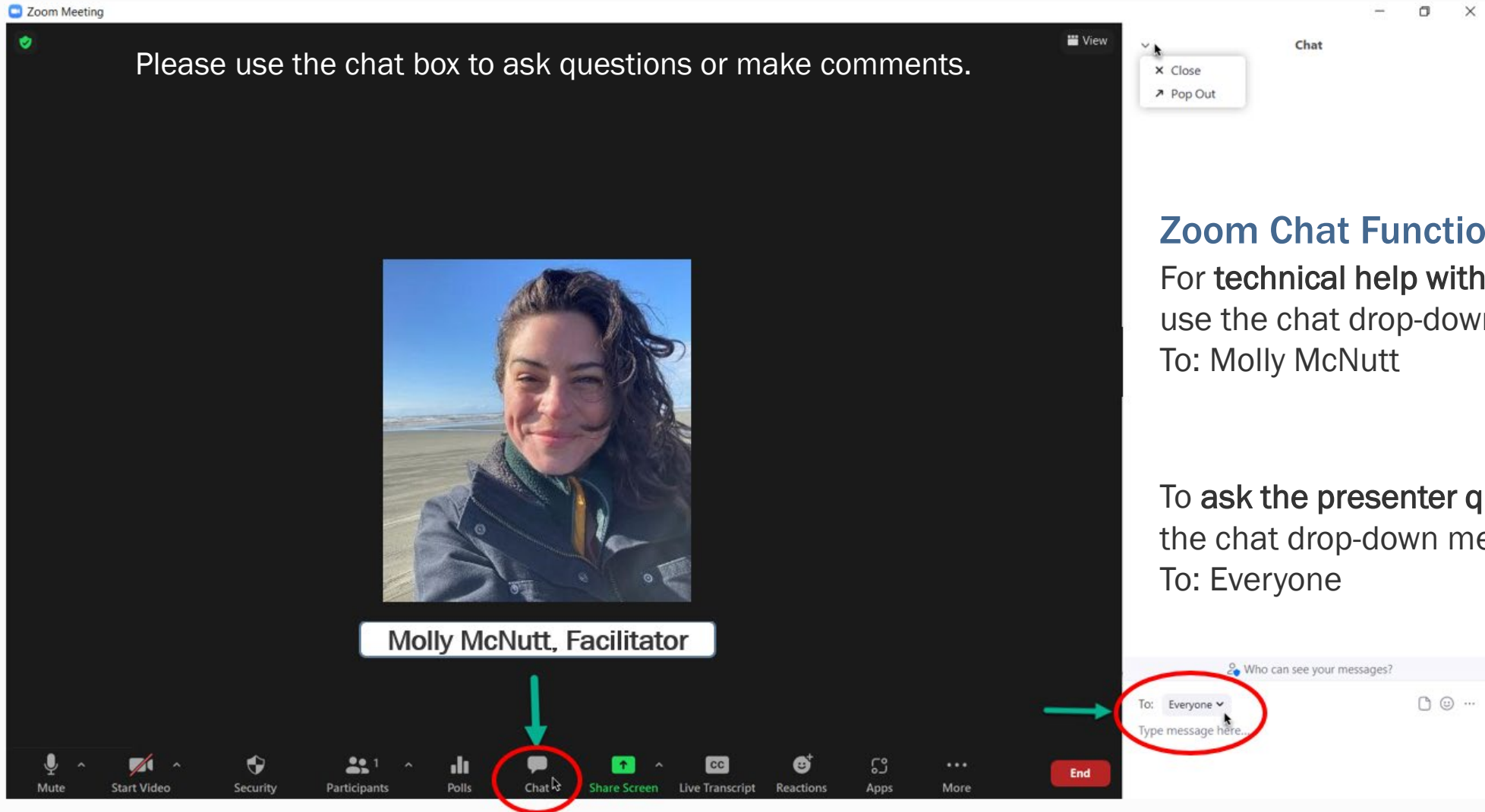




Photovoltaic (PV) Module Stewardship and Takeback Program

Megan Warfield
September 20, 2024

Assisting with this meeting:



The image shows a Zoom meeting interface. At the top, a text box says "Please use the chat box to ask questions or make comments." Below this is a video feed of a woman, Molly McNutt, with the caption "Molly McNutt, Facilitator". At the bottom, the Zoom control bar is visible, with the "Chat" icon circled in red. A green arrow points from the "Chat" icon to a separate window showing the chat interface. In this window, the "To:" dropdown menu is also circled in red, and a green arrow points to it from the "Chat" icon. The dropdown menu is currently set to "Everyone".

Zoom Meeting

Please use the chat box to ask questions or make comments.

View

Chat

Close

Pop Out

Who can see your messages?

To: Everyone

Type message here...

