

## The Solar Industry's Proactive Plan for Photovoltaic Waste Management

### What are Photovoltaics?

Photovoltaic (PV) cells are the most common technology used in solar energy generation. Panels made of PV cells act as semiconductors, converting sunlight into electricity for home, commercial and industrial use.

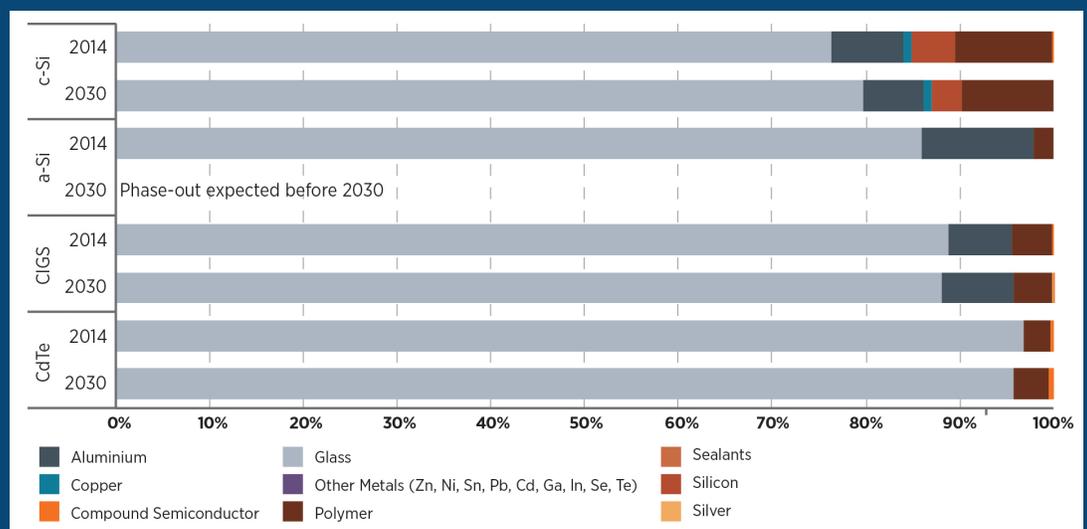
### What is the solar industry's current position on recycling?

The falling cost of solar in recent years has made renewable energy accessible to more people than ever before and has resulted in an exponential increase in solar adoption. With over 227 gigawatts (GW) of panels installed globally, recycling is important for all PV technologies to ensure clean energy solutions do not pose a waste burden for future generations.

Although most PV panels produced today will have a useful life for decades, there is inevitable waste created when panels are damaged during shipment or installation, determined to be defective, or become obsolete. High-value recycling can help minimize life cycle impacts and recover valuable and energy-intensive materials, thereby increasing sustainability within the PV industry. A state-of-the-art recycling network for PV panels also ensures responsible end of life disposal for an ever-growing volume of PV panels, and is a key element of a responsible transition to a clean energy economy.

### What is the material content of PV?

PV panels typically consist of glass, aluminum, copper, and semiconductor materials that can be successfully recovered and reused in new PV panels and other products at the end of their useful life. By weight, more than 80 percent of what goes into PV panels is glass and aluminum – both common and easy-to-recycle materials. The image on the right displays the material composition of an average PV panel.



Source: IRENA and IEA-PVPS (2016), "End-of-Life Management: Solar Photovoltaic Panels," International Renewable Energy Agency and International Energy Agency Photovoltaic Power Systems.



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## ***What is the role of SEIA and its members?***

Members of the Solar Energy Industries Association® (SEIA) are committed to responsible end-of-life management and are proactively developing best practices for the industry. Many SEIA members already operate take-back and recycling programs for their products.

Many of SEIA's solar manufacturers and developers – including First Solar, Flex, JinkoSolar, SolarCity, SunEdison, SunPower, Panasonic and Trina – are working together to create a network of recyclers who can properly handle PV waste and ensure waste is not sent to landfills. By pooling our resources and proactively developing a PV waste management infrastructure, the solar industry will be able to offer the most cost-effective PV recycling solutions through recycling services priced at aggregated volumes versus smaller batched numbers.

## ***How is PV waste management different from waste management for consumer electronics?***

Many consumer electronics have short lifetimes and high disposal rates, which can pose a serious waste management challenge. Conversely, solar panels can last for decades, with 20-25 year warranties and useful life estimates adding another 10-20 years. In fact, less than 1% of PV currently in existence needs to be disposed of annually. In contrast to the more mature and saturated consumer electronics market, the PV industry is still in a relatively early stage. Because of this, PV waste volume will remain relatively low for many years to come, which gives the solar industry an opportunity to establish a proactive waste-management infrastructure.

PV panels are similar in size, shape and composition across the industry, which means recyclers have an easier time planning for and managing their decommissioning. Although PV recycling processes may vary by technology, proven industrial-scale recycling processes have been developed for all PV panel technologies, including crystalline silicon and thin film.

## ***How is the industry proactively planning to deal with future PV waste?***

By creating a portal (to be launched in September 2016) that aggregates the services offered by recycling vendors and PV manufacturers, the industry is making it easier for consumers to select a cost-effective and environmentally responsible end-of-life management solution for their PV products.

Further, SEIA is planning proactive waste management strategies in an effort to make the entire industry landfill-free. This includes developing the national recycling network program and investing in research and development for recycling technologies, with the goal of creating a long-term global circular economy.

For more information on SEIA's sustainability and recycling efforts, contact:

Evelyn Buter  
Director of Codes & Standards  
email: [ebutler@seia.org](mailto:ebutler@seia.org)  
phone: (202) 681-4156

For all media inquiries, contact:

Alexandra Hobson  
Senior Communications Manager  
email: [ahobson@seia.org](mailto:ahobson@seia.org)  
phone: (202) 556-2886