

**C A G**

Citizen consumer and civic Action Group

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The Chairman

Central Pollution Control Board (CPCB)
Parivesh Bhawan, East Arjun Nagar
Delhi - 110032

June 28, 2025

Dear Sir/Madam,

Subject: Submission of comments/Suggestions on the draft Guidelines for Storage and Handling of Waste Solar Photo-Voltaic Modules or Panels or Cells

I am writing on behalf of Citizen, Consumer, and Civic Action Group (CAG), Chennai, a 39-year-old nonprofit organisation working towards protecting citizens' rights in consumer, civic, and environmental issues and promoting good governance processes, including transparency, accountability, and participatory decision-making.

We welcome the CPCB's, release of the draft Guidelines for Storage and Handling of Waste Solar Photo-Voltaic Modules or Panels or Cells. These guidelines represent a crucial step towards ensuring the environmentally sound management of solar waste in India, aligning with the principles of the E-Waste (Management) Rules, 2022, and fostering a circular economy for this vital renewable energy source.

We appreciate the CPCB for addressing key aspects such as Extended Producer Responsibility (EPR), prevention of open dumping, ensuring worker safety, and emphasizing proper storage conditions. The clarity on documentation, traceability, and the need for public awareness campaigns are particularly noteworthy. However, as an organisation working closely on energy, environment and climate mitigation, we have conducted a detailed review of the draft and would like to respectfully submit our comments and recommendations **(attached with this letter)** for your kind consideration.

We believe that incorporating these suggestions will further enhance the effectiveness, practicality, and robustness of these draft guidelines, facilitating a more sustainable and environmentally responsible solar energy sector in India.

TRUSTEES

Mr. H. Ashok Vardhan Shetty IAS (retd)
Dr. George S. Thomas (Orthopaedic Surgeon)
Dr. R. Hema (Associate Professor)

Dr. C. Rammanohar Reddy (Economist & Editor)

Dr. Sandeep Murali (General Surgeon)

Mr. Sriram Panchu (Senior Advocate)

Dr. Suchitra Ramkumar (Doctor and Teacher)

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Ms. Tara Murali (Architect)



We sincerely urge the CPCB to consider our inputs as it finalises the notification. We would also be happy to engage further should there be an opportunity for stakeholder consultations or technical discussions.

Thank you for the opportunity to contribute to this significant policy development.

Regards,

Vamsi Sankar Kapilavai
Programme Lead – Environment and Climate Action

Attachments: Comments/Suggestions on the draft Guidelines for Storage and Handling of Waste Solar Photo-Voltaic Modules or Panels or Cells



Comments/Suggestions on the draft Guidelines

S. No	Section/Clause	Existing Provision	Suggested Amendment/Comment	Rationale/Justification
1	1. Background	E-Waste recycling targets shall not be applicable for waste generated from solar photo-voltaic modules or panels or cells.	Recommend CPCB specify a phased timeline for bringing solar PV waste under recycling targets starting from 2035, aligned with waste stockpile projections.	Absence of clear future targets disincentivizes investment in recycling infrastructure. A timeline ensures predictability and compliance readiness.
2	2. Objective and Scope	Applicable to producers, manufacturers and recyclers.	Explicitly include bulk consumers (e.g., DISCOMs, solar park developers, government agencies) under the scope of the guidelines, with clear responsibilities for storage, safe handling, and handover to authorized entities.	Bulk consumers generate significant waste and their role is critical.
3	3. Environmental Concerns	Qualitative mention of environmental risks	Include quantified projections for solar PV waste generation in India (e.g., study by NITI Aayog) and average material composition breakdown (e.g., glass, metals, silicon) to aid infrastructure planning and resource recovery.	Builds contextual understanding for stakeholders and underscores urgency.
4	4. General Average Composition	Lists materials.	Suggest inclusion of quantified average composition percentages (e.g., glass 70-75%, aluminium 10%, silicon 5%, metals 1-2%) and differentiate based on PV type (silicon-based, thin-film).	Material composition informs recyclers, policymakers, and investors about resource recovery potential.



