

**Solar Panel Recycle Market Assessment, By Type [Monocrystalline, Polycrystalline, Thin-Film, Others], By Material [Silicon, Gallium Arsenide, Aluminium Gallium Arsenide, Cadmium, Others], By Process [Chemical, Thermal, Mechanical, Others], By Region, Opportunities and Forecasts, 2016-2030F**

Market Report | 2024-04-19 | 142 pages | Market Xcel - Markets and Data

**AVAILABLE LICENSES:**

- Single User License \$4500.00
- Multi-User/Corporate Licence \$5700.00
- Custom Research License \$8200.00

**Report description:**

Global Solar Panel Recycle Market size was valued at USD 152.5 million in 2022, which is expected to reach USD 395.48 million in 2030 with a CAGR of 12.65% for the forecast period between 2023 and 2030. The global adoption of solar energy solutions has led to a rise in decommissioned solar panels, creating a significant recycling market. By 2030, the global recoverable raw materials from end-of-life panels are estimated to be worth USD 450 million. Reallocating solar panels to recycling facilities conserves landfill space and maximizes raw material value. The recycling market for solar panel waste is expanding due to stringent environmental regulations and growing awareness of sustainable practices. Advancements in recycling technologies enhance efficiency and cost-effectiveness, while governments incentivize proper disposal and recycling to mitigate environmental impact. Rise in urbanization and industrialization, especially in countries like China and India, the market is expanding at a high pace. In addition, the adoption of circular economy principles. The growing popularity of solar energy in residential and commercial sectors and increasing favorable regulatory policies for solar panel recycling are propelling market expansion.

In June 2022, the Board of Executive Directors of the World Bank sanctioned an additional funding of USD 165 million to bolster India's residential sector in the integration of rooftop solar systems, aiming to enhance the affordability of solar energy. The implementation of these solar photovoltaic (PV) installations is anticipated to furnish a sustainable source of clean energy while concurrently mitigating greenhouse gas emissions by substituting fossil fuel-based generation. Projections for the project indicated a substantial reduction in greenhouse gas (GHG) emissions, with an estimated decrease of 13.9 million tons.

**Increasing Volume of End-of-Life Solar Panels Contributes to Market Growth**

The growing volume of end-of-life solar panels is a driving force behind the growing prominence of the global solar panel recycle market. As solar energy adoption surges globally, an increasing number of photovoltaic systems are reaching the end of their

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

operational life, resulting in a substantial influx of decommissioned solar panels. This surge in volume necessitates effective and sustainable recycling solutions to manage electronic waste responsibly. According to projections by the International Renewable Energy Agency (IRENA), global solar panel waste is anticipated to accumulate to 78 million tons by 2050 in the absence of effective recycling measures.

The demand for recycling services is stimulated by both environmental concerns and regulatory requirements, compelling stakeholders to seek innovative technologies and processes for efficient solar panel disposal. This trend addresses the environmental impact of improper waste management and fosters the development of a robust and sustainable solar industry.

#### Government Policies are Supporting the Market

A variety of government regulations and efforts focused on increasing Solar Panel Recycle and decreasing waste are propelling the worldwide solar panel recycling market. The market benefits by financial incentives or subsidies provided by the government to encourage the adoption of solar energy and, consequently, the recycling of solar panels. For example, in July 2022, the United States Government, the Biden Administration, via the Department of Energy (DOE), announced an allocation of USD 56 million to boost domestic manufacturing and recycling of solar modules. Additionally, the DOE committed an extra allocation of USD 18 million to address obstacles hindering the commercialization of technologies supported by the department.

Furthermore, governments of various nations implement and enforce regulations regarding the disposal and recycling of solar panels. This ensures that manufacturers and users adhere to environmentally friendly practices. For instance, in November 2022, the Ministry of Environment, Forest and Climate Change of India introduced the E-Waste (Management) Rules. The new rules include regulations for the management of solar PV modules, stating that manufacturers must register on the portal, store waste according to guidelines until 2034-2035, submit annual returns, follow processing rules for other waste, maintain a distinct inventory on the portal, and adhere to standard operating procedures outlined by the Central Pollution Control Board. Recyclers are mandated to recover materials as per the board's guidelines.

