

Date: April 3, 2024

To: Connecticut Green Bank

From: Power Advisory

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

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On March 27, 2024, Connecticut Green Bank and Power Advisory facilitated the first 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     | Attruia   | Stephanie  | Asset Management   |
| Connecticut Green Bank     | Desantos  | James      | Regulatory and Legislative Liaison                           |
| 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     | Whelpton  | Leigh      | Director of Environmental Infrastructure                     |
| 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 | McHorney  | Alison     | Staff Attorney   |
| Office of Consumer Counsel | Bhandari  | Prabisha   | Staff Attorney   |

#### 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

| <b>Organization</b>              | <b>Last Name</b> | <b>First Name</b> | <b>Title</b>                                     |
|----------------------------------|------------------|-------------------|--|
| Battery Council International    | Miksad           | Roger             | President & Executive Director                   |
| Battery Council                  | Bernard          | Susan             | Regulatory Director                              |
| Bluewater Battery                | Feinberg         | Steve             | President  |
| Call2Recycle                     | Stuart           | Carin             | Steward Relations Manager                        |
| Cirba Solutions                  | Spalding         | Danielle          | VP, Communications & Public Affairs              |
| Comstock Metals Corporation      | Gompels          | Oscar             | Project Manager                                  |
| Earthlight Technologies          | Bazzano          | Tracy             | Service Coordinator                              |
| Earthlight Technologies          | Whittle          | Heather           | Residential Operations Coordinator               |
| Harness the Sun                  | Thomen           | Emil              | President  |
| LaBella Associates at Avangrid   | Bugatti          | Florencia         | Environmental Permitting & Compliance Specialist |
| Ontility                         | Huchings         | Peter             | Business Development Manager                     |
| Portland Clean Energy Task Force | Bauer            | Andy              | Chair  |
| Redwood Materials                | MacAusland       | Charlotte         | Business Development Lead                        |
| Redwood Materials                | Zotos            | Daniel            | Senior Manager of Public Affairs & Advocacy      |
| SEIA                             | Lapointe         | Clare             | Sustainability Program Analyst                   |
| SEIA                             | Nicholson        | Bob               | Senior Manager of PV Recycling                   |
| Solar Panel Recycling            | Henderson        | Brett             | Vice President                                   |
| SolarCycle                       | Cain             | Nick              | Director of Government Affairs                   |
| United Illuminating              | Kopylec          | Joel              | Supervisor, Conservation & Load Management       |
| United Illuminating              | Whelan           | Robert            | Customer Programs and Products Manager           |
| Yale School of the Environment   | Klee             | Rob               | Lecturer   |
| Enphase Energy                   | Sifuentes        | John              | Supervisor – Customer Support                    |

## **Working Group Presentation**

Sara Harari introduced the working group.

Sarah Simmons discussed protocol for working group discussions.

Andrew Kinross overviewed the working group scope and goals.

Gwyneth Roberts summarized existing state initiatives for renewable energy technologies at end of life. Ms. Roberts discussed the two prevailing policies: extended producer responsibility and fixed fee models.

## **Discussion Summary**

### Recycling vs. Re-use Domestically and Abroad

A working group member asked how we can be sure services that re-sell or refurbish equipment are not simply dumping End of Life (“EOL”) or near-EOL equipment in low-income communities or countries. Working group members responded that this is an open question, and that some nonprofits do ship used equipment to developing economies. These nonprofits could potentially be a source of knowledge.

A working group member stated that it would be better for the environment for the panels to be reused overseas than for new ones to be manufactured, and asked if there is a way to monitor if they’re ultimately going to be landfilled. Working group members responded that that cannot be determined at the time of shipment, but other countries have regulations too, objecting to the characterization of “third world” as meaning those countries would be less well regulated.

A working group member advocated for establishing a minimum efficiency for reuse. For example, 50% of original performance as a minimum performance level. Another working group member said that panels at the 50-80% efficiency percent of original performance level still represent a good value to customers if their price has been equivalently depreciated.

A working group member said facilities in developing nations don’t really have sufficient capacity to recycle panels in the event that panels break there.

A working group member emphasized that a lack of regulation will result in used panels that are damaged in some way being shipped to customers, either in the US or abroad, and expects private industry and the government to vet refurbished material distributors.

Two working group members said that panels are sometimes decommissioned and recycled after as little as 12 years, precluding reuse, and asked for more visibility into panel longevity.

### Applicable Existing Regulations

A working group member observed that offshore materials disposal is covered by established regulations for electronic waste; we could borrow from those regulations rather than reinventing something.

A working group member pointed to North Carolina as having a 2023 law stating that any utility-scale farm over 2 MW has until 2025 to submit a decommissioning + EOL plan to the state DEQ. DEQ can update their practices without a new legislative bill.

A working group member indicated that UL standards could be used to determine eligibility for redeployment.

### Best Practices for Recycling

A working group member pointed to EPA, SERI, and ISO as offering standards that clarify what recyclers are doing, and offered to share materials from conversations with California-based trade groups on recycling standards.

A working group member asked if the working group can and should use established practices outside the US (e.g., Europe) for guidance.

A working group member is concerned about ensuring that people dispose of materials properly, especially because it is cost-prohibitive for recyclers to come and pick up tiny amounts of waste. The member proposed a bond on the order of \$1,000 to ship broken panels to a recycler, and emphasized that the need exists right now. The member said that any project over 25 kW is expected to yield at least one broken panel in construction.

### Eligibility of Systems with Repurposed Components for Incentive Programs

Ms. Harari stated a particular interest in RRES/NRES/ESS.

A working group member observed that individual programs have performance requirements (not newness requirements), and offered to get input from subject matter experts.

A working group member added that used components will have to last the full length of a contract, typically 20 years.

A working group member asked how much solar and storage infrastructure has been deployed outside of regulatory programs.

### **Questions and Comments Received via Slido**

1. Can second life solar or storage technology be used in the RRES/NRES/ESS programs? Are there any program requirements that need to be met?
2. How much solar and storage has been deployed in the state beyond the regulated programs you mention?

3. What is happening internationally in PV/storage EOL policy?
4. Have people/orgs on this call begun work in WA or CA? If yes, how have those programs worked?
5. North Carolina HB 130 is passed and in effect as of July 2023, requiring utility scale (over 2MW) decommission and EOL plans submitted to the state
6. How can we be sure that resell/refurb/repair solar services are not an indirect dumping of near-end-of-life panels in low income communities and countries?
7. Would you please share the PP or at least the schedule & agenda for the monthly meetings?
8. I believe I'm correct that in CT, there are certainly programs - meaning funding - for larger arrays, but none for small (50kW ish) systems. 'Used' option maybe?
9. What are best practices to reduce waste (i.e., refurbish, reuse, etc.) that enters the end-of-life recycling process?
10. What are barriers to reducing waste, and how can they be overcome?
11. The US Treasury Department has guidelines on % required new parts to impact tax credits.

### **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).