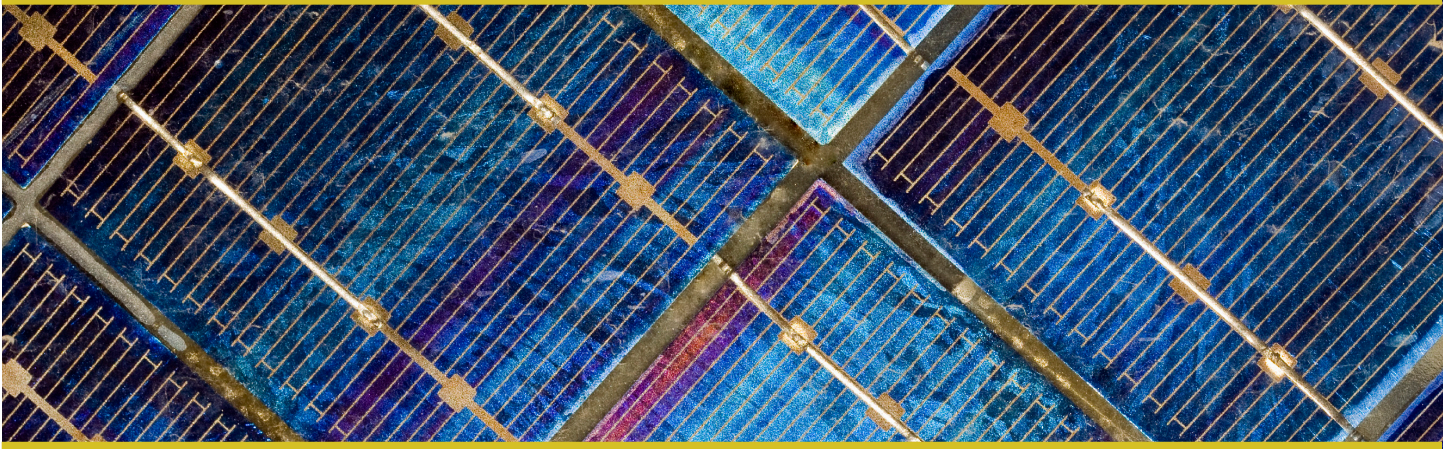


2014 SOLAR SCORECARD



www.solarscorecard.com

SVTC's Vision

The Silicon Valley Toxics Coalition (SVTC) believes that we still have time to ensure that the PV sector is safe for the environment, workers, and communities. We need to take action now to reduce the use of toxic chemicals in PV, develop responsible recycling systems, and protect workers throughout the global PV supply chain.

SVTC envisions a safe and sustainable solar PV industry that:

- 1) Takes responsibility for the environmental and health impacts of its products throughout their lifecycles, including adherence to a mandatory policy for responsible recycling.
- 2) Implements and monitors equitable environmental and labor standards throughout product supply chains.
- 3) Pursues innovative approaches to reducing and ultimately eliminating toxic chemicals in PV module manufacturing.

For over three decades, SVTC has been a leader in encouraging electronics manufacturers to take lifecycle responsibility for their products. This includes protecting workers from toxic exposure and preventing hazardous e-waste dumping in developing countries like India, Ghana, and China that lack the proper infrastructure to protect workers and the environment. SVTC also seeks to stop the practice of sending e-waste to U.S. prisons for dismantling, which results in toxic exposure to inmates.

“The PV industry’s continued growth makes it critical to take action now to reduce the use of toxic chemicals, develop responsible recycling systems, and protect workers.”

The Purpose

The Scorecard is a resource for consumers, institutional purchasers, investors, installers, and anyone who wants to purchase PV modules from responsible product stewards. The Scorecard reveals how companies perform on SVTC’s sustainability and social justice benchmarks to ensure that the PV manufacturers protect workers, communities, and the environment. The PV industry’s continued growth makes it critical that action be taken now to reduce the use of toxic chemicals, develop responsible recycling systems, and protect workers throughout global PV supply chains. Many PV companies want to produce truly clean and green energy systems and are taking steps to implement more sustainable practices. SVTC is committed to helping these companies achieve that goal. At the same time, we need to create and enforce policies that ensure industry safety and improve the environmental performance.

the 2014 SOLAR SCORECARD

SVTC 2014 Solar Scorecard Key

Extended Producer Responsibility—20 points

To earn a sunny score, the company participates in a fully funded collection and recycling system for end-of-life PV modules produced globally; has written a letter to the Solar Energy Industry Association (SEIA) urging it to support EPR laws and regulations; supports public EPR policies in the regions where the company manufactures and sells PV modules and takes responsibility for recycling by including the “crossed out garbage bin” symbol on PV module nameplates, including a PV Cycle link on the company website; and clearly describing on the website how customers can responsibly return PV modules for recycling.

Emissions Transparency—10 points

A sunny score means that the company reports all categories of emissions through its annual report, its website, and/or third-party auditing or government agencies. Points are awarded for reporting: chemical emissions, including chemical waste, hazardous waste disposal, and/or heavy metals; air pollutants, including NO_x, SO_x, volatile organic compounds (VOCs) and particulate matter (PM); emissions of ozone depleting substances; and information regarding landfill disposal.

