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August 5, 2024

Atten: Phoebe O'Connor
Environmental Protection Agency
Office of Resource Conservation and Recovery
Mail Code: 5101T
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

RE: Federalism Consultation on Solar Panel and Lithium Battery Universal Waste Proposed Rule

Dear Ms. O'Connor:

The American Public Power Association (APPA or Association) appreciates the opportunity to provide initial thoughts on the best management practices associated with end-of-life issues with spent photovoltaic solar panels (PV panels) and lithium batteries. In November 2021, APPA joined a broad industry coalition of national trade organizations to petition the Environmental Protection Agency (EPA or Agency) to adopt universal waste management standards for PV panels to support the energy transition to low and non-emitting generation resources. In response to the November 2021 petition, EPA is now developing a proposal rule to add PV panels to the universal waste management program and update the lithium battery universal waste provisions. APPA supports and welcomes engagement with the agency in developing a proposed rule.

APPA is the voice of not-for-profit, community-owned utilities that power 2,000 towns and cities nationwide. We represent public power before the federal government to protect the interests of the more than 49 million people that public power utilities serve and the 96,000 people they employ. Our association advocates and advises on electricity policy, technology, trends, training, and operations. Our members strengthen their communities by providing superior service, engaging citizens, and instilling pride in community-owned power.

Public power utilities serve some of the nation's largest cities (including Los Angeles, California, Seattle, Washington, and Austin, Texas), but most serve smaller communities. Approximately 1,300 of the nation's 2,000 or so public power utilities have ten or fewer employees and serve towns, villages, or counties with fewer than 10,000 people, and all but 144 of the nation's public power utilities would be considered a "small governmental jurisdiction" under the Regulatory Flexibility

Act.¹ Public power utilities operate in 49 states (all but Hawaii) and in 5 U.S. territories (American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands).

Public power utilities are reducing their greenhouse gas (GHG) emissions through various means, including increased use of renewable energy resources, the development of new nuclear power, the addition of distributed energy resources and storage, the adoption of energy efficiency programs, and the promotion of transportation electrification. As the electric sector continues to increase the deployment of solar resources and energy storage, the United States must have national policies in place to enable the responsible reuse and disposal of the materials in end-of-life PV Panels and lithium batteries, given the tremendous number of PV panels and storage being deployed to meet the climate challenge. Therefore, we support EPA's efforts to address the end-of-life issues associated with PV panels and lithium batteries.

We offer the below response to the agency's questions to stakeholders during its federalism consultation.

1. Do you have any best management practices for managing end-of-life solar panels and lithium batteries that you would like EPA to know about?

The best management practices (BMPs) for end-of-life (EOL) lithium-based energy storage batteries might include the following:

- Store in a climate-controlled space with good ventilation;
- Store in an out-building away from offices and other flammable materials;
- Install advanced fire detection and suppression equipment;
- Frequently inspect batteries visually and thermally; and
- Maintain ongoing communications with local fire marshals and first responders about materials and processes happening on site.

The best management practices (BMPs) for end-of-life (EOL) solar panels might include:

- PV panels are separated from other waste streams, stored in areas demarcated by boundaries, and marked clearly.
- Collection containers for PV panels must be structurally sound and prevent release under reasonably foreseeable conditions.
- If PV panels are inadvertently broken, those pieces should be cleaned up and containerized to minimize the potential for a release.
- Once a PV panel is taken out of service, it may be marked and tracked

2. Do you have any other information or concerns you would like to share?

- We are generally concerned about the cost of recycling PV panels and managing lithium batteries. One utility reported that a battery container costs approximately \$250, a standard drum costs \$1000, moving materials costs \$5/pound, and the dedicated truck

¹ 5 U.S.C. §601(5).

costs \$4300/load. This cost could be extremely high depending on the volume of batteries. There are not enough recycling facilities in the market, likely because the materials contained in PV solar panels—mostly glass and aluminum—are currently not considered high-value. To remain profitable, recyclers pass costs down to the generator, which makes it substantially more expensive to recycle the PV panel than to dispose of it in an appropriate RCRA landfill.

- Utilities have concerns about using ASTM E3325-21, particularly about reducing the size of the PV panels to 9.5 mm.
 - As EPA develops universal waste regulations for PV panels and lithium batteries, we encourage the agency to evaluate the emissions and environmental impact of both recycling and landfilling as part of the regulatory impact analysis of the forthcoming proposed rule.
3. EPA would appreciate any information and specific data that state, [stakeholders], and local governments could provide on their experience with:
- a) Testing solar panels for the RCRA toxicity characteristic:
 - Solar panels are not all the same; there are multiple types of PV panels in use and some manufacturers' specifications are not very helpful with waste characterization or end-of-life management. For example, one utility worked with a consultant to test panels for proper waste characterization. Tests showed the panels were nonhazardous – even if broken. If EPA deems all solar panels as universal waste, then the industry would be directing some nonhazardous waste to a hazardous waste landfill at end-of-life, and owners/operators would have to use a treatment storage and disposal facility with proper permits to manage hazardous waste rather than recycle the PV panels.
 - Although it is ideal to determine if solar panels are hazardous or non-hazardous, the determination method needs to be more consistent and representative. Currently, the only method to determine if a panel is hazardous or non-hazardous is collecting a representative sample to assess the leachate of hazardous metals; this includes taking random samples of broken panels. However, if no broken panels are present, you would need to deliberately break a panel to take a representative sample, exposing potentially hazardous material to the environment and the individuals breaking and taking samples. Additional guidance is needed to obtain an accurate representative sample from PV panels. Current methods aren't proven to be true representative. Some samples may contain very little metal content, but taking a sample from another portion of the panel could result in different toxic characteristic leaching procedure (TCLP) readings. We are concerned that inconsistent TCLP readings indicate the material is nonhazardous when it is hazardous, which in turn allows leachate to enter the surrounding environment.
 - b) Storing end-of-life lithium batteries safely to reduce fires:
 - On utility reported that small format lithium batteries have their terminals taped with nonconductive tape to prevent short circuits
 - Some utilities place batteries in individual plastic baggies and place them in poly accumulation containers.

- The batteries are stored in a designated waste area.
- c) Any other difficulties when managing these waste streams:
- Based on current regulations, there are only a few hazardous secondary material recyclers that meet all the transfer-based exclusion recycler requirements. Currently, PV panels that test hazardous must be managed as hazardous waste (though, Hawaii and California have classified hazardous PV solar panels as Universal Wastes under their authorized state hazardous waste programs). Importantly, though, hazardous secondary materials, including hazardous PV panels, are excluded from hazardous waste regulation when recycled under the “transfer-based exclusion” at 40 C.F.R. 261.4(a)(24). We have a concern that not all states have adopted this exclusion; if the recycling facility is in a different state than the waste generator, both the generator state and recycling facility state must have adopted the transfer-based exclusion. We believe only two-thirds of states have adopted transfer-based exclusion.

We appreciate the opportunity to provide initial feedback on best management practices for PV panels and lithium batteries. We look forward to working with the agency to develop workable universal waste requirements for these products. Please contact Carolyn Slaughter (CSlaughter@publicpower.org) if you have questions regarding these comments.

Sincerely,



Carolyn Slaughter
Senior Director, Environmental Policy
American Public Power Association