Mute Start Video Security Participants Polls Chat Share Screen Live Transcript Reactions Apps More End

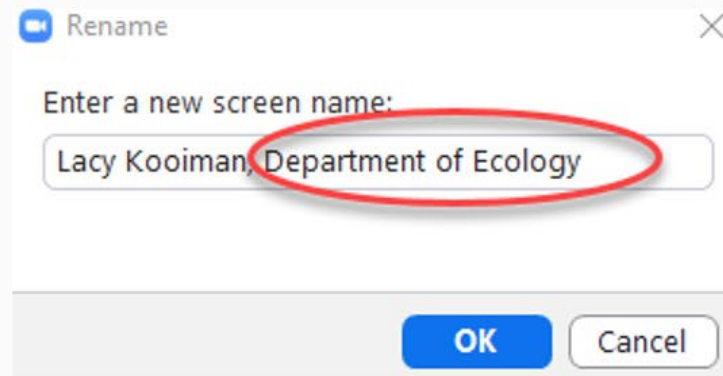
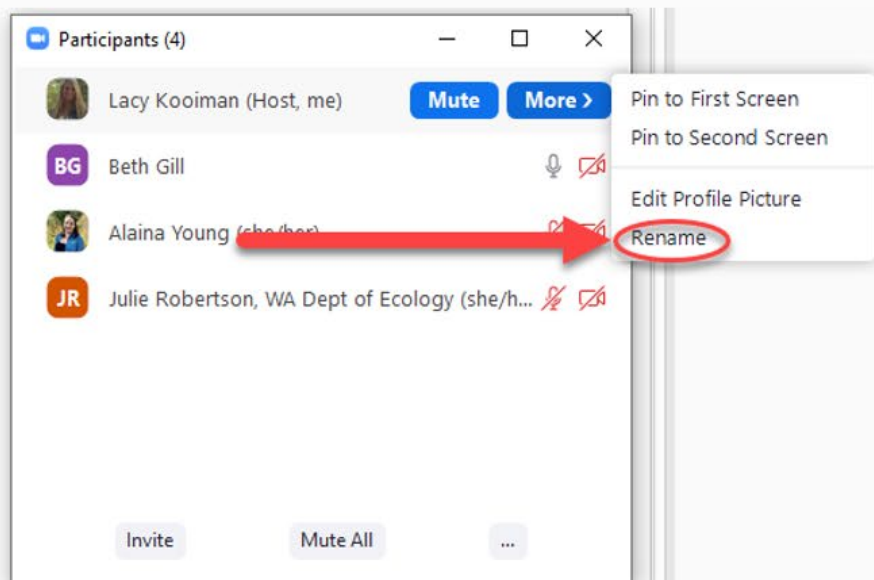
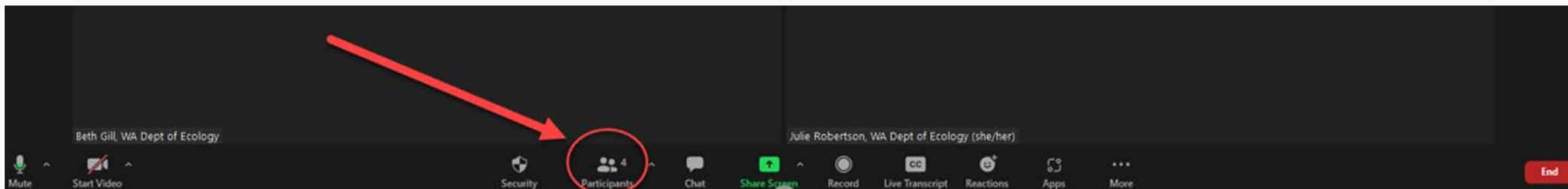
Molly McNutt, Facilitator

Zoom Chat Functions

For technical help with Zoom, use the chat drop-down menu to select To: Molly McNutt

To ask the presenter questions, use the chat drop-down menu to select To: Everyone

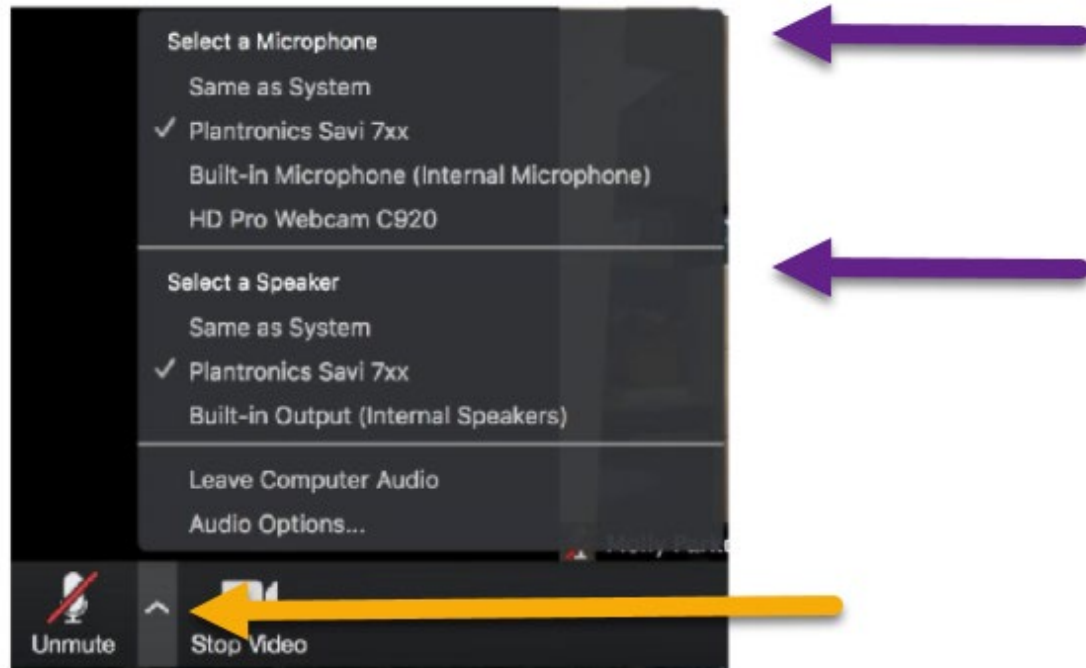
Zoom Functions: Rename to Add Your Affiliation



Zoom Functions: Audio Settings

Mute/Unmute & Audio Settings

You can mute and unmute your microphone. If you click on the arrow next to the mute button (bottom left main Zoom screen), you have additional options for audio settings. You can change your microphone, leave the computer audio or access the audio options.

