



September 28, 2023

Liane M. Randolph, Chair
California Air Resource Board

Shereen D'Souza, Deputy Secretary Cal-EPA
Climate Policy and Intergovernmental Relations

Martha Dina-Arguello, Co-Chair
Sharifa Taylor, Co-Chair
Dr. Catherine Garoupa White, Co-Chair
Environmental Justice Committee Members

**RE: 23-8-1: Public Meeting to Hear an Update on the Low Carbon Fuel Standard -
Comments regarding Life-Cycle Analysis of ZEV Batteries as part of LCFS Regulations**

Dear Liane Randolph, Shereen D'Souza, Martha Dina-Arguello, Sharifa Taylor, and Catherine White:

The California Compost Coalition, as organic waste collectors and haulers, and as renewable natural gas (RNG) producers, has involved with the Environmental Justice Advisory Committee (EJAC) for each of the four Scoping Plans since 2008 as well as Advanced Clen Fleet Regulation and the LCFS regulatory development. We supported the EJAC Charter to advise CARB on key issues. We have worked closely with EJAC on the development of the 2022 Scoping Plan Update and the proposed California ZEV Battery Directive, which included the need to prepare a Life Cycle Analysis (LCA) for ZEVs. As part of the Scoping Plan process, the need to conduct LCAs for ZEV batteries was cornerstone in our comments sent to CARB and EJAC. As part of the upcoming LCFS regulations, ZEVs batteries usage as a transportation fuel need to be included in the LCFS regulations with a life-cycle assessment, where the average carbon intensity based upon recent European Studies is 76 g CO₂/MJ.

The impetus of CARB's policies and regulations and the Governor's Budget is to accelerate the transition from petroleum products to zero-emission vehicles. With this massive \$9 billion investment in ZEVs, there is EJAC support for a ZEV Battery Directive following the European Union (EU) Battery Directive that was adopted in March 2022, in which we have presented to both CARB and EJAC on several occasions.

The EU Batteries Directive, which is part of the European Green Deal, and the new Circular Economy Action Plan, adopted new regulations setting sustainability requirements for batteries to be placed on the EU market, including responsible sourcing of raw materials, hazardous substances, carbon footprint, mandatory level of recycled content and durability, reusability and recyclability conditions; establishing objectives and measures to improve the collection, treatment, and recycling of waste batteries and ensure materials recovery, establishing information and labelling requirements for both economic operators and end-users, modifying requirements for the implementation of extended producer responsibilities (EPR) obligations. The Directive major objectives are to strengthen the functioning of the internal market (including products, processes, waste batteries and recyclates), by ensuring a level playing field through a common set of rules; promoting a circular economy; and reducing environmental and social impacts throughout all stages of the battery life cycle.

The California ZEV Battery Directive would have three major components following the EU Battery Directive:

- 1. A Carbon Footprint Declaration with A Lifecycle Analysis with An Independent Third-Party Verification Statement**
- 2. End-Of-Life Recycling**
- 3. Sourcing And Supply Chain Due Diligence**

With regards to EJAC recommendations and the need to present an Implementation Plan for the 2022 Scoping Plan Update to the Legislature, we have the following comments to support the proposed California ZEV Battery Directive:

1. A Carbon Footprint Declaration with A Lifecycle Analysis with An Independent Third-Party Verification Statement

EJAC has recommended NF5 for Electric Vehicles where a full lifecycle assessment by a disinterested third party. AB 1012 (Quirk-Silva) became a legislative proposal. We have asked CARB to support AB 1012 recognizing EJAC’s NF5 recommendation listed below:

NF5	To address concerns about lithium mining out of geothermal sites and impacts on EJ communities CARB, CEC, Lithium Valley Commission, and other relevant agencies must conduct a full life cycle assessment of lithium extraction methods by a disinterested third-party. Assessment of the lithium battery lifecycle must include manufacture, repurposing, and eventual recycling and/or disposal.
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AB 1012 (Quirk-Silva) would have required CARB, if it proposed a regulation that would require a mobile source to use a particular technology, to perform a lifecycle analysis (LCAs) that considers all of the environmental impacts of the required technology before the adoption of the regulation. Based upon several literature searches there are over 100 LCAs for ZEV batteries published with relevant information where LCAs could cost up to \$100,000.