Chemical Reduction Plan—5 points

A sunny score means that the company has adopted a plan to reduce chemical use per module and described it on their website or in their sustainability report.

Worker Rights, Health, and Safety—15 points

A sunny score is for companies with a formal commitment to protecting worker rights, health, and safety that goes beyond compliance with local laws and regulations. Scoring is based on commitment to improving employee wages; signage informing illiterate workers about minimum wage provisions; coverage of workforce by collective bargaining; workday case rates; recordable incident rates; and adoption of OHSAS for 100% of facilities.

High Value Recycling—5 points

For a sunny score, a company gains points based on high value material recovery rates. Ninety-five percent of the PV module is recycled into products of similar value and quality; recycling takes place at a facility with a documented environmental management system and worker safeguards and protections consistent with ISO 14001; high value recycling is encouraged at the design stage through design for the environment (DfE) training programs.

Supply Chain—10 points

To earn a sunny score, a company purchases from suppliers that report all chemical emissions for all tiers; Has an enforceable commitment from suppliers to protect workers and the environment.

Module Toxicity—10 points

For a sunny score, a company’s PV modules do not contain toxic heavy metals (no more lead or cadmium than allowed under RoHS).

Biodiversity—5 points

A sunny score for biodiversity indicates zero direct impact on wildlife or biodiversity. Scoring includes zero “take permits” for endangered, threatened or special concern animals in the US; No species of special concern present at project sites; no significant impacts on biodiversity in protected areas or on areas of high biodiversity outside protected areas.

Energy Use and Greenhouse Gas (GHG)

Emissions—5 points

A sunny score is for companies that report energy use, GHG emissions, and perfluorocarbon emissions; they also report GHGs and/or energy use to a third party.

Water—5 points

A sunny score in this category means the company recognizes the importance of reducing impacts on water resources. Companies report the volume of water use; report the volume of wastewater generated and submit reports that include several water quality indicators.

Prison Labor—5 points

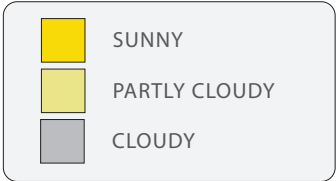
For a sunny score, a company has an explicit policy forbidding prison labor. Points are earned by providing the prison labor policy to SVTC or posting it on the company website; or declaring on previous SVTC surveys that the company does not use prison labor.

Conflict Minerals—5 points

A sunny score means that the company does not use conflict minerals from the Democratic Republic of the Congo (DRC), Angola, Burundi, Central African Republic, Malawi, Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, and Zambia as per the due diligence guidance outlined by the OECD, and that documentation can be produced. Companies can also earn points by starting the due diligence process.

SOLAR SCORECARD

2014



| Company | | EPR | Emissions Transparency | Chemical Reduction Plan | Worker Rights, Health, Safety | Supply Chains | Conflict Materials | Module Toxicity | High Value Recycling | Prison Labor | Biodiversity | Water | Energy & GHGs | 2014 Total Score | |
|---------------|--------------------|-----|------------------------|-------------------------|-------------------------------|---------------|--------------------|-----------------|----------------------|--------------|--------------|-------|---------------|------------------|--|
| Maximum Score | | 20 | 10 | 5 | 15 | 10 | 5 | 10 | 5 | 5 | 5 | 5 | 5 | 100 | |
| 2014 LEADERS | Trina | 17 | 10 | 5 | 15 | 8 | 3 | 10 | 4 | 5 | 5 | 5 | 5 | 92 | |
| | SunPower | 14 | 10 | 5 | 15 | 8 | 3 | 10 | 4 | 5 | 4 | 5 | 5 | 88 | |
| | Yingli | 16 | 2 | 5 | 13 | 10 | 3 | 10 | 4 | 5 | 5 | 3 | 5 | 81 | |
| | SolarWorld | 12 | 10 | 5 | 12 | 10 | 3 | 0 | 4 | 5 | 2 | 5 | 5 | 73 | |
| | REC | 7 | 6 | 5 | 15 | 10 | 0 | 10 | 2 | 3 | 5 | 3 | 5 | 71 | |
| ABOVE AVERAGE | Suntech | 9 | 0 | 0 | 14 | 8 | 0 | 10 | 4 | 3 | 5 | 0 | 5 | 58 | |
| | First Solar | 12 | 6 | 5 | 9 | 7 | 3 | 0 | 4 | 3 | 0 | 2 | 5 | 56 | |
| | Axitec | 9 | 0 | 0 | 12 | 10 | 3 | 10 | 2 | 3 | 5 | 0 | 1 | 55 | |
| | Up Solar | 15 | 2 | 5 | 5 | 0 | 3 | 10 | 3 | 0 | 5 | 0 | 2 | 50 | |
| | Avancis | 8 | 0 | 0 | 8 | 7 | 3 | 10 | 0 | 3 | 5 | 0 | 0 | 44 | |
| | Mitsubishi | 4 | 4 | 0 | 2 | 7 | 0 | 10 | 0 | 0 | 5 | 5 | 5 | 42 | |
| | Renesola | 2 | 0 | 0 | 5 | 7 | 0 | 10 | 4 | 3 | 5 | 0 | 1 | 37 | |
| | LDK | 4 | 0 | 0 | 7 | 0 | 3 | 10 | 3 | 3 | 5 | 0 | 0 | 35 | |
| | Panasonic | 2 | 7 | 5 | 0 | 0 | 3 | 0 | 0 | 0 | 5 | 5 | 5 | 32 | |
| BELOW AVERAGE | Aleo | 10 | 0 | 0 | 6 | 0 | 0 | 0 | 4 | 3 | 5 | 0 | 3 | 31 | |
| | Sharp | 0 | 10 | 5 | 0 | 0 | 3 | 0 | 0 | 0 | 5 | 3 | 5 | 31 | |
| | Calyxo | 12 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 3 | 5 | 0 | 0 | 27 | |
| | Solon | 9 | 0 | 0 | 7 | 0 | 0 | 0 | 2 | 3 | 5 | 0 | 0 | 26 | |
| | China Sunergy-Csun | 5 | 4 | 5 | 2 | 0 | 0 | 0 | 1 | 0 | 5 | 3 | 1 | 26 | |
| | Astronergy | 3 | 0 | 0 | 2 | 5 | 0 | 0 | 2 | 0 | 5 | 2 | 0 | 19 | |
| | Samsung | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 5 | 5 | 19 | |
| | Eurener | 9 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 5 | 0 | 0 | 19 | |
| | Solar Frontier | 4 | 0 | 0 | 0 | 0 | 0 | 10 | 0 | 0 | 5 | 0 | 0 | 19 | |
| | Kyocera | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 2 | 5 | 18 | |
| | Solopower | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 5 | 0 | 0 | 15 | |
| | Motech | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 | 0 | 2 | 14 | |
| | Canadian | 4 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 5 | 0 | 0 | 14 | |
| | Hanwha SolarOne | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 5 | 0 | 5 | 10 | |
| | JA Solar | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 10 | |