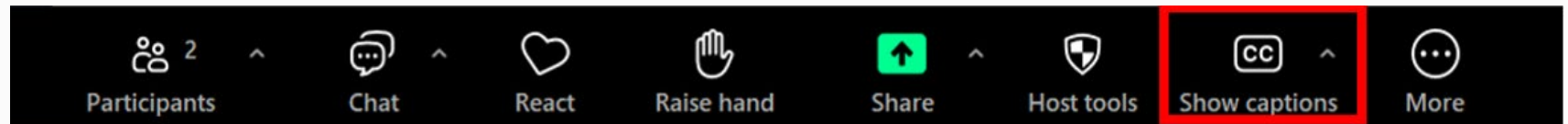
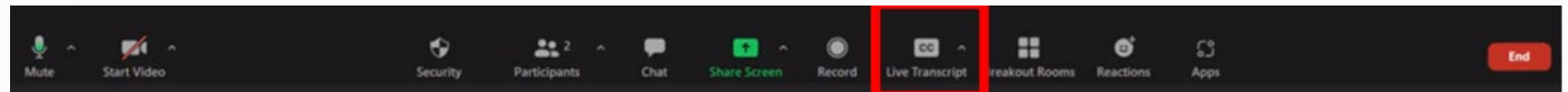


Closed Captions

Closed captions and a live transcript is enabled for this meeting.

To turn on the live transcript:

- Locate the cc “Live Transcript” or “Show Captions” option on your Zoom control bar.
- Different versions of Zoom look a little different.



Meeting Logistics: Questions & Comments

- Throughout the meeting, if you would like to ask a question or make a comment, please use Zoom's chat or "raise hand" feature.
- We have allotted time on the agenda for questions, comments and discussion.
- This meeting will be recorded.

Today's Agenda

Time	Topic
9:30 AM	Welcome and meeting logistics
9:45 AM	Overview of Chapter 70A.510 RCW <ul style="list-style-type: none">• Manufacturer responsibility• Stewardship plans• July 1, 2025 deadline
10:15 AM	Presentations by Third Party Organizations <ul style="list-style-type: none">• Electra• MRM
10:45 AM	Ecology Updates <ul style="list-style-type: none">• Work to identify manufacturers & other data• Plans under review• Interpretation of “no cost” clause in law• Agency request legislation
11:00 AM	Open Discussion
11:20 AM	Next Steps & Conclude <ul style="list-style-type: none">• Future meeting• Survey



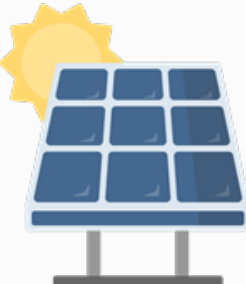
Overview of Chapter 70A.510 Revised Code of Washington



Product stewardship in Washington



2007



2017



2019

2010



2018



2023



Manufacturer Definition

RCW 70A.510.010(2)(e)

- **Manufactures or has manufactured** a photovoltaic module under its own brand names for use or sale in or into this state;
- (ii) Assembles or has assembled a photovoltaic module that uses parts manufactured by others for use or sale in or into this state under the assembler's **brand** names;
- (iii) Resells or has resold in or into this state under its own brand names a photovoltaic module produced by other suppliers, including retail establishments that sell photovoltaic modules under their own **brand** names;
- (iv) Manufactures or has manufactured a cobranded photovoltaic module product for use or sale in or into this state that carries the name of both the manufacturer and a retailer;
- (v) **Imports** or has imported a photovoltaic module into the United States that is used or sold in or into this state. However, if the imported photovoltaic module is manufactured by any person with a presence in the United States meeting the criteria of manufacturer under (e)(i) through (vi) of this subsection, that person is the manufacturer;
- (vi) **Sells** at retail a photovoltaic module acquired from an importer that is the manufacturer and elects to register as the manufacturer for those products; or
- (vii) Elects to assume the responsibility and register in lieu of a manufacturer as defined under (e)(i) through (vi) of this subsection.

Photovoltaic Module

RCW 70A.510.010(2)(f)

“Photovoltaic module means the smallest non-divisible, environmentally protected assembly of photovoltaic cells or other photovoltaic collector technology and ancillary parts intended to generate electrical power under sunlight, except that "photovoltaic module" does not include a photovoltaic cell that is part of a consumer electronic device for which it provides electricity needed to make the consumer electronic device function. "Photovoltaic module" includes but is not limited to interconnections, terminals, and protective devices such as diodes”



Stewardship Organization vs. Individual Manufacturer

RCW 70A.510.010(4) & (5)

- Manufacturers may form or work with a stewardship organization
- Each manufacturer must submit a plan
- Program must accept “all of *their* photovoltaic modules”

Product stewardship program plans RCW 70A.510.010(5)

- List of producers
- Financing
- Outreach
- Takeback locations
- Handling/processing
- Goals & targets



Plan Guidance Document:

<https://apps.ecology.wa.gov/publications/SummaryPages/1907014.html>

Annual Report Requirements RCW 70A.510.010(7)

- Assess achievement of performance goals (85% reuse/recycling rate of collected panels)
- Recommendations to improve the program
- Must be posted on publicly accessible website.

