

PV Module Reuse & Recycling Business



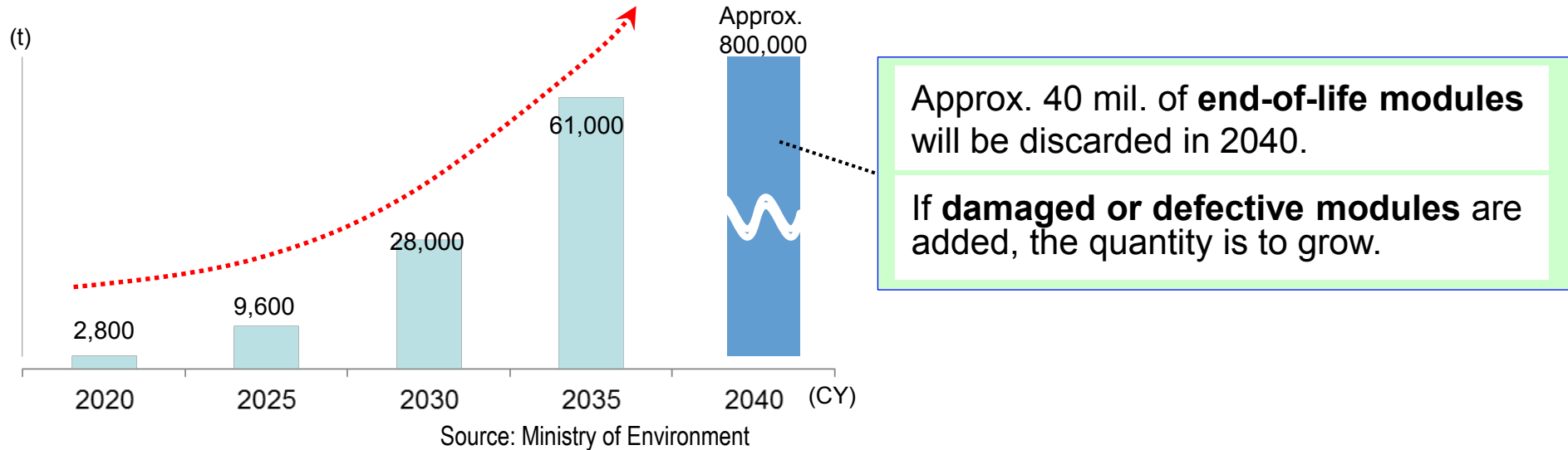
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NPC Incorporated

PV Module Recycling Business

Issues in the PV Industry

■ Forecast of end-of-life PV modules to be discarded in Japan



Challenge in PV market

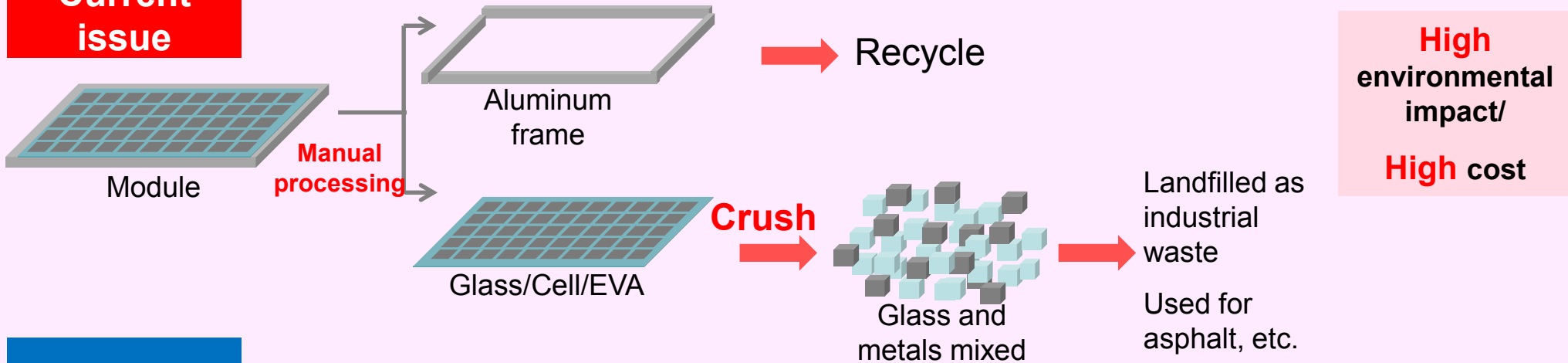
“How to deal with massive PV modules to be discarded in the future”

