

Prepare for recycling PV equipment

Gather information

- Type of equipment
 - PV modules (mono or polycrystalline, thin-film, shingle-type, etc.)
 - Inverters or microinverters
 - Racking equipment or trackers
- Collect manufacturer's name and serial numbers of each product to be recycled
- Identify how many modules and related equipment (such as inverters, racking, etc.) will be processed
- Determine how the shipment is/will be packaged (stacked, packages, banded, on pallets, etc.)
- Determine the total weight in pounds for modules and other equipment (separate by type of equipment)
- Determine if external (third-party) logistics are required for the shipment
 - How will the modules be shipped?
 - Who will pay for the transit?
- Gather photos or pictures of the modules
- Identify current storage location and conditions (inside, outside, how protected, etc.)
 - Are there photos of how the modules have been stored while awaiting disposition?
 - Is the storage location accessible by a lift truck or stacker?
 - Is there a lift truck or stacker available on-site or does one need to be brought on-site?
 - What is the address of current location of modules/other equipment
- Identifying details regarding the condition of the equipment is helpful for advanced preparation of recycling
 - Are the frames bent or damaged?
 - Is there glass breakage?
 - How long have the modules have been in storage?
 - Are the inverters dented or damaged in any way?
 - Is there any corrosion damage on the mounting rails or pilings?
 - Are you making a warranty claim, and have you noted the damage on the modules by serial number?
- Obtain a Material Safety Data Sheet (MSDS) or similar information

Choose a recycling partner

- SEIA members receive specific pricing and other benefits from our [partners](#)
- SEIA's service partners offer their services to other entities
- Note that some local e-Waste recyclers or glass recyclers may accept PV modules
- Note that not all recycling processes are the same
 - Some recyclers may have more sustainable processing techniques
 - Ask about material diversion to landfill if this is of concern
- Check that the recycler has the appropriate R2 or e-Stewards accreditation in addition to complying with EPA permitting requirements
- Ensure that you will receive a Certificate of Destruction/Recycling for the products sent (COD/COR)
 - Request that this be sent with the invoice (or check if credit is to be owed back to your business for the recycled product)
- Using your organization's sustainability guidelines, check if the recycler complies.

Prepare documentation and arrange shipment for collection, transport or drop-off

- Provide Material Safety Data Sheet (MSDS) or similar information on the type of PV modules (i.e. Mono/Poly Crystalline, thin-film etc.)
 - If you do not have an MSDS, ask the manufacturer or distributor for a material info sheet/spec sheet
- Determine whether or not the panel /other equipment should be managed as solid waste, universal waste or other hazardous waste
 - Check your state of local community's waste management criteria or requirements
 - Determine if EPA or state characterization rules apply
- Determine the total weight in pounds for modules and other peripherals
 - Identify the total weights of each type of equipment separately and then the total shipment weight
- Provide any Purchase Order #'s or Company Identifying #'s that clearly identify the shipment
- Label each package or pallet with the Name, Address, and service company's Shipping # (Order# or any # provided by the service company to clearly identify that shipment as matching the Purchase Order # or Identifying #)
- Provide a detailed packing list with the shipment
- If external logistics / shipping services are required, identify the pick-up location, and method of packaging to the shipper and the service company

Using Pallets for shipment

- If using pallets, provide the # and dimensions of the pallets to ensure the right type of truck is arranged to transport the materials to their destination
- If using pallets, it is recommended that you stack the pallets between 28 and 35 modules high to make them economical to ship and to avoid any further damage to the panels. Ask your manufacturer or distributor for more information on recommended stacking.
- Too few modules on the pallet and the economy of the space is not optimized.
- Too many modules and there may be problems with shifting or moving panels, which could increase damage to the panels or the module glass or provide difficulty in fitting the pallet in the truck due to height restrictions, etc.
- The average truckload of PV modules, when palletized as suggested, can hold between 12 and 13 pallets and weigh an average between 18K and 20K lbs.
- Band the Modules to the pallet whenever possible to keep modules from shifting or falling. Shrink wrapping the pallets tightly will help prevent shifting and avoid further broken glass from escaping, thus creating a "clean up" issue for the transportation company.
- Stack like-size modules together whenever possible. When pallets are banded with modules that vary in length and width, they are more susceptible to shifting or tipping over in transit

Schedule the shipment pick-up or transport

- When scheduling your own transportation, it will be important to coordinate the expected delivery date and time with the service company's customer service/logistics staff, so that an arrival date and time slot can be reserved.
- It is not recommended to send a shipment without coordination and notification as the receiving and unloading processes may be delayed if the service company cannot accommodate the shipment without notice.