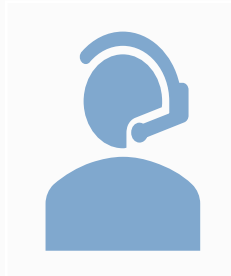


Do Not Sell & Enforcement Provisions

RCW 70A.510.010(8)



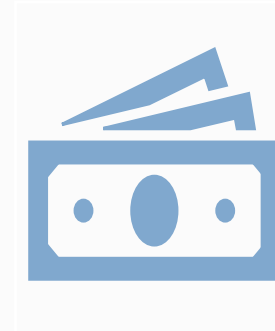
Beginning July 1, 2025,
no manufacturer, distributor, retailer, or installer may sell or offer for sale a photovoltaic module in or into the state unless the manufacturer of the photovoltaic module has submitted to the department a stewardship plan and received plan approval.



Provide technical assistance



Issue warning letter



May assess a penalty of up to \$10,000 for each sale of a photovoltaic module



Must send written warnings to distributor, retailers or installers

Agency Fees

RCW 70A.510.010(9)



The agency may collect a flat fee to cover the costs associated with developing the plan guidance



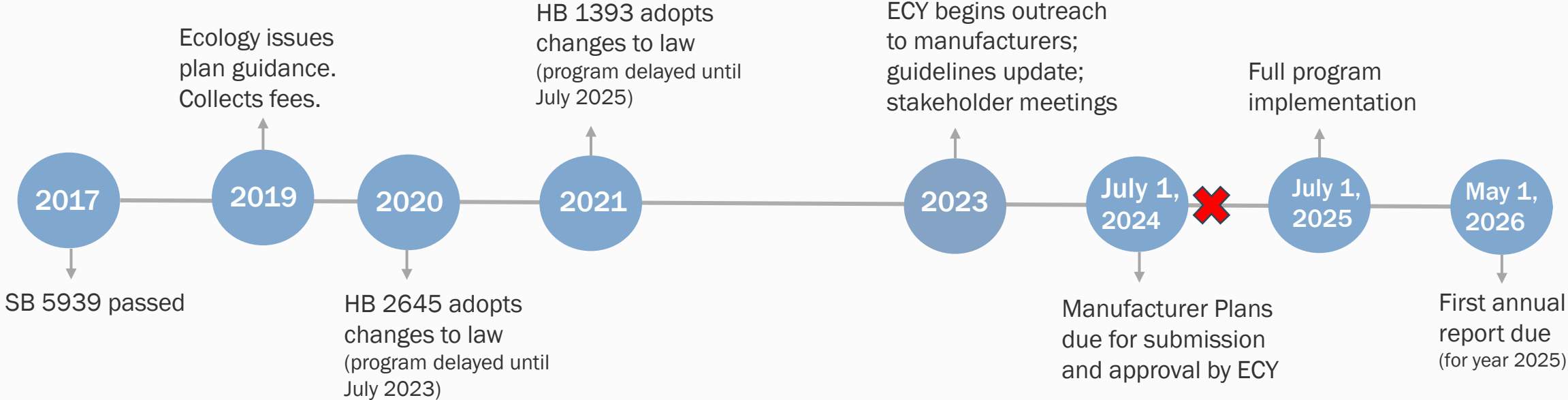
Other administrative costs may be recovered by charging an annual fee based on a manufacturer's pro-rata share of Washington sales

Miscellaneous Provisions

- Photovoltaic module recycling account is created
- Ecology may write regulations
- Ecology may determine substantial equivalence if a national program is developed



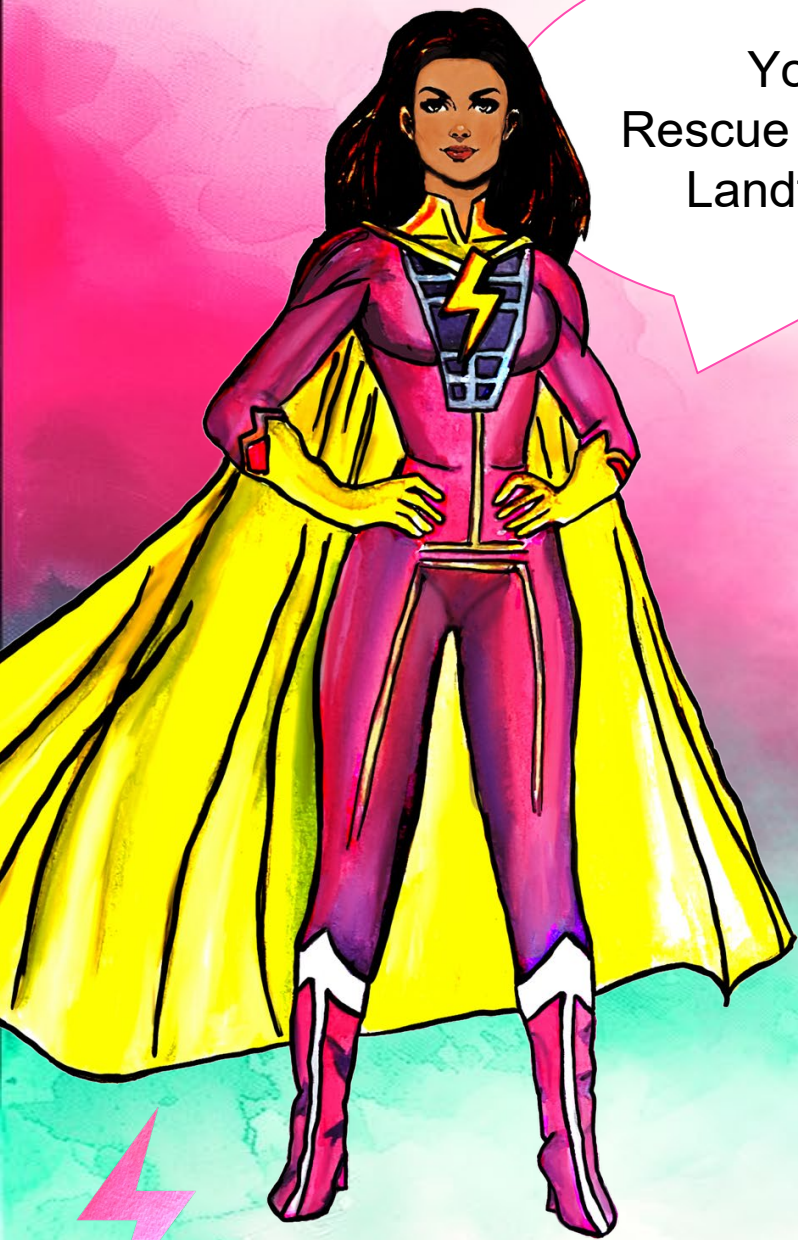
PV Module Stewardship and Takeback Program Timeline





