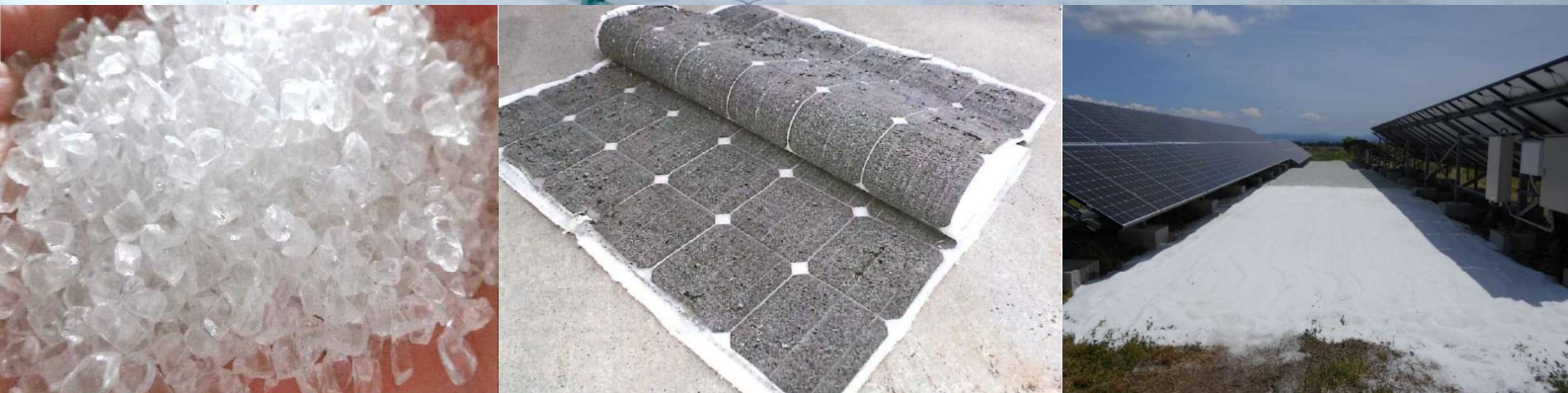


# Waste PV Module Recycling System



# Glass Wakeeru Type III



Waste Glass Recycling business Cooperatives



# Proper Recycling: Sustainable disposal for PV modules

With the urgent need to address climate change, photovoltaic solar power generation is expected to contribute towards achieving carbon neutral by 2050.

However, as the FIT period ends in the mid-2030s, there is concern about the mass disposal of solar panels, reaching 170,000-280,000 tonnes annually. In Japan, waste solar panels are classified as industrial waste and must be properly disposed of and recycled with minimal environmental impact.

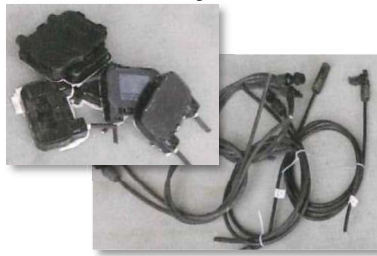
“Glass Wakeeru Type-III” is an integrated system that separates and sorts waste solar panels, facilitating the utilization of valuable recycled materials.

## Recycling process of waste PV modules

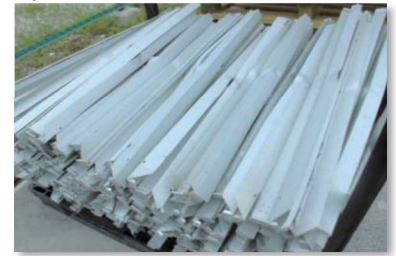
Receiving damaged modules



Removal of junction box



Separation of aluminum frame



Recycled glass



(Glass after sorting)

Sorting of glass



(Glass before sorting)

Delamination of glass



(Back-sheet after delamination)

## Features of Glass Wakeeru Type III system

### Proper recycling of waste photovoltaic modules

- All separated and recovered materials are utilized as valuable resources.
- Aluminum frames and electric cables are recycled as metal, while back-sheets with cells are recovered as silver.

### Glass recycling technology and achievements

- Applying the technology cultivated through glass recycling to waste photovoltaic modules.
- Expertise in utilizing recycled glass, which constitutes two-thirds of PV modules.

### Network & support of Waste Glass Recycling Business Cooperatives

- Support for recycling business, sharing of sales and technological developments.
- Distributing disposal requests to each member for referral to the headquarters, selling back-sheets to smelting plant.

# Is "that glass" really being recycled?

- Are recycling routes truly established?
- Is the glass actually landfilled for final disposal?
- Is there any energy input in production process when using recycled glass?

## Glass Wakeeru Type III makes effective use of recycled glass

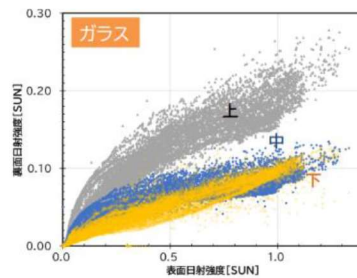
Recycled glass is used as glass sand, and sold as the Eco Mark product "Crystal Stone & Sand".



Aiming for local circulation of recycled resources, joint research on weed prevention and reflective materials made of glass sand is being carried out with AIST(\*).



Examples of use as weed prevention in PV plants



Research as weed prevention and reflective material

The electricity output is expected to enhance by laying glass sand as a reflective material under bifacial modules.

