Lithium-Ion Car Battery Recycling Advisory Group

Meeting Minutes for 3.23.2021

1. **Call to Order, Roll Call, and Establishment of Quorum** – Caroline Godkin, Deputy Secretary for Environmental Policy and Emergency Response, CalEPA
    - Advisory Member roll call:
        - Teresa Bui (TB) – *no longer on Advisory Group*
        - Courtney Smith (CS) – *no longer on Advisory Group*
        - Terry Adams (TA)
        - Dan Bowerson (DB)
        - Mark Caffarey (MC)
        - Toshiya Fukui (TF)
        - Perry Gottesfeld (PG)
        - Steve Henderson (PH)
        - George Kerchner (GK)
        - Bernie Kotlier (BK)
        - Jennifer Krill (JK)
        - Alison Linder (AL)
        - Geoff Niswander (GN)
        - Lou Ramondetta—not present
        - Les Schwizer (LS) in place of Alisa Reinhardt
        - Nick Lapis (NL)
        - Ana-Maria Stoian-Chu (AS)
        - Hannon Rasool (HR)
        - Nathan Nye (NN) in place of Teija Mortvedt (TM)

    - Absent
        - Todd Coy (TC)
        - Mohammed Omer (MO)
2. **Meeting minutes approved** – Caroline Godkin
3. **CalRecycle Presentation**

Heather Beckner – Extended producer responsibility

- Extended producer responsibility (EPR) is a policy approach where producers

are responsible for creating, funding, and managing the end of life of their products.
    - Without this the product disposal is covered by the purchaser or the government.
- EPR programs exists in the US, Europe, and China.
    - They exist in California for pesticides, mercury containing thermostats, carpet, mattresses, and pharmaceuticals
- CalRecycle overseas the EPR
- EPR checklist components by CalRecycle
    - State oversight
    - Definition
    - Funding
    - Program goals
    - Stewardship organization
    - Plans, annual reports, budgets
- The definition identifies the producer, which is key, in addition to the product
    - The producer can be the manufacturer, importer, retailer/distributor
- Funding can be internalized or visible on the product receipt
    - The paint EPR is run by the stewardship organization PaintCare. The manufacturer passes this cost to retailers which then passes to consumers.
- The goals are generally based on recycling rate or convenience (access to program). These goals vary by program.
    - Some of the goals of the EPR are collection, recycling, efficiency rate.
- Conclusion:
    - It is industry run
    - It is not prescriptive—it allows the industry to determine the most cost-effective route
    - There is no one size fits all approach

Matt Sheehan – Electronic Waste program

- E-Waste recycling Act of 2003 was enacted in California to cover the recovery and recycling of covered e-waste
    - This was the first such program in the U.S.
    - This is funded by a fee at the point of purchasing the electronic product

- The flow of electronic waste
    - Goes from the retailer to the consumer which is then collected and goes to recyclers
- CalRecycle works closely with DTSC
- The Covered Electronic Waste Recycling Payment System covers the cost of recycling.
    - The consumer fees are updated yearly
        - They are currently between $4 and $6
- Every two years the collection rates are reviewed to assess if they are appropriate.
    - Rates are set through net cost reports. These show the net cost of collecting and recycling from the manufacturers.
- Authorized collectors:
    - There are currently 300 in California
    - They collect, sort, and transfer the CEW to authorized retailers
- Authorized recyclers
    - There are 20 in California
    - Residuals flow to global markets
- Conclusion
    - The CEW is a system where consumers pay a fee at point of sale
    - This fee funds the collection and recycling
    - This has resulted in a robust recycling industry
- Any Questions?

PG: In regard to the paint collection. What is the governance of the PaintCare system?

HB: They represent manufacturers. They are industry.

PG: For the graph looking at the batteries from 2013 to 2019. There was a decrease in lithium-ion battery collection by half. Why would this be?

MS: These weren't lithium-ion batteries. These were CRT. They don't collect lithium-ion batteries.

MS: Which DTSC industry is under that?