Presentations by Third Party Organizations





You Can
Rescue Panels from
Landfill Doom!



ELECTRATM

**Shockingly Awesome
Solar Stewardship**





30 PLUS
Power Saving System

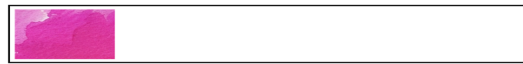
BBC NEWS

What are the Current Options?

LANDFILL



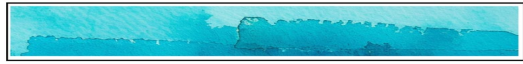
TIME



low

high

RISK



low

high

IN HOUSE PROGRAMS



TIME



low

high

RISK



low

high

APPEAL LEGISLATION



TIME



low

high

RISK

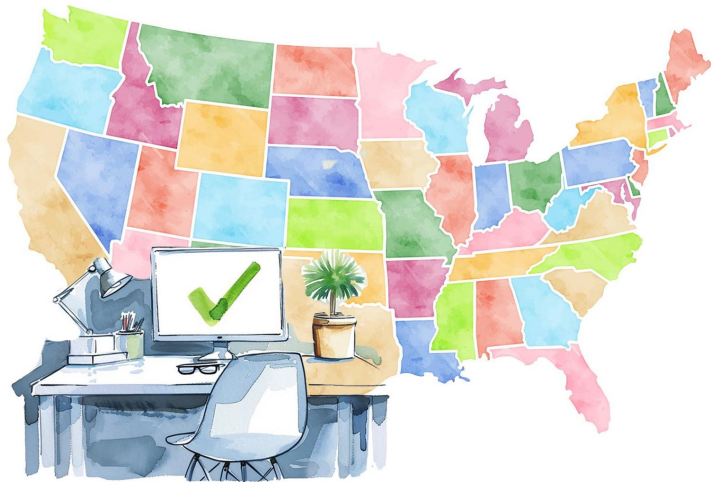


low

high

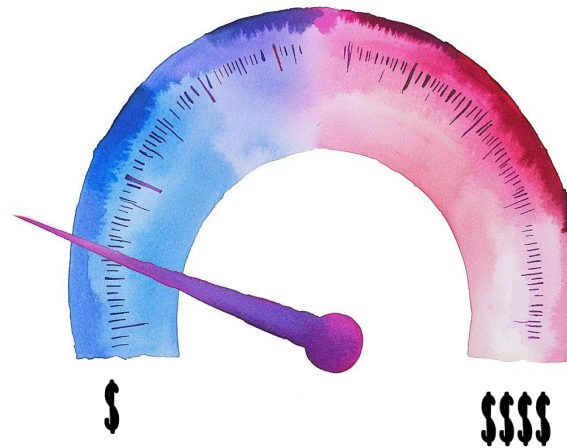
What Would be **Ideal**?