AB 1012 died in Assembly Appropriations due to the possible fiscal impacts. CARB egregiously overestimated the costs of implementing AB 1012 with a budget estimate of approximately \$7.1 million for 17 positions and contracts in fiscal year (FY) 2023-24 and \$4.6 million in FY 2024-25 and ongoing to implement this bill. Tasks include, but are not limited to, developing a lifecycle emission inventory database and regulation support tool to incorporate vehicle manufacturing, disposal, and recycling emissions into existing analysis; external engagement with experts and stakeholders on lifecycle emission impacts for varying mobile source types; contracts for external research on GHG and criteria and toxic emissions impacts for manufacturing and disposal for each mobile source sector; and other related tasks.

Edgar & Associates prepared a report, 'Life Cycle Greenhouse Gas Impacts of Electric Vehicle Battery Manufacturing', submitted into the CARB docket on March 24, 2022, over one year ago and had one recent meeting with CARB's staff and was based upon several European studies. The Response to Comments to the Environmental Assessment dated April 17, 2023, was a qualitative narrative that failed to provide a quantitative analysis. There are several credible European Studies that could have been utilized that were included in the referenced Edgar & Associates report. The Response to Comments referenced diesel as the baseline fuel failing to recognize the 8,000 refuse fleets using the near-zero NOx engine coupled carbon negative RNG. Mandating ZEV fleets would increase GHG from the baseline conditions for the refuse fleet.

The Response to Comments state that carbon negative RNG is limited and is discounted. The GNA Study has shown that there are over 100 million diesel gallon equivalents (dge) of RNG with an average carbon interest if minus 100, which could fuel the rest of the refuse fleet. There will be enough carbon negative RNG to fuel all of the 16,000 refuse fleet, which should be acknowledged.

During the entire ACF proceedings, CARB continued to state that ZEVs are zero emissions in the same context when discussing GHG while utilizing Cap-and-Trade revenue for HVIP incentives that are supposed to be used for GHG reduction programs and not for criteria pollutant reduction programs. It has been disingenuous of CARB used the term of ZEV when discussing GHGs, as ZEV are not zero GHG emissions.

ZEVs are not Zero Emissions but have a Carbon Intensity of 62 to 90 (gCO_{2e}/MJ)

ZEVs are not zero greenhouse gas emission vehicles and have a carbon intensity of **62 to 90 (gCO_{2e}/MJ) with an average of 76 CI** on a life-cycle basis, when combining the electrical energy required to charge the battery and the manufacturing process of the battery. CARB's existing emissions factor to produce the electricity to charge the battery is **24.39 (gCO_{2e}/MJ)**. The range of emissions from the battery manufacturing alone, based upon European Studies, have a carbon intensity of **38.13 – 66.26 (gCO_{2e}/MJ)** depending on the type of ZEV battery. **Meanwhile, CARB modeling keeps diesel viable for decades and phases out carbon negative RNG for transportation.**

AB 32 Climate Change Scoping Plan Statutory Requirements is to Minimize Leakage

ZEV batteries that are manufactured out of state are increasing non-Californian emissions in other countries in the amount of **38.13 – 66.26 (gCO₂e/MJ)** depending on the type of ZEV battery. CARB is picking ZEV as the “future technology” while leaking GHG emission out of state. The U.S. Department of Labor published this graphic showing the ZEV linear economy from the Congo to China to the United States.

