

Date: June 3, 2024

To: Connecticut Green Bank

From: Power Advisory

Re: Summary of End-of-Life Working Group Meeting III

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On May 28, 2024, Connecticut Green Bank and Power Advisory facilitated the third meeting of the End-of-Life Working Group. This memo summarizes meeting attendees, major topics of discussion, and questions and comments received via Slido.

**Meeting Attendees**

Connecticut Green Bank and other State Agencies

Organization	Last Name	First Name	Title
Connecticut Green Bank	Harari	Sara	Associate Director of Innovation
Connecticut Green Bank	Lesniak	Corey	Asset Management
Connecticut Green Bank	Pyne	Sara	Incentives
Connecticut Green Bank	Attruia	Stephanie	Associate Manager
CT DEEP	Frigon	Gabrielle	Director, Waste Engineering and Enforcement
CT DEEP	Sickinger	Claire	Associate Research Analyst for Science and Technology Policy
CT DEEP	Webster	Hank	Deputy Commissioner
CT DEEP	Madho	Brent	Assistant Director, Waste Engineering and Enforcement Division
Connecticut Green Bank	Arpin	Christopher	Staff

Power Advisory

Organization	Last Name	First Name	Title
Power Advisory	Kinross	Andrew	Director
Power Advisory	Lipsitz	Avi	Senior Consultant
Power Advisory	Simmons	Sarah	Director, Utilities and Innovation
Power Advisory	Puram	Rakesh	Manager

Working Group Members

<b>Organization</b>	<b>Last Name</b>	<b>First Name</b>	<b>Title</b>
Bluewater Battery	Feinberg	Steve	President
Cirba Solutions	Spalding	Danielle	VP, Communications & Public Affairs
Comstock Metals Corporation	Gompels	Oscar	Project Manager
United Illuminating	Kopylec	Joel	Supervisor, Conservation & Load Management
United Illuminating	Whelan	Robert	Customer Programs and Products Manager
United Illuminating	Lehoux	Kay	Environmental Compliance Specialist
United Illuminating	Hernandez	David	Field Technician
Yale School of the Environment	Klee	Rob	Lecturer
Wiley Rein LLP	Booish	Marc	Policy Advisor
RWE Clean Energy	Brolin	Ed	Vice President, Policy Development & Distributed Government Relations
PosiGen	Wallace	Kyle	Vice President of Public Policy & Government Affairs
Eversource	Danahy	Julia	Program Manager, CT Residential Solar
SEIA	Souter-Kline	Valessa	Northeast Regional Director
Riomar Group	Garris	Lonnie	Director of Information Security Operations
Yankee Institute	Portfolio	Meghan	Manager of Research and Analysis
Trinity Solar	Wills	Peter	Senior Director, Corporate Operations
Trinity Solar	Farrell	Michael	CT Sales, Operations Manager
Battery Council International	Miksad	Roger	President & Executive Director
Earthlight Technologies	Bazzano	Tracy	Service Coordinator
Earthlight Technologies	Whittle	Heather	Residential Operations Coordinator

## **Working Group Presentation**

Andrew Kinross welcomed participants.

Sara Harari introduced the third meeting of the working group.

Andrew Kinross overviewed the Indicative economics and funding options for solar panels and batteries.

Sarah Simmons facilitated the introduction and schedule.

New members introduced themselves in the working group call.

Andrew led the discussion on indicative economics.

Avi Lipsitz led the discussion on funding sources and options, using slideshow and pulse check questions.

Participants discussed the issues overviewed by Power Advisory.

## Discussion Summary

### Indicative economics

A working group member indicated that LFP batteries have a good recycling price. However, if they can be repurposed, the cost could become neutral (no charge for removal). This depends on the battery chemistry and type. For NMC Batteries, like LFP batteries, there is a possibility that they could be repurposed or given a second life, which might increase their value. They also added that for electric vehicle (EV) batteries, new companies will emerge that focus on repairing these batteries. This will likely be the initial area they target, and in five to ten years, this repair focus will become a significant part of the industry.

A working group member also had a question about the end-product that the recyclers are producing: Are they producing salts that can be sold to electrode makers as the final product?

### Funding options by infrastructure type

- **Pulse Check Question 1 via Slido:** Do you support segmenting the policy-making approach and ultimate recommendations by technology and size?
  - Responses:
    - Yes – 69%
    - No – 31%
    - Not sure – 0%

### Suggestion for Solar Residential Installations

- **Pulse Check Question 2 via Slido:** Is advanced fee administration the most practical/workable option for recycling solar installations?
  - Responses:
    - Not Sure – 55%
    - Yes – 36%
    - No – 9%

A working group member expressed concern around adding fees to residential solar developers. They highlighted the high demand for residential rooftop solar in many states and questioned whether there would be enough volume to justify adding additional fees, especially when the goal is to promote rooftop solar development. Their hesitation is more about the broader implications of the approach rather than the approach itself.

