



SOLARCYCLE + EDP | Customer FAQ

TABLE OF CONTENTS

[About SOLARCYCLE](#)

[Recycling 101](#)

[Recycled Materials and Reuse](#)

[Packing and Logistics](#)

[Locations and Service Areas](#)

[Compliance](#)

[Contact Information](#)

ABOUT SOLARCYCLE

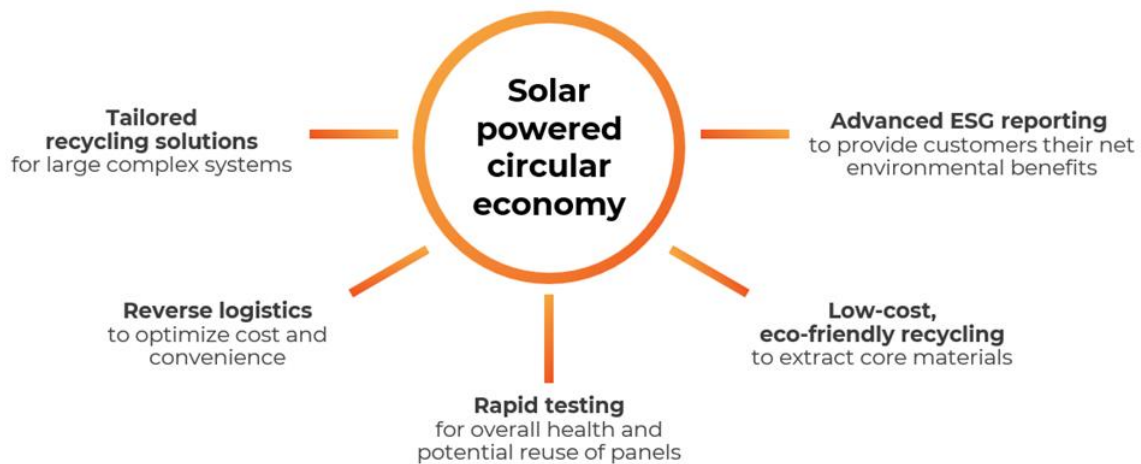
What services does SOLARCYCLE offer?

SOLARCYCLE's mission is to make solar even more sustainable by providing the world's leading solar companies with a cost-effective, environmentally friendly, and scalable recycling and circular economy solution. We offer our customers a suite of tailored services from reverse logistics to advanced environmental reporting.

Our advanced, high-recovery patented recycling process extracts more than 95% of the value in a panel, including aluminum, silver, silicon, and glass. We aim to return that critical material back into supply chains to help grow the domestic solar manufacturing industry.

SOLARCYCLE

End-of-life solution for solar asset owners



- Tailored Recycling Solutions:** We recognize that every customer has different needs, systems, financing, and geographic considerations. Our trained professionals begin with a consultation to identify our customer’s pain points, specific needs, and opportunities to craft bespoke plans that optimize their unique portfolios. This includes full circular economy solutions for installation breakage during the EPC phase, extreme weather damage or warranty failure during the O&M phase, all the way to the eventual repowering when the system reaches economic or technical end of life. We also provide support in navigating various compliance questions particularly when panels may need to be shipped across state lines.
- Reverse Logistics:** Panels are bulky and heavy, making them potentially expensive to ship long distances. We include shipping costs in our per panel price and can do that because we have a team of reverse logistics professionals who know how to optimize the number of panels on a pallet, the number of pallets in a truck and the routes the trucks take to our factories in Texas, Arizona and soon the Southeast. While most of our customers choose to palletize their panels for pick

up, we also provide full decommissioning services if needed. We can mobilize quickly and get your panels off-site within days if needed.

- Rapid Testing:** Many of our customers are interested in extending the life of their panels before they get recycled. We offer on-site as well as off-site testing using our PV Evolutions Lab approved process to identify microcracks, hot spots, water ingress and more. When requested by our customers, we can find ways to extend those reusable panels for another 5-10 years before they eventually get recycled at our nearby facility.
- Low-Cost, Eco-Friendly Recycling:** Our advanced, high-recovery patented recycling process extracts more than 95% of the value in a panel, including aluminum, silver, silicon, and glass. We aim to return that critical material back into domestic supply chains. Our fully permitted facility can handle hazardous and non-hazardous waste. [Listen to Suvi Sharma, SOLARCYCLE's CEO and Co-Founder describe the process.](#)
- Advanced Environmental Reporting:** Our customers care about protecting the environment and have stakeholders who want to see the metrics and the impact. Our Chief Technology Officer, Dr. Pablo Dias, has two PHDs in e-waste recycling and management. He has written peer-reviewed articles on conducting Life Cycle Analysis and the benefits of recycling and reuse over landfilling solar panels. We use his methodology to produce extensive environmental reporting for your team. A sample report is provided below:

Recycling all projected end-of-life solar panels through 2030 is equivalent to that of:



190,467,516
people's e-waste mitigated



145,769
cars taken off the road



10,358,621
acres of forest used for carbon sequestration

Life-cycle assessment highlights:

Climate change	419.03	Million Mt CO2 eq
Ozone depletion	25,904	Kg CFC-11 eq
Freshwater ecotoxicity	8,932,927	Million CTUe
Human toxicity, cancer effects	107,995.08	CTUh

Why do we need circular economy for solar?

For solar to truly scale to its full potential, the US must create renewable supply chains and a vibrant secondary market for upcycled panels and recycled materials. In 2022, NREL [found](#) that with modest government support, recycled materials can meet at least 25-30% of domestic solar manufacturing needs in the United States by 2040.

SOLARCYCLE is helping the solar industry close the loop on the life of their solar systems and create a new domestic supply of raw minerals and materials for the next wave of solar manufacturing.

When was SOLARCYCLE established?

Experts in panel manufacturing, advanced recycling, and climate technology co-founded SOLARCYCLE in 2022 to create a more sustainable, domestic supply chain for the solar industry.

What makes SOLARCYCLE different from competitors?

- Solar expertise: SOLARCYCLE was created by the solar industry for the solar industry. Most of our senior leadership led companies, including Solaria, NextTracker, Sunpower, and more. That means we are trusted partners who know what the solar industry needs, and we are ready to operate at scale.
- Innovation: Our current lines extract more than 95% of the value in a panel, but we are aiming for more. We have dedicated R&D teams on three continents working to push the envelope on the latest techniques getting higher purity materials from our processes.
- Sustainability: Our founding team includes seasoned sustainability professionals who have developed peer-reviewed Life Cycle Analyses on solar panel recycling, provided leadership on climate and clean energy policy and are committed to providing the most environmentally

friendly, climate-forward circular economy solutions for the solar industry.

- Cost: Because of our patented processes that extract so much value from each panel, combined with our reverse logistics expertise, we are able to provide the lowest-cost recycling solution that maximizes environmental benefits and supply chain resilience.
- Compliance: Our facilities are fully permitted for standard and hazardous secondary material (HSM). SOLARCYCLE is endorsed by the Solar Energy Industry Association (SEIA)'s National PV Recycling Program. We are also certified by international standard bodies, such as the International Organization for Standardization (ISO) ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018 standards, which ensures protection of the community, workers and the environment. We are here to help companies navigate this complex environment to mitigate risk associated with the handling of hazardous materials.
- Transparency: We provide complete transparency on our process, our permits and provide advanced environmental LCA reporting on all services and benefits from our service.

What are the most common situations you service when working with the solar industry?

- Manufacturing breakage: We service several of the largest US-based panel manufacturers and recycle their wafer scrap and broken modules.

- Construction breakage: We recycle solar panels that may break during the normal installation process.
- Operations and maintenance: We manage panels that are damaged due to extreme weather events, wear and tear, warranty failure and more.
- Repowering old systems: We manage the repair, refurbishment, and recycling for systems that have reached their end of life.

RECYCLING 101

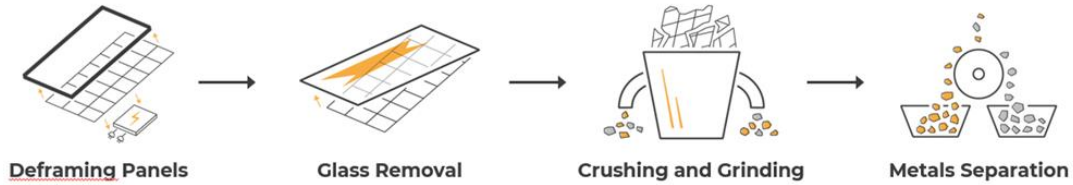
Briefly explain the SOLARCYCLE recycling process

As solar panels arrive at SOLARCYCLE's facility, panels are inspected for reuse. SOLARCYCLE assesses the power and durability of decommissioned panels and evaluates whether they can be used secondhand on-site by employing equipment used in the PV manufacturing industry.

If a panel cannot be used secondhand and needs to be recycled, SOLARCYCLE uses a fully automated line that removes the aluminum frame and the junction box. Next, it goes on a conveyor to another machine for high-recovery glass removal, and then the remaining laminate is crushed, ground, and shredded.

