

# Global Solar Panel Recycling Market to Reach USD 857.8 Million by 2035, Growing at 13.3% CAGR | TMR Research

*Solar panel recycling market to grow from US\$ 217.2 Mn in 2024 to US\$ 857.8 Mn by 2035 at a CAGR of 13.3%*

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EINPresswire.com/ -- The global solar energy landscape has expanded exponentially over the past two decades, establishing solar power as one of the leading renewable energy sources worldwide. With installations surging and solar systems approaching the end of their typical 25–30-year operational life, the [solar panel recycling market](#) is witnessing a robust emergence. Recycling end-of-life (EoL) solar panels ensures sustainable management of valuable materials, prevents environmental contamination, and supports a circular economy in the solar energy sector.

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Rising end-of-life solar modules and advanced recycling tech are driving a circular economy, with leaders achieving 90%+ material recovery.”

*Transparency Market  
Research*

The global solar panel recycling market was valued at US\$ 217.2 million in 2024 and is expected to grow at a CAGR of 13.3% from 2025 to 2035, reaching an estimated US\$ 857.8 million by 2035. Growth is driven by increasing solar installations, regulatory mandates, and technological innovations in recycling processes.

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## Solar Panel Recycling Market Outlook 2035

The solar panel recycling market valued at

**US\$ 217.2 Mn**  
in 2024

It is estimated to grow at a CAGR of

**13.3%**  
from 2025 to 2035



The solar panel recycling industry is estimated to reach **US\$ 857.8 Mn** by the end of 2035

## Analysts' Viewpoint on Solar Panel Recycling Market

Analysts note that the market momentum stems from two main factors:

**Rising Volume of End-of-Life Solar Panels** – Panels installed in the early 2000s are now approaching the end of their lifecycle. This creates both a logistical challenge and a business opportunity for companies to recover valuable materials from decommissioned modules.

**Stringent Environmental Regulations and Extended Producer Responsibility (EPR)** – Governments globally are establishing mandates requiring solar panels to be collected, recycled, and responsibly disposed of. Regulations such as the European Union's WEEE Directive enforce recycling obligations, driving the market forward.

This confluence of regulatory pressure, environmental responsibility, and material recovery potential is propelling investment and innovation in solar panel recycling.

## Global Solar Panel Recycling Market Overview

Solar panel recycling involves the retrieval of valuable materials from decommissioned photovoltaic (PV) modules, including glass, aluminum, silicon, copper, silver, and rare metals. These materials can then be reintroduced into the manufacturing supply chain, reducing dependence on virgin resources and mitigating environmental impacts.

## Recycling Processes

**Mechanical Recycling** – Physical dismantling of panels, separation of materials such as glass, aluminum frames, and conductive metals.

**Thermal Recycling** – Heat-based methods to recover silicon and other components.

**Chemical Treatment** – Chemical separation processes, often used for silver, PV-grade silicon, and other high-value metals.

**Combination Approaches** – Integration of mechanical, thermal, and chemical processes for higher recovery efficiency.

**Advanced Automation** – Use of AI-sortation and robotic deconstruction for precision, lower labor costs, and improved recovery rates.

Recycling is no longer a peripheral activity; it is increasingly embedded in the lifecycle of solar panels, forming a critical part of clean energy sustainability strategies.

## Market Drivers

### Rising Volume of End-of-Life Solar Panels

The first generation of solar panels is now reaching its designed operational life, producing a

large wave of EoL panels. This surge presents both an environmental challenge and a market opportunity. Recycling these panels:

- Prevents waste accumulation in landfills.

- Allows recovery of high-value materials such as silicon, silver, and copper.

- Supports material security for manufacturers, reducing dependence on raw resource extraction.

### Stringent Environmental Regulations

Countries worldwide are establishing legal frameworks for PV module recycling. Key regulations include:

- European Union WEEE Directive – Mandates collection and recycling of solar panels.

- Emerging North American and Asia-Pacific Regulations – Slowly enforcing producer responsibility and compliance standards.

Such regulations drive companies to adopt efficient recycling processes, encourage technology innovation, and ensure environmentally responsible waste management.

### Extended Producer Responsibility (EPR)

EPR programs hold manufacturers accountable for the lifecycle management of solar panels.

Manufacturers are required to collect, transport, and recycle EoL panels. This encourages:

- Investment in dedicated recycling infrastructure.

- Development of closed-loop recycling technologies.

- Compliance with environmental standards, enhancing brand credibility.

### Solar Panel Recycling Market Segmentation

#### By Panel Type

- Silicon-Based Solar Panels – Dominates the market with ~80.8% share.

- Includes monocrystalline and polycrystalline panels.

- Recyclable materials include glass, aluminum, and purified silicon.