AS: That is for the rechargeable battery act? That is a different system, not an obligation. It is just a requirement to take back rechargeable batteries.

GN: Battery collection data can also be found through form 33 the household collection rate.

GK: Would you say the e-waste and the paint care programs are the most accessible programs operating now.

HB: The paint program is longest operating and convenient. The other two EPR systems have different models. The e-waste collection is not EPR.

GK: I was encouraged to see that the two most successful EPR programs use environmental handling fees, we generally advocate for EHFs for batteries because it is a good way to have funding given to the programs.

GN: Well done, thank you!

SH: I agree, this gives us hope. The only thing we have to consider is there is a big difference between electronics and cars because the cost is already high for EVs. I don't know what the cost of an EHF would be for an EV, it would definitely be higher. This is something we need to consider because it would drive up the cost of the EV.

NL: This presentation was a great summary. I almost wish we could add in the other programs we have and create a matrix of what goals and fees we have. We have a tire recycling program, the bottle bill which is a deposit system, the cell phone and rechargeable battery acts, which is completely punted onto manufacturers and retailers. We can also throw in the voluntary ones that are operated in California. I'm thinking the lead acid core fee which is also voluntary. I think it would be interesting to know have them all on one matrix to compare and contrast. And thermostats.

CG: Maybe it would be helpful to know from everyone what should be in that matrix.

AL: I guess my question is about how one can track the success of a program. None of these programs are 100% successful so I wonder if the speakers could clarify what parts are required and what is voluntary? If a fee is required that's mandatory and easy to track. What are the other steps in the process?

MS: For E-Waste, the fee is not voluntary, but collectors and recyclers do not need to participate in the program. If they want to receive the fee they need to participate.

HB: A success metric in our program is whether the funding is sufficient to do what's outlined, we look at paint as a consumable product. The recycling is important, but the convenience is also important, a success metric is whether it's convenient to manage properly. You look at how much is sold, how much is returned and then paint that isn't returned, how easily is it to get it back into the system. So, the recycling efficiency and the convenience.

MS: For our program we also measure by how much material is collected, which is 2.5 billion pounds. A lot of what we were collecting was legacy material that was created before our program started.

AS: To further add, we do not have a collection or recycling goal in our program. The law was designed to address CRT's that were sitting in people's garages or attics. We do not benchmark against current products that have been sold.

TF: I think that was excellent information and I agree that a matrix would be interesting to look at. It would be interesting to look at what percentage of the cost for the initial fee; what percentage of the cost is going to be borne on what the manufacturer will have to put back on

EPR. I also thought it was interesting to have the different fees by size, theoretically car batteries are all different sizes as well, they are bigger and smaller and different chemistries. Another comment regarding the CRT program I think it's an excellent idea but as was highlighted we're talking about legacy items. We had a broad scope idea of how many TVs were sold. A challenge with EV batteries is that we're forecasting forward and don't know exactly what battery chemistries and sizes we'll have. In that area my feeling is that anything that were to come up would need to be reviewed on a time periodic basis. My last comment is that there were 300 collectors and 20 recyclers for CRT program. We need to look at how many collectors and how many recyclers we have. I agree that we need to look at each item that is currently being processed to see how successful it is and what is the final cost to the consumer.

Gavin McHugh: Do we have any examples from Europe and from Asia? Europe seems more progressive and ahead of the game, do we have examples where they are assessing a fee at point of sale where this is already working?

MS: I believe Japan has a fee on the vehicle itself that goes into recycling the car.

TF: The fee percentage-wise of the vehicle is nominal but it is less than would be considered if there was a battery in that vehicle.

MS: I think the fee is $1000 to the manufacturer in Japan.

CG: Could I just ask to whom that $1000 gets paid?

MS: To the manufacturers running the EPR.

TF: The average transaction price of a vehicle in Japan is also significantly lower than the US because they are smaller cars.

NL: What roughly would be the cost of a car in Japan?