The shredded materials go through a multi-step patented process to recover valuable metals, such as silver, silicon, and copper, and also separate the plastics. SOLARCYCLE received a [grant](#) from the DOE in 2023 to further refine those metals into higher purity materials that can go into the domestic supply chain for clean energy.

Recycling Process



Material Outputs



Explain the steps on how to get started and work with SOLARCYCLE.

The following graphic illustrates how easy it is to work with SOLARCYCLE:

THE PROCESS

How It Works



What types of panels does the company intake for recycling?

SOLARCYCLE currently accepts all C-si panels and CdTe panels, unless they are an abnormal form factor. Our CdTe line will be operational in Q2 2024.

What components are you generally NOT able to recycle today?

The backsheet polymers are the materials that SOLARCYCLE cannot currently recycle. However, even with the back sheet, SOLARCYCLE is seeking to identify off-takers that can use it for filler in their aggregate, instead of ending up in a landfill. EVA polymers are also challenging, but we see many more pathways for reusing once we can separate them from the backsheet. Everything else from the panel can be recycled.

What is the quantity of panels SOLARCYCLE can recycle?

SOLARCYCLE's first facility in Odessa Texas can currently process 150,000 panels a year. We are on track to have nameplate capacity to process one million panels per year (roughly 300MW) by the end of Q2 2024. Our second facility in Mesa Arizona will be operational in Q2 2024 and will initially focus on CdTe panels with a capacity of 100,000 per year.

In 2024, SOLARCYCLE will be expanding to at least one more facility, possibly two more, to cover a wider geography and thereby lower climate impacts and costs from reverse logistics.

RECYCLED MATERIALS AND REUSE

Who does SOLARCYCLE sell recycled and refined materials to? Are they solar companies?

SOLARCYCLE's medium-term plan is to sell as much of the recovered material as possible back to the US-based solar manufacturing companies. For now, SOLARCYCLE sells materials back into the domestic supply chain for a wide variety of manufacturing purposes. Examples include:

- Aluminum, Steel and Copper: The Commercial Metals Company (CMC) in Texas. [Odessa | Commercial Metals Company \(cmcrecycling.com\)](http://cmcrecycling.com)
- SolarMETAL (the unrefined magnetic fraction of silver, silicon, and copper): We have a global publicly traded mining company as our primary off taker.
- Glass – We have an off taker in Texas that upcycles this glass into fiberglass.
- Inverters and Batteries: If/when we receive these, we partner with [ERI](#)

What amount of the recycled materials are returned to the supply chain versus disposed?

SOLARCYCLE’s patented process recovers at least 95% of the value of the panel and returns it, in some way, to the domestic supply chain. Here is how SOLARCYCLE calculates the 95% statistic:

Module material value	Weight%	Value USD/kg	% Value / PV Module	SCI Recovery Rate	Value Recovery
Glass	68	\$0.10	12.7%	99%	12.6%
Silver	0.03	\$500.00	28.1%	95%	26.7%
Silicon	3	\$2.40	13.5%	80%	10.8%
Copper	2	\$3.80	14.2%	98%	13.9%
Aluminum	12	\$1.40	31.5%	100%	31.5%
Balance (10%)	14.97	\$0.00	0.0%	0%	0.0%
				SUM	95.5%

Over the next few years, SOLARCYCLE plans to further optimize the full recovery value of the panel by:

- Refining the SolarMETAL on-site to get the purest silver, copper, and silicon possible. The capital investments required for the SolarMETAL refining are fully funded via our [Series A](#) and the recent [DOE grant](#).
- Building a glass factory on site to upcycle the recovered glass into new solar panel glass. The investments required for the glass factory are in process via multiple financing sources.

PACKING AND LOGISTICS

Can SOLARCYCLE coordinate removing, trucking, and disposal? Can SOLARCYCLE recycle batteries, scrap value PV components, racking, Piles, or equipment like MV Transformers?

SOLARCYCLE's focus is on recycling modules, but we will also accept batteries, racking, inverters, cables, etc. SOLARCYCLE will coordinate shipping logistics and it will be the customer's responsibility to pack modules onto pallets before picking them up. For batteries and other power electronics we have an exclusive arrangement with an ISO and R2 certified partner, whereby they take our power electronics, and we take the solar panels they receive.

Do the cord plates (i.e., junction box) need to be removed prior to sending the modules back for recycling?

SOLARCYCLE will provide packing instructions for all panels. We do not require the junction box to be removed prior to sending modules back. The main requirement is to palletize and band. SOLARCYCLE will then pick up on your site.