NATIONAL COMPLIANCE



- **Traceable**
- **Quick Reports**

COST-EFFECTIVE



- **Lowest Expense**
- **Predictable Fees**

CERTIFIED STEWARDSHIP



- **Validated Metrics**
- **Lower Liabilities**



Electra's 2-Part Solution

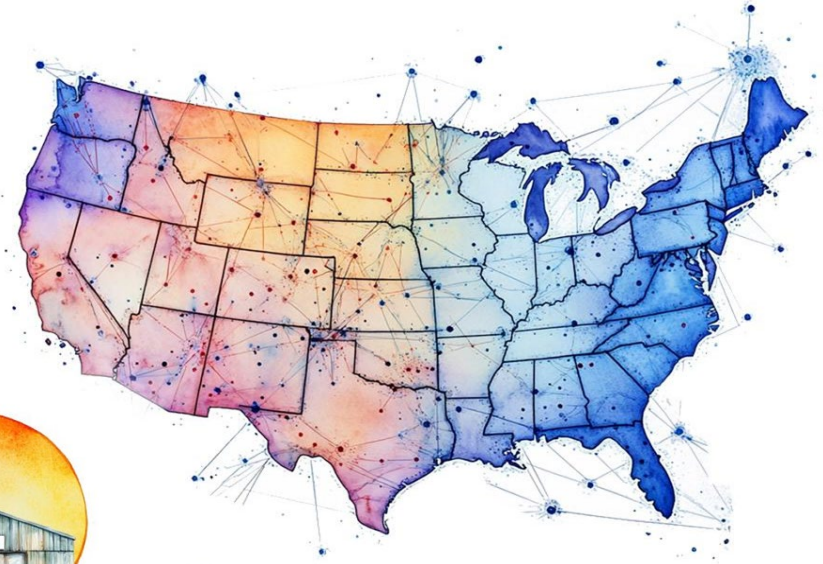
SOLAR PANEL REGISTRY



Cloud-Based
Software



STEWARDSHIP NETWORK



Real-World
Infrastructure

Dashboard

Registrations

Customers

Inventory

QR Code Generator

QR Scanner

Calculator

Settings

Panel Registration Wizard

- 1 Customer Information
- 2 **Panel Details and Calculator**
- 3 Summary and Document Upload

Panel Details and Calculator

STATE OF REGISTRATION
Washington

NUMBER OF PANELS

WATTS PER PANEL

MANUFACTURER
SolarTech

MAKE
ST 200W

YEAR OF MANUFACTURE
2017

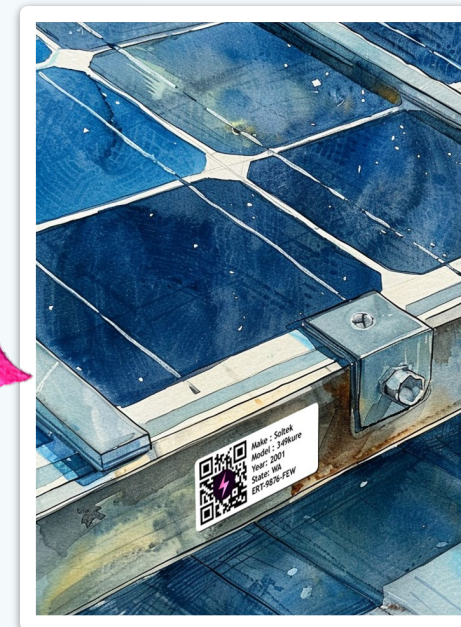
I have a valid proof of purchase ?
 I have a serial number for each panel ?

ANTICIPATED DROP-OFF DATE
After: July 16, 2034

Registration Fee	\$320
Qualifying Discounts: 75%	-\$240
Standard Takeback Fee	\$80
manufacturer pays 100%	-\$80
Subtotal	\$80

Your Cost: \$80
[show me the cost breakdown](#)

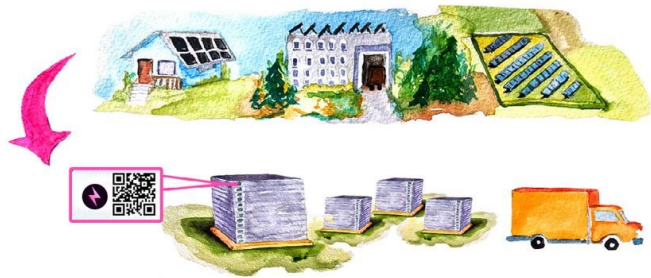
You Save 75%
with participating manufacturers and valid documentation



BACK CONTINUE

Fast Forward to...Decommission

1 PV DECOMMISSION



Labeled
During Removal



2 COLLECTION & SORTING



4 REUSE & RECYCLE



3 SMART HAULING



[Dashboard](#)[Registrations](#)[Customers](#)[Inventory](#)[QR Code Generator](#)[QR Scanner](#)[Calculator](#)[Settings](#)[Registrations](#) > #5162

Registration: #5162

[PAY NOW](#)[EDIT](#)

Registration Information

REGISTRATION COMPLETED 05-04-202	REGISTRAR Bright Future Solar	REGISTERED IN STATE Washington	NUMBER OF PANELS 200
INSTALLATION ADDRESS 321 Green Lane, Ecoville, WA 80201	REGISTERED TO Eco Friendly eco.friendly@solarhome.demo	REGISTRATION INITIATED 10-02-2024	LAST ACTIVITY Registration Complete
CURRENT STATUS PENDING	EXPIRATION DATE 10-02-2024		

Panels in the Registration

[ACTIONS](#)

<input type="checkbox"/>	Panel ID	Make	Model	Year Manufactured	QR Codes
<input type="checkbox"/>	pan-89	SolarTech	ST-200W	2017	
<input type="checkbox"/>	pan-90	SolarTech	ST-200W	2017	
<input type="checkbox"/>	pan-07	SolarTech	ST-200W	2017	
<input type="checkbox"/>	pan-90	SolarTech	ST-200W	2017	
<input type="checkbox"/>	pan-89	SolarTech	ST-200W	2017	
<input type="checkbox"/>	pan-90	SolarTech	ST-200W	2017	

[ASSETS](#)[BILLING](#)[ACTIVITY](#)