TF: Not sure but I think Korean cars start in the low teens, but Japan is a different environment in terms of car ownership. Not as many people own cars because it's not a necessity in metropolitan areas, cars are sold more in the countryside where they are necessary so it's different than California where everyone has to have a vehicle. People also don't buy multiple cars.

CG: Thanks so much Heather and Matt. For everyone who doesn't know Matt also does a lot of work supporting and facilitating for the committee. We are going to move onto our next presentation from Wayne Lorentzen and his colleagues on permitting requirements. Wayne is a phenomenal resource with a lot of experience.

DTSC Presentation

Wayne Lorentzen (WL) – Permitting

- Strategic plan, what we do, how we do it, and how we learn
- DTSC protects 40 million Californians
    - Everyone generates hazardous waste
        - E-waste

        - Chemicals for cleaning
        - Tires
    - Clean-up of legacy sites
    - High speed rail required to clean up land purchased
    - School builds must have land assessed to make sure it is safe
    - Treated wood waste
    - Energy sources – biomass, oil refinery
- CA generates 4.5 billion pounds of hazardous waste per year.
- There are drop off centers where the public can bring their waste.
    - The waste is segregated to transfer stations, treatment, landfilled, and recovered.
    - DTSC and U.S. EPA has oversight of the transportation and the treatment.
    - Hazardous waste has to go somewhere
- South of Niagara Falls there were large amounts of chemicals dumped and then covered with clay. It was sold to a school and people got sick
    - Hazardous waste laws and DTSC was created because of this incident
- Permitting makes sure that the places were the waste ends up treats, controls or eliminates the waste carefully so it doesn't leach into land water or go into air.
    - Permitting changes, the way that buildings are built and the process of disposal
- The standards for operation of hazardous waste facilities to product communities from harm. This includes design of equipment, procedures for operations, reporting, and closing the facility. The engineered landfills are in place to contain releases and have a backup plan in case of a release.
- Treatment facility: Must submit a permit application to DTSC that includes how the company proposes to operate and what practices put in place to protect human health and the environment.

Lori Koch (LK) – DTSC, Permitting Process

- The generator or operator must find out if they require a permit. It is their responsibility to comply with the law.
- Meeting or call with the permitting staff to talk about their operation and permitting process. They review their operations
    - Permitting staff point out the timing (2-year goal), land use decision (may trigger EIR), CEQA, and the cost (range from $200 to $800k).
    - New permits are rare.
        - Choose different location.

        - Modify to not trigger permit.
- Pre-Application
    - Existing facilities must review permits every ten years
    - The facility must have a public meeting
    - DTSC communicates expectations for the facilities
    - Applicant works on application.
- Application review
    - Site visit
    - Compared with regulatory requirements
    - Focused review of the application
    - Coordinated review: Many disciplines review the application (engineering, geology, enforcement, planning)
- Notice of deficiencies:
    - These are an important piece because they look at the application comprehensively and are specific as to what they should do and what standard is missed.
    - A revised application is expected back
    - The revised application will then be the one finally looked at
- Improvements
    - Common are financial insurance
    - Increased secondary containment
    - Closure plan improved
    - The waste stream and waste codes clarified
- Public involvement: Ran by the environmental justice committee.
- Draft permit
    - the entire permit application and all the versions
    - the type of waste
    - the corrective actions
    - and the plot plan
- Final decision
    - Issue as planned
    - Issue with modification
    - Deny for good case

- Permit appeal
    - Anyone who participated in the public hearing can appeal within thirty days

Wayne Lorentzen – process improvement

- A third party assessed DTSC permitting and concluded the average time of permitting was 4.5 years
    - This is a long time, and we understand the trouble of this
    - There were times it took decades
- Lack of permitting process, understaffed, and unorganized staff collaboration
    - We have and are improving this!
- Need for more environmental justice related outreach
- Lean six sigma black and green belts
    - Collect data, look for improvements, then make improvements
- The completed projects are reducing time for technical analysis, accessibility of public documents, and complete reports
- Were able to reduce permit decisions by 2 years and $241,100 reduction of costs. The dashboard of our website has these great metrics
- We have now established a continuous process improvement project team
    - We have developed a digital flow board to keep up on the phases of the permitting projects and process
- Questions?