Andrew Kinross posed a follow-up question to this working group member. Andrew recognizes the member's concern about not wanting to add extra costs for installers and ask if there are any alternative suggestions. Andrew mentions that the AFA could be funded by various parties, such as through a utility tariff or by ratepayers, to avoid increasing prices and reducing installation volume.

The working group member responded by acknowledging that they have discussed the issue with NYSERDA in New York and explored the possibility of creating a fund to address it. While they don't have a definitive answer yet, they have been considering third-party owned setups as a better solution compared to homeowner-owned setups, which are typically left alone like household appliances. However, ongoing discussions in Connecticut suggest that this approach may need to be re-evaluated. They express concern about the potential slowdown effect and emphasize the need to find a workable solution, though they currently do not have a concrete answer.

#### Suggestion for Solar Commercial Installations

- **Pulse Check Question 3 via Slido:** Are decommissioning bonds the most practical/workable option for commercial-scale solar installations?
  - Responses:
    - Not sure – 56%
    - Yes – 44%
    - No – 0%

A working group member raised a question about the purpose of a bond, asking whether it is intended to elicit responsible profit-making or to encourage specific behaviors, such as donating used lithium-ion batteries. They referenced World War II war bonds, which aimed to change behavior by discouraging commercial vehicle purchases to prioritize military production. Avi Lipsitz clarified that, in the context of solar panels on a commercial scale, the bond's purpose is to induce specific actions, namely ensuring that solar sites are decommissioned and remediated at the end of their life, rather than being abandoned by developers.

A working group member raised a point about decommissioning bonds, emphasizing that they believe these bonds are the most effective method to ensure solar panels are recycled. They agree on the importance of defining the specifics of including recycling in decommissioning bond agreements. However, they acknowledge hearing skepticism from legislators and regulators about the effectiveness of these bonds, possibly due to experiences with underfunded fossil fuel bonds. The speaker discussed efforts to address this skepticism through side conversations and decommissioning project demonstrations. They seek to understand how to build trust in decommissioning bonds as a reliable legal tool for ensuring the recycling of solar panels, and how to make these bonds robust enough to gain widespread confidence.

### Suggestion for Battery Residential Installations

A working group member questioned why the existing recycling infrastructure for residential lead batteries, which uses a mandatory participation open market model, wasn't considered as a model. They note that this model, which isn't classified as either Extended Producer Responsibility (EPR) or Advanced Fee Administration (AFA), already achieves nearly 100% recycling rates. The member points out that while some in the battery industry support EPR, many manufacturers and distributors they've spoken to oppose it and prefer market-based solutions, especially for products with positive end-of-life economic value. They argue that open market models with mandatory participation, such as banning landfill disposal and requiring distributor take-back, are highly efficient. The member believes that not evaluating the successful lead battery recycling infrastructure underestimates its efficiency and does a disservice by not considering how it effectively operates without government oversight.

Andrew Kinross asked a working group member for clarification on their points. Andrew states the member mentioned the lead battery industry functions independently, with batteries being returned through distributors. Andrew also noted the member's concern that an EPR model, which includes an EPR fee, would be detrimental to the industry. Andrew sought to confirm if member's main argument is that EPR adds unnecessary burden, bureaucracy, and fees; whereas the market can function effectively without such policies, if there are restrictions like banning landfill disposal.

The working group member responded, explaining their perspective, drawing from their experience in the lead battery, lithium battery, and electronic waste industries. They highlighted that in 42 states, including Connecticut, laws mandate recycling of lead batteries, prohibiting landfill disposal and requiring consumers and commercial users to return batteries to qualified retailers. Retailers, distributors, and manufacturers must accept these returns, creating a forced participation open market without state-controlled fees or direct oversight. This system operates efficiently due to the positive scrap value of the batteries. The member argued that for products with a positive scrap value, market forces can ensure effective recycling without the need for EPR fees, which add unnecessary costs. They acknowledged that for products with a negative net value, EPR fees might be necessary but emphasize that these fees increase the product price for consumers. They conclude that avoiding unnecessary price increases and maintaining an efficient backend system leads to more effective recycling at a lower overhead cost.

- **Pulse Check Question 4 via Slido:** Is an extended producer responsibility framework the most practical/workable option for both residential and commercial-scale stationary battery recycling?
  - Responses:
    - Yes – 33%
    - No – 33%
    - Not sure – 33%

Sarah Simmons posed a question to the working group as to whether the “No” response is coming from either residential or commercial-scale battery recycling or both?