Industry Average = 31

Industry Leadership = 70

LAGGARDS

Companies with a score below 10:
 Hareon Solar Jinko Miasole Suniva
 Hyundai Gintech NBSolar Andalay Solar

2014 Solar Scorecard Analysis

The Solar Scorecard is based on SVTC's annual survey of photovoltaic (PV) module manufacturers, as well as on prior survey responses, interviews, news stories, and publicly available data. The goal of the Scorecard is to enhance transparency around environmental health, safety, and sustainability issues for communities, workers, and the environment.

SVTC started collecting data for the Solar Scorecard in 2009 when the solar industry produced just 6.4 GW of PV modules. In 2013, the PV industry produced 38.7 GW, more than six times the 2009 total. Since 2010, 44.5% of the PV industry (based on 2013 market share) has participated in one or more SVTC survey.

Seven companies representing 25.2% of the PV module market share responded to the 2014 SVTC survey. This is a decline from the response of 51.1% in 2012, due largely to the bankruptcies and/or restructuring of former participants. For the 2014 Solar Scorecard, SVTC scored a total of 37 companies based both on survey responses and on information available on company websites and from publicly available sources.

The results compiled from SVTC's 2014 survey and research include the following:

- Most PV modules sold in Europe are covered by a pre-funded Extended Producer Responsibility (EPR) scheme to ensure safe and responsible disposal. No PV modules in the USA come with EPR. Three PV manufacturers (Trina, Yingli, and Up Solar) have written letters to the Solar Energy Industries Association (SEIA) seeking action on EPR for PV modules in the USA. Over the past three SVTC surveys, 14 companies have said they would support public policy for an EPR scheme for PV modules.
- Ten PV manufacturers post annual hazardous chemical reduction targets on their websites or in sustainability reports.
- Twelve companies manufacture PV modules with amounts of cadmium or lead below regulatory thresholds set by the European Union, the world's most stringent standard. This means that the maximum concentration found in any homogenous material that makes up these PV modules is less than 0.01% for cadmium and 0.10% or less for lead.
- Two companies have recently obtained or are planning to obtain incidental take permits for endangered, threatened, or species of special concern for their power plants (First Solar and SolarWorld). Very few companies build, own, or operate PV power plants.
- A total of 23 companies include some information about PV recycling on their websites, in varying depth and detail. Most companies have logos or links to PV Cycle for European customers. Only one PV manufacturer (First Solar) explains to all customers how to recycle end-of-life PV modules. For other companies, if recycling options were described, it was for European customers.
- Zero companies can provide documentation to verify that their supply chains do not contain conflict minerals based on the due diligence guidelines set by the OECD. Twelve companies are engaged in or have started the process of due diligence to determine if conflict minerals are present in their supply chains.

Recommended Actions

Commercial, government, or residential purchasers of PV modules are making a long-term financial and environmental commitment, and PV module manufacturers should make the same long-term commitment to the environment and worker safety.

Use this scorecard to help choose a manufacturer that is committed to high environmental and worker safety standards for PV module manufacturing.

Sponsors