#### Contributions from Leading Nations Drive Solar Panel Recycle Market Expansion

The global solar panel recycling market experiences significant growth influenced by the proactive contributions of various countries. China, a prominent leader in solar PV capacity expansion, not only stimulates market demand through its extensive installations but also generates a surge in end-of-life solar panels, thereby intensifying the need for recycling solutions. This demand is further propelled by China's ambitious targets set in the 14th Five-Year Plan for Renewable Energy.

Within the European Union, the rapid deployment of solar PV and the stringent environmental regulations outlined in initiatives such as the REPowerEU Plan and The Green Deal Industrial Plan significantly shape the global solar panel recycling landscape. The EU's unwavering commitment to sustainability and circular economy principles drives the increased demand for recycling services and technologies. Collectively, these and other countries' efforts to promote solar energy adoption and encourage recycling policies synergize to foster growth in the global solar panel recycling market. As global awareness of the importance of sustainability continues to rise, the demand for solar panel recycling is poised to sustain an upward trajectory.

#### Impact of COVID-19

The COVID-19 pandemic has impacted the global solar panel recycling industry. As the pandemic caused economic slowdowns and lowered economic activity worldwide, demand for new solar panels may have declined with disruptions in global supply networks. As a result, the supply of panels accessible for recycling may have been limited. However, governments worldwide have enacted new restrictions and policies, which have impacted the recycling industry's operations. Moreover, the pandemic has also brought to light the significance of sustainability and environmental concerns, which may increase awareness and interest in recycling solar panels.

#### Impact of Russia-Ukraine War

Russia plays a significant role in the global solar panel industry, manufacturing numerous panels for international markets. However, the ongoing war has disrupted solar panel production and supply chains, leading to decreased availability in the global market. Ukraine houses several solar panel recycling facilities, but the conflict threatens to impede their operations, potentially reducing the industry's recycling capacity. In addition to production and recycling disruptions, the political instability and interruptions in the supply chain have also resulted in increased costs for solar panels. This confluence of factors is having a notable impact on the solar panel sector, both in terms of supply and pricing.

#### Key Players Landscape and Outlook

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

Companies in the solar panel recycle market implement strategies like collaborations, global expansion, regulatory compliance, public awareness campaigns, circular economy initiatives, customer engagement, cost efficiency, government advocacy, and diversification of services. Moreover, operating companies invest in research and development to create advanced recycling technologies. Innovations that improve efficiency, reduce costs, and enhance the overall recycling process give companies a competitive edge.

In 2023, JinkoSolar developed a recycling process that allows for recycling 92% of a solar panel's materials. This includes cells, front glass, back sheet, aluminum frame, copper wire, encapsulation material, and junction box. In contrast to traditional recycling methods that blend materials, making separation challenging, the company's innovative solution employs thermal and mechanical processes to separate the glass and silicon wafer. It also leverages the distinct melting points of encapsulation materials like thermoset EVA/POE during the module's heating for disassembly.

In November 2022, First Solar Inc. unveiled plans to invest USD 1.1 billion in constructing a photovoltaic (PV) solar module manufacturing facility in Lawrence County, USA, with the aim of generating more than 700 employment opportunities in North Alabama. During the same month, Taiwan's Industrial Technology Research Institute (ITRI), United Renewable Energy (URE), Taiwan's largest solar panel and solar cell manufacturer, and San Fang Chemical Industry Co. Ltd., a Taiwan-based technological film producer dedicated to sustainability, collaborated on developing easily disassembled solar panel modules, allowing for complete recycling of photovoltaic (PV) modules upon decommissioning.

In July 2022, the U.S. Department of Energy (DoE) disclosed its intention to allocate USD56 million, including USD10 million for infrastructure, to drive innovation in solar manufacturing and recycling across the United States. The funding's objectives are to make clean energy more accessible and reliable by 2035 and achieve net-zero emissions by mid-century.

In September 2022, SOLAR CYCLE, a technology-driven company specializing in recycling solar panels, partnered with Silicon Ranch Corporation, one of the largest independent electricity producers. Their collaboration focuses on processing end-of-life stage solar systems from Silicon Ranch installations through SOLAR CYCLE's advanced, high-recovery recycling platform. SOLAR CYCLE's innovative module recycling process recovers nearly 95% of the value of solar panels, which can then be reintroduced into the supply network to create new panels.