2. End-Of-Life Recycling

EJAC has recommended NF5 to assess eventual recycling of the ZEV batteries. SB 615 (Allen) would require all electric vehicle traction batteries sold with motor vehicles in the state to be recovered and reused, repurposed, remanufactured, or recycled at the end of their useful life in a motor vehicle or any other application. We have asked CARB to support SB 615. SB 615 died in Assembly Committee on Environmental Safety and Toxic Materials

NF5	To address concerns about lithium mining out of geothermal sites and impacts on EJ communities CARB, CEC, Lithium Valley Commission, and other relevant agencies must conduct a full life cycle assessment of lithium extraction methods by a disinterested third-party. Assessment of the lithium battery lifecycle must include manufacture, repurposing, and eventual recycling and/or disposal.
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AB 2832 (Dahle, 2018) created the Lithium-Ion Car Battery Recycling Advisory Group to review, and advise the Legislature on policies pertaining to the recovery and recycling of lithium-ion batteries sold with motor vehicles in the state and to submit policy recommendations to the Legislature aimed at ensuring that as close to 100% as possible of lithium-ion batteries in the state are reused or recycled at end-of-life in a safe and cost-effective manner. Their work has concluded for which it was established and completed its final policy recommendations to the Legislature in its Lithium-ion Car Battery Recycling Advisory Group Final Report. The final policy recommendations, posted on May 9, 2022, have been sent to the Legislature as required by AB 2832. These recommendations should be part of CARB’s regulatory process regarding ZEV deployment. Plus, the components of the European Battery Directive need to be incorporated into all ZEV policies and regulations.

Extended Producer Responsibility

- Producer of batteries shall have EPR for batteries made available to the market to ensure the attainment of waste management obligations.

End-of-Life Information

EPR organizations need to present information on end-of-life programs.

3. Sourcing And Supply Chain Due Diligence

EJAC has recommended NF55 and F1B to monitor and ensure that raw materials to produce low-carbon fuels do not result on impacts to environmentally burden communities and support all request and recommendation of environmental justice communities. Surprisingly, there is no legislation being proposed this year to support environmental justice for all.

NF55	Monitor for and ensure that raw materials used to produce low-carbon fuels or technologies do not result in unintended consequences, including allowing for ongoing pollution in low income communities, communities of color, and environmentally burdened regions and communities.
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F1B	<p>CARB climate policies must not be achieved at the expense of environmental justice communities impacted by lithium mining.</p> <p>Support all requests and recommendations of environmental justice communities impacted by lithium mining. A just transition must include mitigation and workforce investment. (See NF5 above.)</p>
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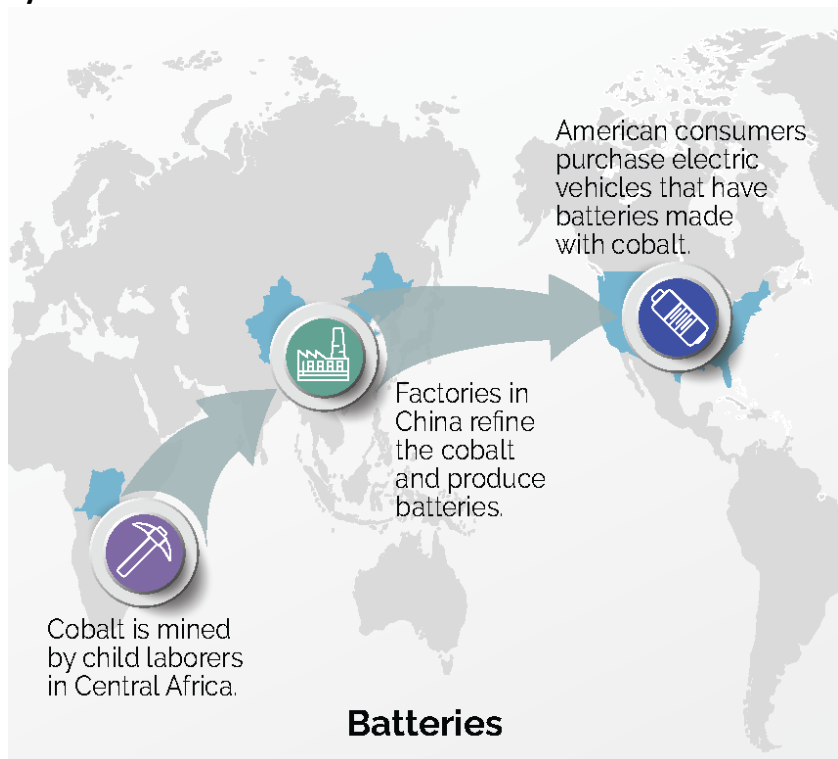
Edgar & Associates has submitted two Reports into the CARB and EJAC docket with supportive information on the impacts of mining of rare earth mineral to manufacturing ZEV batteries with credible third-party references:

