste streams. Inadvertently hitting waste streams or being brought in. LIB in automobiles are basically

larger capacity and strung together in parallel. Is there protection to rate payers who will shoulder the burden when they are disassembled into smaller sizes/units?

GK: We need to narrow the scope of this, thought we were focusing on 4-wheel automobile, not also scooters etc. When we develop our report, need to define who the producers of these batteries are for EPR, secondary and tertiary use.

TA: Safety issues with removing batteries as voltage changes for the auto dismantler. Cost of recycling – intrinsic value of the battery and its components is driving down; someone needs to be responsible for those costs. Recycling cost may exceed value of battery. Easy to trace ownership when battery is in car, but what about in 2nd life scenarios? No responsible party from original owners.

TC: 2.5 years is not a long time to take on this task. We need to have a scope focus, not limitation. “Mobility” is very broad, don’t want to suffer from project creep. Make the “right” recommendation moving forward. How it may impact whether it’s recycling in our state that may be precluded because of other regulations that are currently in place (hazardous waste treatment etc). Need to recognize other influencing factors, such as safety testing.

JK: Producer responsibility – now at product design level. Encourage design so recyclability can be maximized. Material recovery maximization. Minimize toxicity to ensure protection to workers and communities.

PG: Need for some definitions. Recycling, refurbishment, reuse. We need to be clear on how we want to use these terms. Look at both small and large vehicles, use in smaller vehicles may surpass larger vehicles due to shorter lifespan, batteries more abused than when in larger vehicles, and cheaper batteries used for lesser products. Consider various chemistries for LIB, they’re not all alike, different implications at end of life. Producer responsibilities, how that transpires when looking at other models that have been used for other legislation in CA and elsewhere. Bring experts who have done a lot of work on this issue (Argonne National Lab). Assess where we’re at with recycling today.

AS: Policy options like financial incentives, take back schemes, extended producer responsibility to ensure robust collection and processing in CA so consumer has convenient places to discard their old batteries. Critical to have a holistic approach, from product design to end of life.

AL: Design and manufacturing – ways to create batteries that have minimal impact, using early design stage to minimize use of extracted materials. In the design phase, maximize interchangeability of parts, and find opportunities for standardization to provide consumers more options. Investigate policy levers that encourage reuse recycling and barriers to recycling. Expand definition to include all means of reuse. How can this provide opportunity for economic development within California? Lead the way nationally. Scalable beyond California.

DB: Reuse, lots of value in the battery before it gets recycled. Chain of custody after that, certification before battery can go on to its next use. Transportation issues – defined as hazardous etc., take that into account. Have opportunity to develop this so it can be adopted in other states.

JW: Do we want battery recycling in CA? If so, how to incentivize recycling development in California. Barrier – recycling not cost feasible at scale. Challenge – if we can develop efficient reclamation processes, optimize recovery of ALL materials (aluminum, copper steel), do it efficiently, it can be cost effective. Batteries must be able to be recycled profitably. What would be required to make battery recycling in CA possible?

CG: Recap – define recycling, economic incentives of recycling. Let's take a 30-minute break and return promptly at 2:40.

BREAK

EV Battery Recycling Discussion

CG: Welcome back. I'd like to pose some questions. What experts should we bring in, what topics should be discussed and where could we visit in the future? How would you like these discussions to be structured?

MO: This is an open forum for anyone to suggest research, researchers, site visit and future presentation to the committee.

Any particular researches or topics that you recommend? Where would be good to visit? (some restrictions, don't volunteer someone else's time)

LR: Want to learn more about battery (8-10-year capacity still 80% life after that). Any options that might be viable to extend life of battery or allow battery to be used below 80% capacity? Allow more charge to be used off battery. Someone to talk about chemistry and break down and hazardous material perspective, what will be reliable options when the battery will be broken down? Will come down to an economic equation.

PG: Good to involve Argonne National Laboratories, they've done a lot of research of recycling feasibility. Look at other models that exist for lifecycle regulation/producer responsibility for LIB in other jurisdictions (Europe). How do those operate?

DB: Department of Energy, agree with Argonne. Can set up contact.

Question from e-mail: Darryl Delacruz, electric vehicle enthusiast. "Seems you need an advisor to the board that has a history of industrial scale experience with the mechanics of refurbishing and dismantling all forms of batteries, and the costs. Perhaps "Interstate Battery (Johnson Controls). Don't forget to include flying transportation batteries as a side note with scooters."

JW: Academic and mechanical review of battery degradation. Lots of talk of standard use but based on research done at Tesla – non-linear degradation of battery. Once past 50% of life, degradation accelerates. Potentially very short life battery towards the end of life. Recommend visiting a battery recycling facility and automobile recycling facility.

TA: We need to get a handle on what is the world of recycling on LIB – what can be done, what's economically feasible? We can recycle 100% of the battery but there's a cost associated with it.

BK: In terms of expertise, in addition to Argonne, National Renewable Energy Lab in Colorado (has funding from DOE and partnership w/ UC San Diego).

LR: Schnitzer Steel recycles metal, I can contact to tour facility to see what's done from a shredding perspective.

AL: Understanding of how issues are handled with other products that use similar components.

CG: Foundational presentations for our early meetings. What does it look like right now? Basic chemistry aspects of this? What other jurisdictions do? Beyond driving distance of Sacramento. Mapping out calendar so we can play.

JW: Visit manufacturing facility in Nevada for Tesla, no promises but I can see what I can do. CalRecycle has visited.

UC Davis (Hanjiro Ambrose): Repurpose lab where EV batteries are being repurposed. Happy to facilitate contact with national labs as well.

Public Commentary

MO: Note - We cannot make decisions on items not on agenda. May decide to incorporate into future meetings.

Michael Watford, CA Energy Commission: Please consider disadvantaged and low-income communities in your policy recommendation. Huge impact on these communities. Sustainable manufacturing, great economic opportunity for all communities in California.

Future Agenda Items and Meetings

CG: Schedule review for the next year.

MO: Review of scheduled meetings. I've spoken to many of the members up here. We must meet quarterly per the bill. It is necessary to provide dates in advance to allow for planning and noticing under Bagley-Keene. Now I'll open the floor up to members to discuss optimal dates for meeting. There is no mandatory day of the week and I suggest prioritizing the next two meetings of Jan and April. Meetings are mostly on Mondays, not

set in stone, chosen for travelers in mind. Future topics – we can only discuss items that are on the agenda. Any ideas of what we want to discuss in Jan or April, this will need to be planned in advance, including if we bring in an expert or go visit somewhere else.

LR: Any option other than Monday? Tuesday or Thursday?

TA: Has an issue with Jan date. Return Feb 1, can we postpone until then?

JK: April date is around Earth Day, might be difficult.

MO: Any other issues with the first 2 meeting dates for 2020?

GK: April 20 will be out of country for the week. Week before would be nice.

LR: Also out of country that week.

CG: Tuesdays?

TA: Standing meetings 2nd Tuesday of every month.

Meeting Summary

MO: Introduction of group to each other and public. Overview of goals, how it came to fruition. Overview of Bagley-Keene act. Contents of eventual report. Identified key areas where we would like further clarification or more research to be done as part of our work moving forward. Welcomed questions and comments from the public.

CG: Thank you all for coming and this may be the first time we adjourn early. We have a lot to work on. Thank you for UCD. With that, thank you to everybody and the meeting is adjourned.