## **Table of Contents:**

- 1.□Research Methodology
- 2.□Project Scope & Definitions
- 3.□Impact of COVID-19 on the Global Solar Panel Recycle Market
- 4.□Impact of Russia-Ukraine War
- 5.□Executive Summary
- 6.□Global Solar Panel Recycle Market Outlook, 2016-2030F
  - 6.1.□Market Size & Forecast
    - 6.1.1.□By Value
    - 6.1.2.□By Volume
  - 6.2.□By Type
    - 6.2.1.□Monocrystalline
    - 6.2.2.□Polycrystalline
    - 6.2.3.□Thin-Film
    - 6.2.4.□Others
  - 6.3.□By Material
    - 6.3.1.□Silicon
    - 6.3.2.□Gallium Arsenide
    - 6.3.3.□Aluminium Gallium Arsenide
    - 6.3.4.□Cadmium
    - 6.3.5.□Others

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

- 6.4. By Process
  - 6.4.1. Chemical
  - 6.4.2. Thermal
  - 6.4.3. Mechanical
  - 6.4.4. Others
- 6.5. By Region
  - 6.5.1. North America
  - 6.5.2. Europe
  - 6.5.3. South America
  - 6.5.4. Asia-Pacific
  - 6.5.5. Middle East and Africa
- 6.6. By Company Market Share (%), 2022
- 7. Global Solar Panel Recycle Market Outlook, By Region, 2016-2030F
  - 7.1. North America\*
    - 7.1.1. Market Size & Forecast
      - 7.1.1.1. By Value
      - 7.1.1.2. By Volume
    - 7.1.2. By Type
      - 7.1.2.1. Monocrystalline
      - 7.1.2.2. Polycrystalline
      - 7.1.2.3. Thin-Film
      - 7.1.2.4. Others
    - 7.1.3. By Material
      - 7.1.3.1. Silicon
      - 7.1.3.2. Gallium Arsenide
      - 7.1.3.3. Aluminium Gallium Arsenide
      - 7.1.3.4. Cadmium
      - 7.1.3.5. Others
    - 7.1.4. By Process
      - 7.1.4.1. Chemical
      - 7.1.4.2. Thermal
      - 7.1.4.3. Mechanical
      - 7.1.4.4. Others
    - 7.1.5. United States\*
      - 7.1.5.1. Market Size & Forecast
        - 7.1.5.1.1. By Value
        - 7.1.5.1.2. By Volume
      - 7.1.5.2. By Type
        - 7.1.5.2.1. Monocrystalline
        - 7.1.5.2.2. Polycrystalline
        - 7.1.5.2.3. Thin-Film
        - 7.1.5.2.4. Others
      - 7.1.5.3. By Material
        - 7.1.5.3.1. Silicon
        - 7.1.5.3.2. Gallium Arsenide
        - 7.1.5.3.3. Aluminium Gallium Arsenide
        - 7.1.5.3.4. Cadmium

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

- 7.1.5.3.5. □Others
- 7.1.5.4. □By Process
- 7.1.5.4.1. □Chemical
- 7.1.5.4.2. □Thermal
- 7.1.5.4.3. □Mechanical
- 7.1.5.4.4. □Others
- 7.1.6. □Canada
- 7.1.7. □Mexico
- \*All segments will be provided for all regions and countries covered
- 7.2. □Europe
- 7.2.1. □Germany
- 7.2.2. □France
- 7.2.3. □Italy
- 7.2.4. □United Kingdom
- 7.2.5. □Russia
- 7.2.6. □Netherlands
- 7.2.7. □Spain
- 7.2.8. □Turkey
- 7.2.9. □Poland
- 7.3. □South America
- 7.3.1. □Brazil
- 7.3.2. □Argentina
- 7.4. □Asia-Pacific
- 7.4.1. □India
- 7.4.2. □China
- 7.4.3. □Japan
- 7.4.4. □Australia
- 7.4.5. □Vietnam
- 7.4.6. □South Korea
- 7.4.7. □Indonesia
- 7.4.8. □Philippines
- 7.5. □Middle East & Africa
- 7.5.1. □Saudi Arabia
- 7.5.2. □UAE
- 7.5.3. □South Africa
- 8. □Supply Side Analysis
- 8.1. □Capacity, By Company
- 8.2. □Production, By Company
- 8.3. □Operating Efficiency, By Company
- 8.4. □Key Plant Locations (Up to 25)
- 9. □Market Mapping, 2022
- 9.1. □By Type
- 9.2. □By Material
- 9.3. □By Process
- 9.4. □By Region
- 10. □Macro Environment and Industry Structure
- 10.1. □Supply Demand Analysis

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)