GK: The goal is to keep batteries in California, talking to our members there aren't capacity to recycle that in the state. When was the last time a new facility was issued a Part B permit in CA?

WL: We do get a lot of inquires per year and the owner stops pursuing the option. Sometimes it has to do with the cost. I think it has been 8 or 9 years.

LK: We had a state permit issued about 6 years ago.

WL: We recognize the need to create a streamlined process. There is a need to expedite and being clearer about the expectations for the process and reducing time.

GK: The last permit. Do you know what kind? And cost?

LK: Used oil recycling. This was the flat fee option so it wouldn't be comparable.

GK: The recycling is very important. Having the capacity is a huge undertaking to establish in CA because of time to permitting.

LK: That is exactly our goal. It is our responsibility to manage waste. If it takes two years and they are trying to lease a site, this is not workable.

PG: One of the things we've heard is CA is much more onerous. Can you tell us how this 2-year timeframe compares?

WL: 2013 was the last time we compared. Other states such as Arizona, sometimes they look at processing permits that are not associated with hazardous waste which skews the data. I don't have an answer.

LK: Even if it does take more time in CA. CA has the most permitted facilities.

TA: It is important if we compare apples to apples, you have to distinguish between what is hazardous in CA and not in Arizona. It could be a multi-year permit in CA, but AZ doesn't consider it hazardous and therefore it is fast. Someone mentioned permit modifications. Can you talk through if there is a process change or permitting change like would chemistry or solvent changes? How would this work?

WL: There are four classes that are all dependent on the regulations. So, depending on the type of change, there are different processes. Class 1 doesn't require a change; these just have to notify DTSC. Class 2 would be increasing the capacity by 25% or more, this is similar to a permit renewal.

AL: The reason we are having this talk is because we want to encourage recycling within the state. As you said, there are not a lot of permits. What is the current capacity that are available to recycle lithium-ion batteries? What is the vacancy rate of these hazardous material facilities?

WL: We don't have open facilities that are vacant. The end of their process requires cleaning up of a site to a level that any site can move in without restrictions. It does not end with a vacant facility.

AL: So, this is just dead space.

WL: There is a closure plan to return the site, so maintenance is minimized.

LK: Very often permitted facilities are a part of the larger operation. It varies widely.

AL: Maybe I misheard, you said the facilities are repurposed in your presentation.

LK: The permits are renewed, not repurposed. This is required every ten years.

AL: So, recycling lithium-ion batteries would have to have a new facility. I don't know if we have facilities that could support lithium-ion battery recycling. A lithium-ion battery facility would need to have a new permit.

LK: It is possible that a facility doing e-waste recycling could then recycle lithium-ion batteries from EV. It is all economic and business-driven what operates in the state of CA.

BK: One process was over 200 days and it was reduced to one day. How?

WL: We combined two teams because the function is now within the group. The other piece was creating the proper forms to be filled out.

BK: Thank you. There have been references to the federal EPA regulations. What are the major differences between the federal requirements and the CA?

WL: There are a lot. The best characterized by waste streams. In CA we designate different things as hazardous waste. There are exclusions that federal EPA has adopted that CA has not. CA does not have the authority to make things less stringent than the US EPA.

GK: Thank you

GK: One issue that has come up over the last year has been the permitting requirements for any company that dismantles battery into modules or cells and then ships them off to recycling. Has anyone come in to ask if they need a permit for this?

WL: I am not aware of many.

LK: I don't think anyone has asked yet either.

WL: We would start with the legal definition of treatment and start from there. We look at standards and see if they are applicable. There are E-waste facilities that do dismantling and operate under alternative management standards. These are for unique industries—they are the exception rather than the norm.

LK: There was one person to reach out and talk but they haven't followed up on that. We haven't had the meeting.

Bruce Armbruster: George asked that question. How do we distinguish treatment and how do we classify this disassembling? We will take you up on the meetings.