Tracking History

- Proof of Purchase Failed**
Tue, Aug 9, 2024 (GMT-7)
📍 Location: [Redacted]
👤 Updated by: Heather Alvis
- Document Uploaded**
Tue, Aug 9, 2024 (GMT-7)
📍 Location: [Redacted]
👤 Updated by: Heather Alvis
- Registration Modified**
Tue, Aug 9, 2024 (GMT-7)
📍 Location: [Redacted]
👤 Updated by: Heather Alvis
- Registration Expired**
Tue, Aug 9, 2024 (GMT-7)
📍 Location: [Redacted]
👤 Updated by: Heather Alvis
- Invoice Paid**
Tue, Aug 9, 2024 (GMT-7)
📍 Location: [Redacted]
👤 Updated by: Heather Alvis
- Invoice Generated**
Tue, Aug 9, 2024 (GMT-7)
📍 Location: [Redacted]
👤 Updated by: Heather Alvis

PRODUCT STEWARDSHIP

1 **PV DECOMMISSION**
Certified **Electra Members** apply tracking **QR code** label to retired panels



2 **COLLECTION & SORTING**
Pallets dropped off & **screened** for reuse at convenient certified **Collection Hubs**,



3 **SMART HAULING**
We optimize **shipping routes**, **link pick-ups** and generate **full truckloads**

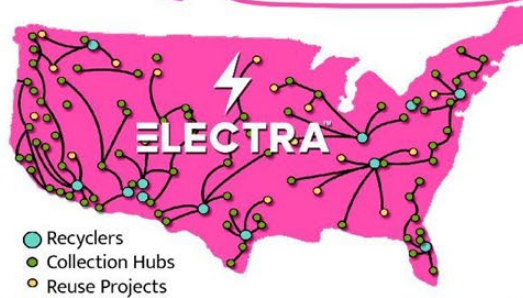


SOLAR PANEL REGISTRY



STATE CENTRAL FUND
Electra **collects funds locally**, and digitally **manages payments** for collectors, haulers & recyclers

~~90% Landfill~~ **95% Reuse & Recycle**



REPORTING
Members export **metrics & reports** for regulation compliance & ESG



PAYMENT
We **digitally pay** Collectors, Haulers and Recyclers and provide reports through SaaS accounts



REUSE & RECYCLE
Reuse & Recyclers **scan** each panel and data is stored for reporting.



Join Our Program

Starter Kit - Available NOW

ELECTRA'S SOLUTION OFFERS

- Easy Compliance
- Lowest Costs
- Verified Tracking, Real-Time Data
- Your Brand on Our Stewardship Plan
- \$10K Credit (Pre-Paid Fees)
- July 2025 Launch



heather@goelectra.io



PRODUCER RESPONSIBILITY ORGANIZATIONS AND WASHINGTON SOLAR PANEL RECYCLING

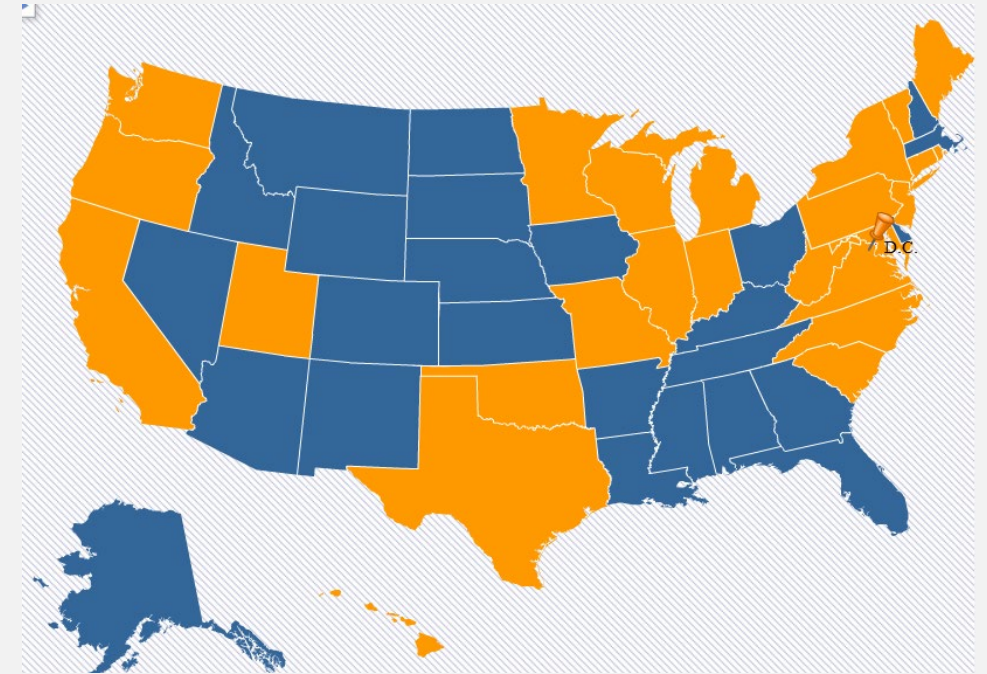
*Presentation to Washington Department
of Ecology Solar Stakeholder Meeting
September 20, 2024*

By Electronic Manufacturers
Recycling Management Co.
(MRM)



Introduction to MRM

- Created by manufacturers, for manufacturers
- Founded in 2007 in response to electronics EPR laws in US
- Currently run the largest electronics Product Stewardship PRO in US – just under 50 manufacturers and operate e-waste programs in 21 states, Washington DC, and Ontario, Canada
- Set up and run programs, ensure compliance with e-waste laws and regulations, submit required reporting to states, ensure responsible recycling, provide additional risk protection, insurance, and oversight, and assist with manufacturers' Circular Economy goals
- Awarded work by manufacturer to develop a Solar Program in Washington