One working group member expressed a firm "No" on applying the Extended Producer Responsibility (EPR) model to residential battery installations. For commercial applications, they're uncertain and believes the considerations vary greatly between commercial and utility-scale installations. The member argues that an EPR fee for utility-scale projects would place a significant burden on both the industry and the state during decommissioning. They also noted that most EPR programs use last year's revenues to fund this year's decommissioning, which could lead to financial instability in states like Connecticut with few utility-scale installations. The member suggested segmenting the approach into residential, commercial, and utility-scale categories, as each has different funding needs. They concluded that EPR is not suitable for residential or utility-scale applications and remains unsure about its appropriateness for commercial projects.

One working group member suggested that if there were a guaranteed or highly certain value for the components of a battery installation, an EPR model might not be necessary for storage batteries. They question the level of certainty required to forego an EPR model, asking how certain the value needs to be to eliminate the need for such a model.

A working group member shared an experience with car battery recycling, noting that they are charged a core fee if they don't return their old battery when buying a new one, which they liken to a deposit refund scheme. They view EPR as a spectrum of options that can include deposit refund schemes. They are interested in the logistical challenges of handling larger stationary household batteries, which are more difficult and potentially dangerous to transport compared to car batteries. They question how these larger batteries, used in home power storage, would be transported, and returned for recycling, acknowledging that while the model used for car batteries is effective, it may not be as easily applicable to larger, stationary batteries.

Another working group member responded to the comment. The member clarified that in most states, a core charge is attached to car batteries, which is refunded when the consumer returns the used battery. They don't consider this an AFA or EPR because it acts as a return incentive. They agreed with the member that such systems are a form of EPR, though not defined as such by the group. Regarding large format batteries, they point out that lead batteries have been successfully used and recycled in data centers and telecom applications for decades. These batteries are removed from service by manufacturers, installers, or scrappers at no cost to the site owner due to their residual value. They argue that this existing system, which also applies to residential lead batteries used in off-grid solar installations, is efficient and doesn't need to be reinvented. The network for installation and retrieval already operates effectively, typically at no cost to the consumer.

## Discussion on Q&A on Funding Sources

### **Questions to WG members**

- Are there any other funding models or options not discussed here, but which should be considered?
- Is it better to identify best-fit solutions for various segments (as presented here), or consistent solutions across multiple technology and customer types?

### **Questions and Comments Received from WG members via Slido**

- Will people get confused with different recycling policies for each program/sector? If so, how could that be overcome?
- What are the mechanisms for implementation? i.e., contracts/program rules, vs. regulation?

A working group member suggested a shift in mindset from traditional EPR frameworks, typically involving manufacturers, distributors, retailers, and consumers, to a model that includes licensed electricians in the product flow for solar and Battery Energy Storage Systems (BESS). They proposed that electricians, through their state licensing, could be made responsible for the appropriate disposal of these products. This would provide states with an additional regulatory touchpoint, leveraging the presence of licensed electricians during maintenance and decommissioning, which involve potential high voltage. By involving electricians, the responsibility for compliance would shift from homeowners to trained professionals, potentially increasing the effectiveness of the disposal process, and reducing consumer confusion. They emphasized the impracticality of regulating compliance at every level, suggesting instead that efforts should focus on achieving a high compliance rate (~95%).

### **Additional Questions to WG members**

- What should ratepayers' role be in funding solar and battery recycling in Connecticut?
- How, if at all, should the availability of external funding (e.g., federal grants) be factored into the ultimate recommendations to PURA?

A working group member stated they are collaborating with the US Army to develop a solution for recovering critical metals from batteries, including those used in deployed scenarios. The primary goal is to enhance circularity and reduce dependency on countries like China. They suggest that there might be a federal option where the government could subsidize these efforts for reuse in defense applications.



Avi Lipsitz asked a follow up question to the working group: Are there any unintended consequences that members would be concerned about in respect of the suggested options for each of the four installation types presented today?

A working group member responded by pointing out that Connecticut residents already face high energy costs, and even a modest increase in ratepayer costs would likely be unfavorably received by both the public and the legislature.

A working group member expressed concern about unintended consequences of some state models that create a monopoly or quasi-monopoly recycling organization. While this approach can be effective for products with negative net value, it could have negative consequences for products with positive demand at the end of their life. They suggest that such centralization might push the market in an unfavorable direction.

### **Contact**

For more information about the working group, or to provide comments or ask questions, please contact Andrew Kinross at [akinross@poweradvisoryllc.com](mailto:akinross@poweradvisoryllc.com).