Necessary approach

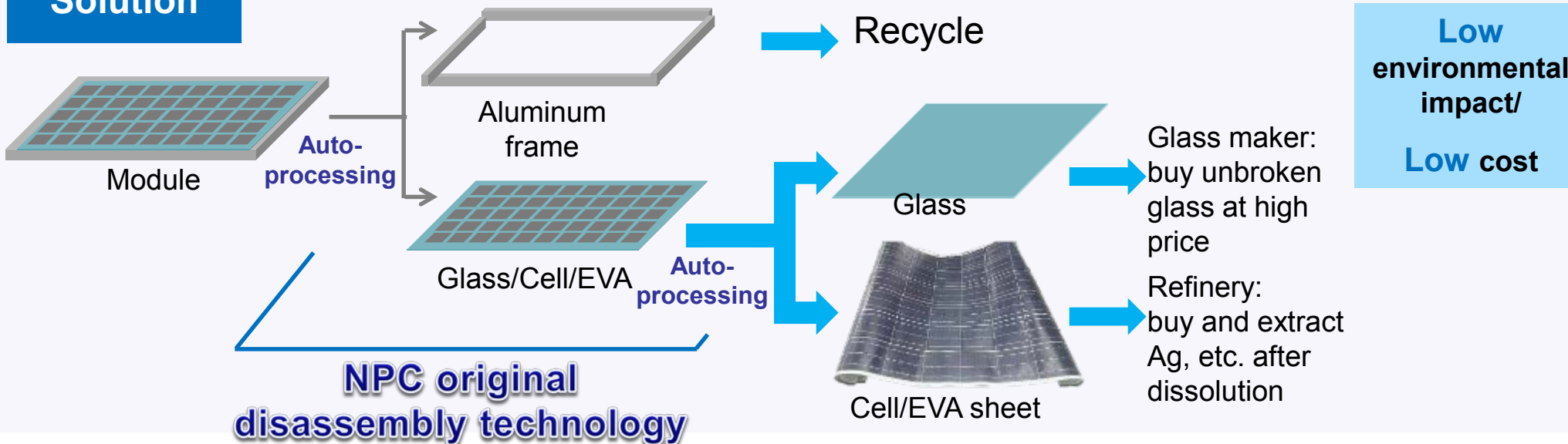
- Increase capacity of recycling facilities
- Establish systems enabling the reuse/recycling of PV modules

Issue and Solution of Module Recycling

Current issue



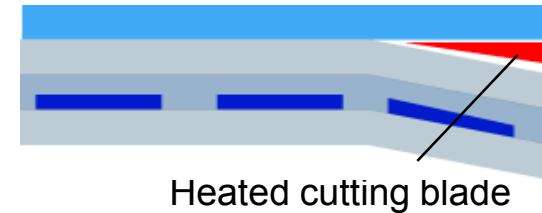
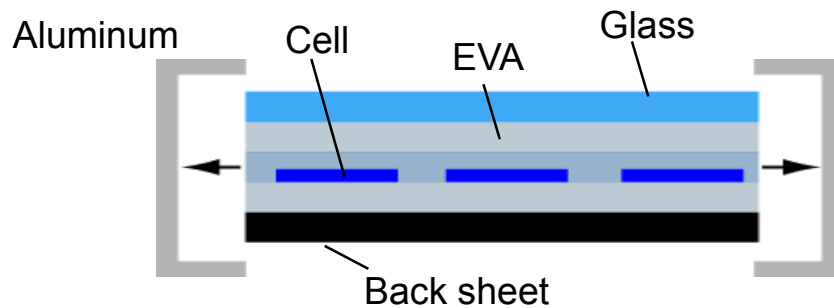
Solution



Major Solutions

Remove aluminum frames

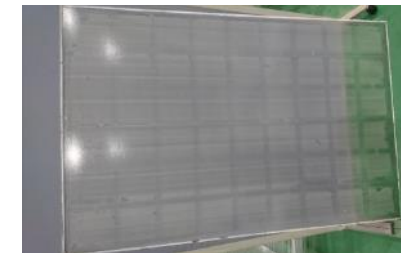
Separate EVA from glass



Collect metal (aluminum)



Collect metals
(cell/wiring material)

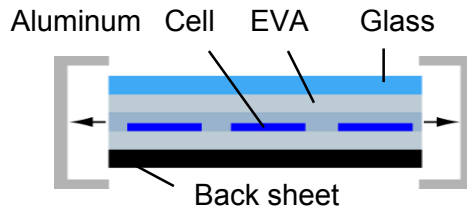


Collect glass
without crushing

**Development of various disassembly equipment without crushing glass
utilizing our equipment technology**

Aluminum Frame Removing Equipment

Remove aluminum frames



Collect metal (aluminum)

Aluminum Frame Removing Equipment

Removes aluminum frames from PV modules



**Japanese Patent
No. 6133475**

[Features]

- Successfully automated the process of removing aluminum frames
- Corresponds to various shapes, structures and sizes of frames
- Minimizes stress on modules, does not crush glasses

Aluminum Frame Removing Equipment

Glass/EVA Separating Equipment

Separate EVA from glass



Heated cutter



Collecting metals
(cell/ wiring material)



Collecting glass
without crushing

Glass/EVA Separating Equipment

Separates glass from EVA/cell layer with a heated cutter



[Features]

- No need to crush glass and collects valuables in a sheet shape
- Corresponds to distorted or warped modules
- Process time is as short as approx. 50 seconds per piece

Glass/EVA Separating Equipment

Joint Venture “PV Techno Cycle”

■ Established JV, “PV Techno Cycle”, with Hamada

- Provides solution by leveraging strengths of both companies and exerting synergistic effects
- Establishes effective recycling technology in the market ahead of others

HAMADA

- Collects discarded modules
- Disassembles discarded modules
- Sells valuables



NPC

- Inspects and sorts discarded modules
- Develops and provides equipment
- Repairs modules for reuse

PVTechnoCycle

Established: August 1, 2016 / HQ:Keihin-jima 2-7-1, Ota-ku, Tokyo (utilizes recycling point of Hamada)