LOCATIONS AND SERVICE AREAS

Does SOLARCYCLE offer their services nationwide? Where are your collection points located at? Do you service Hawaii?

SOLARCYCLE currently serves the continental US and covers the cost of shipping anywhere in the continental US. SOLARCYCLE plans to expand to 2-3 locations in 2024. We do service Hawaii, but there may be additional cost.

Are your processing panels outside the United States?

We will take panels from Canada and Mexico, with a slight surcharge.

COMPLIANCE

Is SOLARCYCLE certified for any environmental standards?

Although panels in normal operation pose almost no risk to the public, recycling panels involves breaking up the components and turning them back into new materials. To ensure that these materials are handled responsibly and that the environment, workers, and the public are all protected, our facilities are fully permitted for standard and hazardous secondary material (HSM). SOLARCYCLE is endorsed by the Solar Energy Industry Association (SEIA)'s National PV Recycling Program.

We are also certified by international standard bodies, such as the International Organization for Standardization (ISO) ISO 9001:2015, ISO 14001:2015, and ISO 45001:2018 standards, which ensures protection of the community, workers and the environment. We are here to help companies navigate this complex environment to mitigate risk associated with the handling of hazardous materials.

What documentation of recycling will you provide? Recycling certificates?

SOLARCYCLE will provide a recycling certificate, proof of destruction, and advanced environmental impact reporting upon completion of your project. See below for an example:

CERTIFICATE OF RECYCLING



This certifies that the solar products identified in the Appendix attached hereto and made a part hereof have been recycled by SOLARCYCLE, Odessa LLC, on behalf of:

 **Company Name**

SOLARCYCLE's proprietary recycling process allows for the recapturing of the high-value material in a solar panel, including silver, silicon, copper, solar glass, and aluminum. SOLARCYCLE's goal is to close the circular economy loop and recycle or reuse the entire value of the solar panel.

Rob Vinje

Rob Vinje
Chief Operating Officer

SOLARCYCLE ODESSA LLC
8000 N Golder Ave
Odessa, TX 79764

Order Summary

Project Name	Project Address	Work Order #	Service Order #(s)
Project Name	123 Main Street Town, City ST 12345	12345	12345 12345 12345 12345

Recycling Details

Item	Manufacturer	Model	Wattage	Quantity
Item	Manufacturer	Model	123	12345
Item	Manufacturer	Model	123	12345
Item	Manufacturer	Model	123	12345

Total 123456

Date Recycled
4/26/2023

Does SOLARCYCLE have a TSDF permit to recycle hazardous waste in Texas?

SOLARCYCLE has all necessary permits issued by the Texas Commission on Environmental Quality (TCEQ) to process C-si panels from anywhere in the country that are not considered hazardous. This covers the vast majority of all C-si panels in production and operation.

SOLARCYCLE is developing a comprehensive database of all panels and their known toxicity levels, TCLP testing histories, pictures, conditions and additional information, allowing the company and its customers to quickly and easily qualify panels as hazardous or non-hazardous before shipping, storage, and disposal (legitimate recycling).

For the panels that are deemed hazardous, SOLARCYCLE has recently obtained a Hazardous Secondary Material (HSM) permit from TCEQ that will allow the company to transport and process hazardous C-Si panels from the 29 states that have enacted the EPA's Travel-Based-Exclusion (TBE). The EPA is actively encouraging the remaining states to adopt the TBE.

SOLARCYCLE is also in the process of obtaining appropriate RCRA and TSDF permits in order to ship, store, and process hazardous panels from anywhere else in the country.

How can SOLARCYCLE assist in a decommissioning plan and preparation? Can they prepare estimated costs for recycling and disposal? What about panels in late stage/construction/operations?

SOLARCYCLE can assist in decommissioning planning by providing a year-by-year price for panel recycling costs for up to 30 years in the future, as well as estimates for how many panels are likely to reach end-of-life in each year.

SOLARCYCLE customers have used this to get pricing for bonds and in their decommissioning plans at the beginning of a project. This could also be done in the late stage of a project as well. SOLARCYCLE is also prepared to enter long-term contracts for a project, for all the projects in a state, or potentially a customer's whole portfolio.



This would provide certainty in both directions and guarantee significantly better pricing.

CONTACT INFORMATION

What is the best point of contact for customers?

SOLARCYCLE will be sharing a how-to guide with instructions for submitting a work order which will be shared with our operations, development, and environmental compliance managers.

In the short term, you can reach out to your team's recycling project manager, who will connect them with the appropriate SOLARCYCLE contact.