- Well-established recycling processes enhance adoption.

- Thin-Film Solar Panels – Smaller share but growing, includes cadmium telluride (CdTe) and copper indium gallium selenide (CIGS) panels.

#### By Recycling Process

- Mechanical – Physical dismantling and material separation.

- Thermal – Heat treatment for silicon and metals recovery.

Chemical – Wet chemical processes for high-purity material extraction.  
Combination – Multi-stage approaches integrating all techniques for higher efficiency.

### By Material Recovered

Glass – Largest recovered material due to its mass percentage in panels.  
Aluminum – From frames, highly recyclable.  
Copper & Silver – Conductive components with high economic value.  
PV Silicon – Core component, reusable for new panels.  
Plastics & Others – Structural and encapsulant materials.

### Regional Insights

#### Europe – Market Leader (34.1% Share)

Europe leads due to:

Early adoption of solar PV systems in Germany, France, and Italy.  
Strong regulatory frameworks like the WEEE Directive.  
Developed recycling infrastructure and established industry players.

Germany has become a hub for solar recycling innovation, integrating efficient collection systems, automated dismantling, and advanced chemical processing.

#### Asia-Pacific – 29.7% Share

Recycling infrastructure is less mature, but investments are increasing in China, Japan, and India.  
Massive volumes of decommissioned panels expected in coming decades.  
Government incentives and industrial adoption are expected to boost market growth.

#### North America

Recycling adoption is gradually increasing, with policy development in Canada and the U.S.  
Collaborative programs between manufacturers, utilities, and recycling firms are emerging.

#### Latin America & Middle East & Africa

Market is in nascent stages.  
Growing solar installations will generate EoL panels, driving future demand for recycling solutions.

### Key Players in Solar Panel Recycling Market

Global leaders are investing heavily in recycling infrastructure and technology, focusing on high material recovery, efficiency, and sustainability.

#### Notable Companies Include:

ROSI SAS – High-purity silicon and glass recovery.

Solar Recycling Solutions (SRS) – Innovative mechanical and chemical recycling.

Recycle Solar Technologies Limited – Focused on closed-loop recovery.

TG Companies & Soren – Thermal and mechanical recycling specialists.

Ecoactiv & Sofies SA – Sustainable recycling and consulting.

First Solar – Pioneering chemical interlayer separation and silver recovery.

We Recycle Solar, Silcontel, PV CYCLE, Envaris GmbH – Collaborative recycling programs and EoL solutions.

#### Market Developments

LONGi (July 2025) – Partnered with Rafiqui (Mexico) and energy sector partners to develop solar recycling infrastructure in Mexico, advancing circular economy practices.

Trina Solar (2024) – Introduced fully recyclable crystalline-silicon modules (645 W, ~20.7% efficiency), demonstrating advanced chemical separation and dismantling for high recovery without compromising power density.

These developments reflect innovative approaches to improving material recovery, regulatory compliance, and environmental sustainability in the solar energy lifecycle.

#### Challenges and Opportunities

##### Challenges

High Cost of Advanced Recycling – Chemical and robotic processes require significant capital.

Technological Complexity – Recovering multiple materials efficiently demands sophisticated methods.

Regulatory Fragmentation – Inconsistent regulations across countries can hinder global operations.

##### Opportunities

Circular Economy Integration – Increasing EoL panel volumes present opportunities for closed-loop material recovery.

Technological Innovation – AI-driven dismantling and chemical separation enhance efficiency.

Policy Incentives – Manufacturers investing in recycling may benefit from EPR compliance and subsidies.

Emerging Markets – Asia-Pacific and Latin America represent untapped growth potential due to rapidly expanding solar installations.

## Outlook to 2035

By 2035, the solar panel recycling market will likely:

Achieve US\$ 857.8 million in market value, reflecting a 13.3% CAGR.

Expand recycling infrastructure globally, with Europe continuing to lead and Asia-Pacific rapidly catching up.

See higher adoption of chemical, thermal, and robotic recycling technologies to maximize material recovery.

Encourage manufacturers to design panels for recyclability, incorporating materials and processes that allow easier end-of-life recovery.

Promote a sustainable circular economy, reducing reliance on virgin resources and mitigating environmental contamination.

The solar panel recycling market is emerging as a critical component of the global solar industry, addressing both environmental and resource-related challenges. Rising volumes of end-of-life panels, regulatory mandates, technological innovation, and industry partnerships are collectively driving market expansion.

As the market moves toward advanced recycling solutions, material recovery optimization, and circular economy integration, solar panel recycling will not only contribute to sustainability goals but also create long-term economic and environmental value. By 2035, the market is poised to reach US\$ 857.8 million, reflecting robust growth and a strategic evolution toward a cleaner, more responsible solar energy ecosystem.

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