- 10.2.□ Import Export Analysis - Volume and Value
  - 10.3.□ Supply/Value Chain Analysis
  - 10.4.□ PESTEL Analysis
    - 10.4.1.□ Political Factors
    - 10.4.2.□ Economic System
    - 10.4.3.□ Social Implications
    - 10.4.4.□ Technological Advancements
    - 10.4.5.□ Environmental Impacts
    - 10.4.6.□ Legal Compliances and Regulatory Policies (Statutory Bodies Included)
  - 10.5.□ Porter's Five Forces Analysis
    - 10.5.1.□ Supplier Power
    - 10.5.2.□ Buyer Power
    - 10.5.3.□ Substitution Threat
    - 10.5.4.□ Threat from New Entrant
    - 10.5.5.□ Competitive Rivalry
  - 11.□ Market Dynamics
    - 11.1.□ Growth Drivers
    - 11.2.□ Growth Inhibitors (Challenges, Restraints)
  - 12.□ Key Players Landscape
    - 12.1.□ Competition Matrix of Top Five Market Leaders
    - 12.2.□ Market Revenue Analysis of Top Five Market Leaders (in %, 2022)
    - 12.3.□ Mergers and Acquisitions/Joint Ventures (If Applicable)
    - 12.4.□ SWOT Analysis (For Five Market Players)
    - 12.5.□ Patent Analysis (If Applicable)
  - 13.□ Pricing Analysis
  - 14.□ Case Studies
  - 15.□ Key Players Outlook
    - 15.1.□ First Solar Inc.
      - 15.1.1.□ Company Details
      - 15.1.2.□ Key Management Personnel
      - 15.1.3.□ Products & Services
      - 15.1.4.□ Financials (As reported)
      - 15.1.5.□ Key Market Focus & Geographical Presence
      - 15.1.6.□ Recent Developments
    - 15.2.□ SunPower Corporation
    - 15.3.□ Hanwha Group
    - 15.4.□ Echo Environmental, LLC
    - 15.5.□ Reclaim PV Pty Ltd.
    - 15.6.□ PV Industries Pty Ltd.
    - 15.7.□ Veolia Environnement S.A.
    - 15.8.□ JinkoSolar Holding Co., Ltd.
    - 15.9.□ Poseidon Solar Services Pvt Ltd
    - 15.10.□ Reiling GmbH & Co. KG
    - 15.11.□ Yingli Green Energy Holding Company Limited
- \*Companies mentioned above DO NOT hold any order as per market share and can be changed as per information available during research work
- 16.□ Strategic Recommendations

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: support@scotts-international.com

www.scotts-international.com



**Solar Panel Recycle Market Assessment, By Type [Monocrystalline, Polycrystalline, Thin-Film, Others], By Material [Silicon, Gallium Arsenide, Aluminium Gallium Arsenide, Cadmium, Others], By Process [Chemical, Thermal, Mechanical, Others], By Region, Opportunities and Forecasts, 2016-2030F**

Market Report | 2024-04-19 | 142 pages | Market Xcel - Markets and Data

To place an Order with Scotts International:

- ☐ - Print this form
- ☐ - Complete the relevant blank fields and sign
- ☐ - Send as a scanned email to support@scotts-international.com

**ORDER FORM:**

Select license	License	Price
	Single User License	\$4500.00
	Muti-User/Corporate Licence	\$5700.00
	Custom Research License	\$8200.00
		VAT
		Total

\*Please circle the relevant license option. For any questions please contact support@scotts-international.com or 0048 603 394 346.

☐ \*\* VAT will be added at 23% for Polish based companies, individuals and EU based companies who are unable to provide a valid EU Vat Numbers.

Email*	<input type="text"/>	Phone*	<input type="text"/>
First Name*	<input type="text"/>	Last Name*	<input type="text"/>
Job title*	<input type="text"/>		
Company Name*	<input type="text"/>	EU Vat / Tax ID / NIP number*	<input type="text"/>
Address*	<input type="text"/>	City*	<input type="text"/>
Zip Code*	<input type="text"/>	Country*	<input type="text"/>

**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: support@scotts-international.com

www.scotts-international.com



Date

2025-05-07

Signature



**Scotts International. EU Vat number: PL 6772247784**

tel. 0048 603 394 346 e-mail: [support@scotts-international.com](mailto:support@scotts-international.com)

[www.scotts-international.com](http://www.scotts-international.com)