

Date: May 3, 2024

To: Connecticut Green Bank

From: Power Advisory

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

On April 29, 2024, Connecticut Green Bank and Power Advisory facilitated the second 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
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
Office of Consumer Counsel	Bhandari	Prabisha	Staff Attorney
Connecticut Green Bank	Arpin	Christopher	Staff

Power Advisory

Organization	Last Name	First Name	Title
Power Advisory	Kinross	Andrew	Director
Power Advisory	Metz	Andrew	Consultant
Power Advisory	Roberts	Gwyneth	Senior Consultant
Power Advisory	Simmons	Sarah	Director, Utilities and Innovation

Working Group Members

Organization	Last Name	First Name	Title
Bluewater Battery	Feinberg	Steve	President
Cirba Solutions	Spalding	Danielle	VP, Communications & Public Affairs
Comstock Metals Corporation	Gompels	Oscar	Project Manager
LaBella Associates at Avangrid	Bugatti	Florencia	Environmental Permitting & Compliance Specialist
Redwood Materials	MacAusland	Charlotte	Business Development Lead
Redwood Materials	Zotos	Daniel	Senior Manager of Public Affairs & Advocacy
United Illuminating	Kopylec	Joel	Supervisor, Conservation & Load Management
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
United Illuminating	Lehoux	Kay	Environmental Compliance Specialist
Eversource	Danahy	Julia	Program Manager, CT Residential Solar
SEIA	Souter-Kline	Valessa	Northeast Regional Director

Working Group Presentation

Andrew Kinross welcomed participants.

Sara Harari introduced the second meeting of the working group.

Andrew Kinross overviewed the size of the waste market, EOL management regulatory frameworks, business models, and issues.

Participants discussed the issues overviewed by Power Advisory.

Discussion Summary

Waste Volume

A working group member indicated that people in the panel waste industry see panel lifetimes around 17 years (15-20 years). Desert and cold environments notably reduce the lifetime of a panel. Some waste management places have seen major contracts for panels only 13 years old as a result of repowering motivated by microcracking caused by freeze-thaw cycling. This indicates that the 30-year model assumption is optimistic.

A working group member advocated for deliberate action on solar waste, pointing out that there is a climate crisis and that solar waste is not a crisis under the worst modeled scenarios. Another working group member offered to follow up on modeled scenarios.

A working group member asked about existing provisions for projects to maintain fiscal viability in the event of an early panel failure. The concern is that early failure might oblige a project owner to dispose of panels in the cheapest way possible to maintain viability. Insurance was suggested as an option.

A working group member clarified that one of the questions the working group is to answer is whether solar modules are to be reclassified from normal solid waste. Any modules that are processed in Connecticut will be processed by means other than landfilling. Universal waste is the next step up in regulation; hazards presented by universal waste may be mitigated. The Universal Waste designation may only apply to panels that don't pass a TCLP test; this is likely a small subset of panels.

A working group member compared PV to lead-acid batteries, holding up the latter as an example of good waste management. This is because professionals, not consumers, are the last ones to handle the waste.

Two working group members disputed the idea that solar panels are hazardous waste, pointing out that most pass EPA's TCLP test.

A working group member advocated for Extended Producer Responsibility (EPR) for "highest and best" disposal.

Recycling Business Model & Issues: Open Discussion

A working group member suggested adding component reuse as a business model (however, the scope of this study is on recycling).

Several working group members expressed concerns about the extended producer responsibility program, observing that EPR is better for short-life consumer goods than for long-life items like solar panels, and advocated for decommissioning bonds as a better tool.

A working group member spoke about batteries and EPR, advocating for PROs instead of EPRs, especially for larger batteries. New Jersey defined a Specialized Battery Recycler for the first time. This may be useful.

Pros and Cons of EPR and AFA

A working group member recommended that residential and large commercial installations' waste management discussions should be separate. Another responded that ownership models may also be an input to EOL responsibilities.

Questions and Comments Received from WG members via Slido

How can we balance the manufacturer narratives to "extend" out & "pretend" the problem is small vs. recyclers pushing for \$ in the SCH for end of life today?

CT's clean energy programs have equity provisions and goals. How can we ensure equity in any recycling proposal?

Questions and Comments Posed to WG members via Slido

General: a) What are the pros and cons of the EPR and AFA policies? For solar, for battery? Is one better than the other for CT?

For EPR, should both an individual company Stewardship Plan and a PRO (Producer Responsibility Organization) be acceptable?

General: b) What should be the accreditation and certification requirements for parties to serve CT?

General: c) How should CT policy relate to other state and federal policy on the topic of recycling? Should other models be adopted?

Decommissioning Plan at COD: a) What should be required in a decommissioning plan? Should an authorized US recycler be required to be specified?

Decommissioning Plan at COD: b) Should the TCLP test (Toxicity Characteristic Leaching Procedure) be required by the OEM (to determine that the product is not hazardous) for solar panels?

Dismantle, Collect and Palletize: What is optimal for collecting panels or batteries from homeowners and small commercial owners?

Transportation to Recycling Facility: a) Should CT provide a Transfer-Based Exclusion (TBE), a hazardous waste classification exemption, to allow for easier and cheaper transport of solar panels?

Transportation to Recycling Facility: b) Are there approaches CT can take to reduce transportation costs, which are typically a large part of the overall cost of recycling?

Recycle: a) How should recycling companies / facilities be certified and audited?

Recycle: b) What should the definitions be for acceptable recycling methods? Upcycling (higher purity or quality, suitable for reuse) vs. downcycling (lower quality recycling)?

Recycle: c) What should the penalties be for non-conformance with the recycling policy?

Remanufacture: Can Connecticut help in ensuring that remanufacturers get credit for domestic content?

What if the OEM is no longer around? Is the financial assurance sufficient? How does CT assure that?

Contact

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