- California Battery Directive – Supply Chain Due Diligence Proposal first submitted on March 23, 2022, and recently re-submitted with a new cover on March 1, 2023, with a focus on cobalt mining in the Congo.
- California Battery Directive – Lithium Supply Chain Due Diligence Proposal submitted on March 15, 2023.

AB 32 Climate Change Scoping Plan Statutory Requirements is that CARB Should Not Exacerbate Harm Disproportionately to Low Socio-economic Communities.

Cobalt is being mined by forced child labor in the Democratic Republic of the Congo where Amnesty International and dozens of credible organizations have documented serious human rights violations and environmental damage linked to the extraction of the minerals used in lithium-ion batteries.

The Lithium-ion Car Battery Recycling Advisory Group Final Report released by Cal-EPA on March 16, 2022 mandated by AB 2832 published the following information on page 13-14:



1.4.1 Cobalt

Nearly 70% of cobalt is produced in the Democratic Republic of Congo (U.S. Geological Survey, 2021b) through both industrial mining, which is primarily mechanized, and small scale or artisanal mining, which is practiced manually using simple tools (Sovacool, 2019). An estimated 15-30% of the country's cobalt output is generated through artisanal mining, where adults and an estimated 40,000 children work up to 12-hour days in abusive work environments, exposed to hazardous conditions (Baumann- Pauly, 2020). Artisanal miners have little to no protective gear or tools, nor safety measures at mining sites, all while earning less than \$2 per day. A multitude of battery-using companies, from Apple to Tesla, as well as international mining companies, have engaged in programs to either assist local communities to improve economic and educational conditions or to formalize artisanal and small-scale mining enterprises in an attempt to create conditions where mine safety and child labor standards can be improved (Amnesty International and Afreewatch, 2016).

1.4.2 Nickel

Indonesia is the largest producer of nickel where strip mining for nickel leads to deforestation of tropical rainforests that are home to native people, act as crucial carbon sinks, and provide habitat for endangered species (Abood et al., 2015; Supriatna et al., 2020; U.S. Geological Survey, 2021b). After strip mining, the soil is depleted of nutrients, posing a significant challenge to rehabilitation efforts (Van der Ent et al., 2013).

Where is the environmental justice for all?

In summary, the following comments are filed:

- CARB needs to support a California Battery Directive following the EU adopted regulations when considering any regulations deploying ZEV technology.
- CARB has a statutory requirement to minimize emissions leakage when considering the AB 32 Climate Change Scoping Plan Update and needs to address the carbon intensity of ZEV linear supply chain battery manufacturing.
- CARB should require a ZEV Battery Manufacturing full lifecycle analysis which was also supported by EJAC recommendation NF5 and should have supported AB 1012.
- As part of the upcoming LCFS regulations, ZEVs batteries usage as a transportation fuel need to be included in the LCFS regulations with a life-cycle assessment, where the average carbon intensity based upon recent European Studies is 76 g CO₂/MJ.

Sincerely,

A handwritten signature in black ink, appearing to read "Evan WR Edgar". The letters are cursive and somewhat stylized, with the "WR" being particularly prominent.

Evan WR Edgar
Regulatory Affairs Engineer