CG: Any more questions? Thank you everyone! I want to flag that there is a lot of improvements happening in the DTSC processes, as well as if we have enough funding, and creating a governing board. I am happy to answer any questions offline.

Break until 1 PM.

CG: thank you for coming back from the break. Now is the time we will have updates from the members

4. Committee member updates

DB: I have an update on the EV Disposition and Recycling Process Opportunities. I am part of an organization that is only a year and a half old. We are the Alliance of Automotive Innovation.

- Our goals are to enable capturing the end-of-life vehicles and enable recycling and reuse.
- We think we can meet this through partnerships.
- The transportation is transitioning to an electrified industry and there are supply chain concerns.
    - The federal government has released an executive order
    - US Department of Energy has released $30 million for research
- Ideas we have are:
    - Review of CA hazardous waste rules
        - We see an opportunity for a safety net to make sure all repair

parties ensure EV batteries are transferred to a collection center.

- Framework should require reporting by all parties.

- There are different steps between hydro and the pyro process. Hydro is much more streamlined.
- There is also more domestic remanufacturing occurring which will also feed the recycling.
- We see that the recycling will grow in the long term (beyond 2030)
- We have seen positive value recycling in the industry in the past with catalytic converters and NiMH batteries.
- We see an opportunity at the end of life and at battery repair, there just needs to be a proper process in place.
- To summarize what we see as the pillars for making efficient policy recommendations.
    - All stakeholders including the manufacturers, dismantlers, independent repair shops, collision shops, dealerships
    - Transport system
    - Recycling process
- Our concern is being aware of the goals of CA and the unintended consequences that could come from overregulation.
- Questions?

Gavin McHugh: From the automaker's perspective do you envision a scenario that an auto dismantler to sell a functioning battery for a repair?

DB: Good question. I think we will need to give a little more thought to. There will need to be a tracking. I think this is something that needs to be addressed.

PG: What do you mean by positive value?

DB: We see the emergence of positive value but don't think we are there yet. Incentives are needed to achieve positive value now but as volume increases it can be profitable.

AS: You mentioned that the recycling facilities should be licensed. By whom? A permit?

DB: A permitted facility by the state but also an opportunity for companies to authorize they are capable of receiving the EV battery.

CG: Is there any money flow in the material flow diagram? Or is that further out in the work?

DB: We have discussed that but don't have an answer

CG: What is the most effective level for this to be put in place? State, national, or transnational?

DB: I think national or transnational level. I think it is harmful to have a patchwork of states having different standards. I think there is an opportunity due to the focus at the federal level on critical materials.

SH: Obviously federal is the way to go but CA almost always leads on these things. If we can come up with something at the state level hopefully it can go to the federal level. We were trying to avoid putting a deposit fee or core charge at the same level or a financial burden on the purchaser.

Michael Kent – Do you have any concerns with the current or emerging fire code and how that might affect battery recycling?

DB: We are aware of it but unfortunately, I don't have a comment on that today.

CG: Thank you.

GN: The reuse subcommittee had a great update about the fire codes. Hopefully that helps.

5. **Meg Slattery, UC Davis** – subcommittee updates

- The purpose of the presentation is to give a consolidated update of the subcommittees. This will be an abbreviated update. At the end, please speak up if anything should be added or I have misrepresented anything.
- The goal and scope have been updated
    - The recycling subcommittee did edit theirs. The largest change is the previously the group included the material processing, this has been removed.
    - There were discussions about the logistics group, but nothing has changed.
- Clarification of definitions
    - Reuse vs. repurposing
    - Dismantling vs disassembly
- Another way to think about the scope is through this flowchart provided by DB.
    - The purple box is not in the purview of the AG.
    - When the battery reaches its end of life it is brought to a collection point which is then brought to the recycling or repurposing facilities.
    - The logistics is bringing to recycling or repurposing. The recommendation by the logistics is that it is not classified as waste until it is determined if it should be reused or recycled. It would still be hazardous material.