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5	5.1 (Transportation)	It shall be ensured that solar waste shall never be disposed of or dumped in open area.	Explicitly mention that producers, manufacturers, and bulk consumers are responsible for ensuring proper disposal and preventing unauthorised dumping. State Pollution Control Boards (SPCBs) should oversee compliance.	Eliminates ambiguity and gives responsibility to the relevant stakeholders.
6	5.5 (Transportation)	Trucks preferably authorized for transportation of hazardous waste.	Make use of authorized hazardous waste transport mandatory, not optional, for damaged or waste solar panels.	Eliminates ambiguity, prevents unsafe handling and reduces illegal dumping risks.
7	5.6 (Transportation)	Sender should follow Hazardous and Other Wastes Rules, 2016.	Clarify that Transport Manifest under Hazardous Waste Rules must be maintained for all interstate movement of solar waste.	Enforces traceability and prevents illegal diversions during transit.
8	5.4 (Storage)	Storage area should be covered, ventilated, dry.	Recommend minimum standards for ventilation rates, protection from UV exposure, and pest control to preserve panels for potential reuse/refurbishment.	Preservation enables reuse, supporting circular economy principles.
9	5.5 (Storage)	Storage area floor should be non-leachable, impervious.	Suggest inclusion of BIS/IS code references for recommended floor material (e.g., IS 456 for concrete specifications).	Standard references ensure quality, reduce interpretation errors.
10	5.6 (Storage)	Stack not more than 20 layers or 2 meters.	Develop differentiated stacking guidelines based on panel types (e.g., thin-film, silicon-based) to ensure safety and efficiency.	Avoids blanket rules that may be unsuitable for varying panel types.
11	5.7 (Emergency Preparedness)	ERP in place.	Mandate submission of ERPs to CPCB and SPCBs during facility authorization. Require	Ensures ERP quality, implementation and enhances preparedness.



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			periodic mock drills and compliance with National Building Code fire safety norms.	
12	5.8 (Labeling)	Containers should be clearly labelled.	Recommend standardized labelling format with pictograms for "Recyclable Solar Waste", "Hazardous Material", date of storage, and emergency contact.	Uniform labels aid quick identification during inspection, handling, and emergencies.
13	5.9 (Inventorization)	Inventorization should be done.	Provide a prescribed digital format integrated with CPCB's portal for real-time waste tracking.	Supports national database creation, aids planning for recycling infrastructure.
14	General	No mention for pre-existing solar PV installations	Clarify the disposal and take-back responsibilities for pre-existing solar PV installations to ensure safe handling at end-of-life.	Provides clarity to manufacturers and consumers on disposal mechanism for panels sold before the release of this rule/guideline.
15	General	No clarity on solar waste collection from individual consumers.	In case of individual consumer, as the installed capacity is small (say 100 W to 10 kW) it may not be in the manufacturers interest / attention especially for pre-existing PV installations. Monetising on selling the used the panel will motivate individual consumers to take up recycling on their own accord.	Consumers will voluntarily take up recycling of panels or for safe disposal.
16	General	Worker safety is not explicitly mentioned.	Include mandatory training on safe handling, use of Personal Protective Equipment (PPE), and emergency procedures for all workers involved in solar waste management.	Solar PV panels contain hazardous materials that pose health risks if handled improperly. Mandatory training and PPE use will minimize these risks and ensure worker safety.



S. No	Section/Clause	Existing Provision	Suggested Amendment/Comment	Rationale/Justification
17	General	No mention of awareness programs.	Mandate producers to conduct periodic public awareness and training programs for bulk consumers and transporters on safe handling and legal disposal.	Strengthens compliance through awareness, reduces informal/unscientific disposal.
18	General	No provision for informal sector risks.	CPCB should caution against informal sector dismantling of solar waste and mandate awareness in vulnerable areas (e.g., near landfill sites, informal e-waste hubs).	Prevents health/environmental hazards from unauthorized handling, often by marginalized groups.
19	General	Just Transition for Workers	Incorporate provisions to support a just transition for informal waste workers, such as capacity building, formal employment opportunities, and inclusion in authorised waste management systems.	Informal waste workers play a significant role in material recovery but often face unsafe working conditions and lack social protections. A just transition ensures their livelihoods are protected by integrating them into the formal sector, providing training, and improving working conditions, thus reducing health risks and promoting responsible solar waste management.