\* Development and commercialization project for renewable energy technology, supported by the Fukushima Renewable Energy Institute of the National Institute of Advanced Industrial Science and Technology

## Advancing towards resource recycling of PV modules



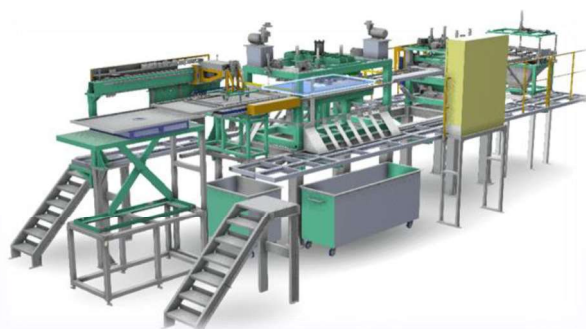
Disposal or damage of PV modules

Local utilization of recycled resources



Weed prevention/reflective materials

Appropriate collection and disposal of waste



Glass Wakeeru Type III system

Recycling resources as valuable resources



# Realizing of resource circulation through PV module recycling

# Equipment Capacity & Specification

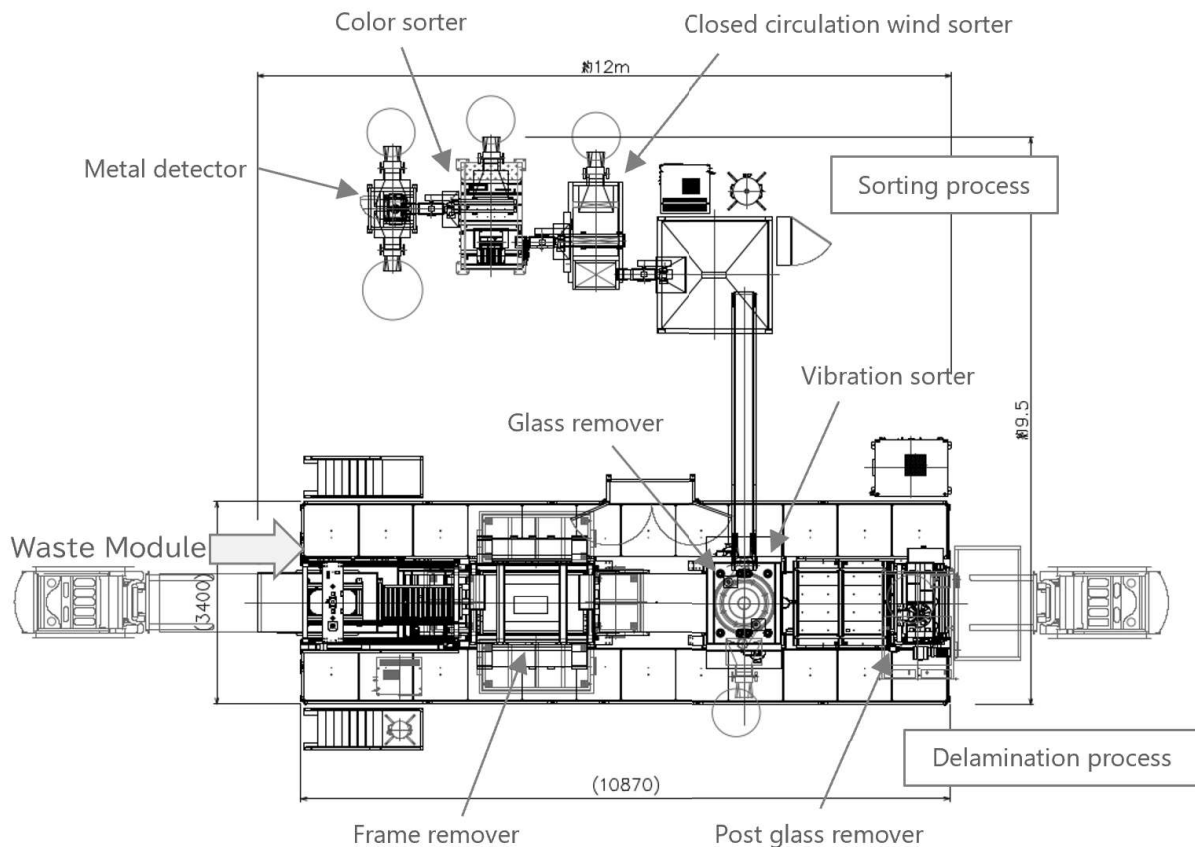
Delamination Process (Glass Wakeeru Type 3)	Module size	L2000 ~ 1580 x W1030 ~ 930
	Process capacity	Approx. 60 seconds per module
	Max. power consumption	29.2kW
	Components	Frame remover, Glass remover, Conveyed systems, Hydraulic and pneumatic systems, Control equipment, Dust collection systems, etc.
Sorting process	Sorting methods	Particle size selection (Vibration sorter), Gravity sorting (Closed circulation wind sorter), Color sorter, Metal detection
	Process capacity	Approx. 1000kg/h
	Max. power consumption	21.0kW

\* Specifications and capacities depend on equipment configuration and other requirement.



← Check the website for more details and movies  
<https://wakale.mk-partners.jp/en>

## Equipment Layout



\* This layout shows typical example, optimal system configuration and layout will be proposed according to customer requirement.

Waste Glass Recycling business Cooperatives  
 Head quarter MizusawaOroshi-machi 4-7, Ohshu-Shi, Iwate  
 Tokyo branch Iwate Ginga Plaza, Ginza5-15-1, Chuo-ku, Tokyo

**MK&Partners** (Western Japan Sales Office)  
 Ishogami-Dori 8-1-29-403, Chuo-ku, Kobe-shi, Hyogo  
<https://www.mk-partners.jp/en/>  
[miyawaki.kenichi@mk-partners.jp](mailto:miyawaki.kenichi@mk-partners.jp)  
<https://www.linkedin.com/in/mkpartners/> (LinkedIn)