States highlighted in [orange](#) have some type of electronics recycling *program* law

Producer Responsibility Organizations (PROs)

- PROs administer Extended Producer Responsibility (EPR) programs on behalf of group of producers
- EPR programs require those manufacturing products to take responsibility for end-of-life management of their products
- PROs help those subject to EPR requirements meet obligations
 - Set up and run Stewardship programs. Handle takeback operations, reporting, oversight, outreach to public
 - Allow those subject to requirements to pool resources
 - Are organized by product type or category



PRO Structures

Variety of PROs structures:

- Established or required by state (Packaging)
- Set up as independent manufacturer collective programs (Electronics/MRM)
- Private for-profit entities (run by recyclers)
- Organized by product type or category
- Can be organized in response to laws, as voluntary initiatives, or combination of both



**Circular
Action
Alliance™**



PaintCare®
RECYCLING MADE EASY

PRO Features and Considerations

State Law

- Often manufacturers have option to carry out EPR requirements on their own, but requirements are challenging to meet as an individual company
- In Washington State producers can fulfill requirements individually or collectively

Costs – start up and ongoing. Funding mechanisms vary between PROs

- Up front licensing fees
- Recycling volume fees
- Combination models

Responsible recycling – environmental and financial

Capability – Experience and track record



MRRM Plan Concept – Sept 2024

By Manufacturers, for Manufacturers: Sensitive to manufacturer efficiency concerns, ensure compliance and highest environmental performance.

- Pay for your brand returns as need arises; no up-front collection fees
- Small annual fee to cover public outreach and operations costs
- Bill actual panel collection and recycling cost + small administrative mark up

Program Overview

- MRRM toll-free number and email response system already in place for those requesting recycling
- Determine brand and eligibility of items for recycling
- State-wide collection network with collection hubs
- Build out collection network as volumes grow – long-lived product
- SEIA approved recyclers

Thank You

Electronic Manufacturers Recycling Management Co. (MRM)

Main Phone: 952.582.2965

Tricia Conroy

Phone: 612.384.4264

Email: Tricia.Conroy@mrmrecycling.com





Ecology Updates



Current Status

- The statewide collection program is not currently operational.
- Manufacturer outreach is challenging.
- Lack of data on panels installed since 2017
- Recycling Options are limited:
 - Lack of recyclers within a reasonable distance
 - Recycling processes may not meet requirements in law
 - Recycling costs are high

Submittals Received

- ✓ Canadian Solar
- ✓ Heliene
- Hyundai Energy Solutions
- ✓ Jinko Solar
- LG
- Longi Solar
- Maxeon
- Panasonic
- ✓ Qcells
- REC
- ✓ Silfab Solar
- Solar4America
- ✓ Electra*
- ✓ Cypress Creek*

** Not a manufacturer*

General Feedback



- Stewardship plans should detail “how” programs will operate.
 - How will panels get to takeback locations?
 - Where will takeback locations be?
 - Who will be transporting them?
 - Where will they go?
- Locations of collection/consolidation sites
- Outreach & education about program
- Detail about downstream processors
- Fees and funding

“Cost” Language in RCW 70A.510(5)(a)(i)

“ (i) Describe how manufacturers will finance the takeback and recycling system, and include an adequate funding mechanism to finance the costs of collection, management, and recycling of photovoltaic modules and residuals sold in or into the state by the manufacturer with a mechanism that ensures that photovoltaic modules can be delivered to takeback locations without cost to the last owner or holder;

- No fee may be charged at a takeback location at the panel’s end-of-life
- Law is silent on other additional fees

Problems with Chapter 70A.510 RCW Photovoltaic Module Stewardship & Takeback Program

- PV Module manufacturers were required to submit stewardship plans to Ecology July 1, 2024
- Beginning July 1, 2025, PV modules may not be sold into Washington unless the manufacturer of that module has an approved plan
- Many manufacturers have decided to not sell in Washington, threatening the state's transition to clean energy



Agency Request Legislation



Delays stewardship plan submittal until January 31, 2028



Delays “do not sell” provision until January 31, 2029



Calls for the formation of an advisory committee

Third party facilitator

Develop recommended changes to the law

Culminates with Ecology legislative report,
December 1, 2026

Comment on the Legislative Proposal

- You can access the proposal here:
 - <https://ecology.wa.gov/waste-toxics/reducing-recycling-waste/our-recycling-programs/solar-panels>
- You can go directly to the comment form:
 - <https://wt.ecology.commentinput.com?id=KQpmg8hSf>





Open Discussion





Next Steps



We need your help



Stay in Touch

We are creating an email list to keep people informed of this work. Please join the list using this link or QR code.

https://public.govdelivery.com/accounts/WAECY/subscriber/new?topic_id=WAECY_302



Next Steps

- Feedback to those who submitted.
- Future meeting?
- Continued outreach to manufacturers and solar industry partners.
- Publish updated guidance and FAQ.



Thank you

Megan Warfield

Product Stewardship Unit Supervisor
Solid Waste Management Program, Dept. of Ecology

Megan.Warfield@ecy.wa.gov

Cell: (360) 701-9683

Brett Rude

Product Stewardship Specialist
Solid Waste Management Program, Dept. of Ecology

Brett.Rude@ecy.wa.gov

Cell: (564) 669-9349

Visit: <https://ecology.wa.gov/waste-toxics/reducing-recycling-waste/our-recycling-programs/solar-panels>