Barriers and opportunities

- Logistics barriers
    - The financial burden that will be experienced as part of the financial

process

- How to handle the batteries as safe
  - The need to make funding available for those handling end of life vehicles
- There are special challenges associated with dealing with damaged batteries
  - Shipping and safety
- Information needs for the contents of the battery pack and how to safely handle it

- Logistics opportunities
  - Reducing the overall need for transportation by identifying next use as soon as possible
  - Proper storage to enhance the safety and cost
  - Enhance the reuse and recycling by having a proper system in place
- Reuse barriers
  - High cost to meeting standards such as the UL
    - The need to compete with new batteries is exasperated because new storage batteries are eligible for incentives that used batteries are not eligible for
  - The allocation of costs and defining who owns the battery and is liable for accidents
  - Data: The lack of unique ID markings, no universal diagnostic systems
  - The variety of model types complicates second life
- Reuse Opportunities
  - Environmentally friendly stationary storage option
  - Job creation
  - Benefit to repurposing batteries
  - Set expectations for the traceability of batteries
  - Connecting manufacturing with end of life and encouraging a feedback loop
- Recycling barriers
  - The cost of end of life and setting a responsible party
  - The lack of a lithium-ion supply chain in North America because the recycled material would still need to be exported to produce cathode materials

    - The difficulty in the permitting process
    - The information needs include labeling the cathode chemistries, the lack of design for recycling and the uncertain performance of recovered material.
- Recycling Opportunities
    - The reduced environmental and social impact by conserving and better utilizing resources
    - The economic opportunities of skilled labor job creation
    - And the recycling industry growth through creating an easy path to recycling.
- Information as a common theme: it has come to our attention that there is a theme of needed information
- All of the subcommittee groups discussed the relevant regulations that will affect the different steps of battery end of life management. This includes, permitting, hazardous material transportation, universal waste regulations, and fire codes.
    - Dismantling: facility licensing requirements
    - Transportation: Hazardous material transportation
    - Storage: the fire codes and universal waste laws
    - Disassembly: high voltage equipment and personal safety references
    - Energy storage system instillation: Interconnection, electrical storage requirements, fire codes
    - Hazardous waste treatment: permitting requirements, operating standards
    - Exports: UN and EPA

Next steps

- Brainstorm policy solutions
    - What are the highest propriety barriers?
    - How can these barriers be mitigated?
    - Where is new policy needed?
    - Where should regulations and policies be enforced?
- We are currently at the end of phase one. We will need to start developing policy proposals.

CG: Thank you. Any committee member comments?

LR: A few comments about the presentation. I think someone mentioned a matrix of all the various EPR programs. I think this is a great idea that will really help going forward. Some of the

questions that came up about permitting and the length of time. Any manufacturer, those types if numbers would scare them away. I would be interested to hear how this compares to other states. We should also be aware that there is infrastructure in California.

MC: Great session. I fully appreciate the EPR presentation. I do believe we need to process them at the end of life. So, transporting before they are declared as universal waste before they need to be is essential.

DB: In the next step the subcommittee will start developing policies and they will report back to the advisory group?

MS: Yes (by nod)

TC: There was a statement by DTSC about the length of time. They talked about getting it down to less than two years. They also differentiated a state permit and a RCRA permit. There is a lack of clarity about whether the lithium-ion battery is regulated under RCRA as a hazardous waste or not. If you are looking to build a facility in CA, would this be state permit for regulating CA waste or a RCRA federal permit? I don't have a position on this, or at least not in front of this group. This is a clarification we need from the regulator. Maybe Bruce can speak to this. Our facility is RCRA equivalent, so we haven't looked at this.

AK: All the barriers and opportunities can be found in a public google doc. Please provide comments on these to the facilitator.

Ryan Barr: I am with Repurpose energy. I thought the presentation with DTSC was well done but the goal and scope were off the mark. I think they missed the AG need for information. When does a battery become waste and what is treatment? My fear here is that existing regulations may be misaligned with the ideal interpretation. I fear if the advisory group doesn't get answers then it might miss its goal.

CG: Thank you to everyone. I look forward to our next meeting in May.