A PROJECT OF THE **SILICON VALLEY TOXICS COALITION**

2013 SOLAR SCORECARD

www.solarscorecard.com

SVTC's Vision

The Silicon Valley Toxics Coalition (SVTC) believes that we still have time to ensure that the solar 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 socially just 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.

> "Many PV companies want to produce truly clean and green energy systems ***... SVTC is committed to helping these companies achieve that goal.***"

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 PV manufacturers protect workers, communities, and the environment. 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 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 the safety and improve the environmental performance of the entire sector.

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the 2013 SOLAR SCORECARD

SVTC 2013 Solar Scorecard Key

Sunny
Earned perfect scores in a given category.

Partly Cloudy
Earned 50% or more, but didn't have perfect scores.

Rainy
Earned less than 50% of the points in a given category.

Here is a summary of what PV manufacturers needed to do in order to earn a sunny score. More detailed information about the Solar Scorecard scoring can be found at www.solarscorecard.com.

Extended Producer Responsibility (EPR)
A company has or participates in a fully funded collection and recycling system for end-of-life PV modules produced globally. The companies must also support EPR policies in the regions where they manufacture and sell PV modules and describe on their websites how all customers can responsibly return PV modules.

Emissions Transparency
The company reports all categories of emissions including chemical waste, hazardous waste and heavy metals, air pollutants, ozone depleting substances, and landfill disposal.

Chemical Reduction Plan
The company has adopted a plan to reduce chemical use per module and described it in their website or sustainability report.

Worker Rights, Health, and Safety
The company has adopted a code of conduct that protects worker rights, health, and safety that goes beyond compliance with local laws and regulations. The company is also transparent about worker wages and conditions and utilizes a workforce protected by collective bargaining.

Cradle-to-Cradle Recycling
All recycling activities take place at a facility with a documented environmental management system and 95% of the PV module is recycled into products of similar value and quality.

Supply Chains
The company reports all chemical emissions from module upstream to polysilicon production or semiconductor preparation. The company also has an enforceable commitment from suppliers to protect workers and the environment across all tiers of the supply chain.

Module Toxicity
The company's modules do not contain toxic heavy metals. Some manufacturers have been able to significantly reduce the toxicity of their modules to very low levels. Unfortunately some PV modules intrinsically contain toxic materials.

Biodiversity
The company's decisions are having zero direct impact on wildlife or biodiversity. This means zero take permits for endangered, threatened, or special concern species in the US from 2011 to 2013.

Energy and GHGs
The company reports energy use, GHGs, and perfluorocarbons to a third party.

Water
The company reports volume of water use and wastewater generated according to several water quality indicators.

Prison Labor
The company has an explicit policy forbidding prison labor, and provided the policy to SVTC.

Conflict Minerals
The company can confirm that their supply chain does not contain 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.

	EPR	Emissions Transparency	Chemical Reduction Plan	Worker Rights, Health, Safety	Supply Chains	Conflict Minerals	Module Toxicity	C2C Recycling	Prison Labor	Biodiversity	Water	Energy & GHGs	Overall Score
MAXIMUM SCORE	**20**	**10**	**5**	**15**	**10**	**5**	**10**	**5**	**5**	**5**	**5**	**5**	**100**
Trina	14	5	5	15	7	3	10	4	5	2	3	4	77
Yingli	9	4	5	14	8	3	10	4	5	5	3	5	75
SunPower	7	6	5	14	7	3	10	4	5	3	2	4	69
Upsolar	14	4	0	13	8	3	10	2	3	5	0	4	66
SolarWorld	9	10	5	8	7	0	0	3	5	0	5	5	64
REC	10	10	5	8	7	0	0	1	4	5	3	4	57
First Solar	12	6	0	13	7	3	0	4	3	0	2	5	55
Axitec	4	0	0	10	8	3	10	4	3	5	0	0	47
Suntech	9	2	5	10	7	3	0	0	4	5	0	2	47
Mitsubishi	0	4	5	4	7	0	10	0	0	5	5	5	45
Aleo	10	0	0	11	7	0	0	4	3	5	0	3	43
Renesola	2	0	0	12	7	0	10	1	3	5	0	1	41
LDK	4	0	0	12	0	3	10	3	3	5	0	0	40
Avancis	9	0	0	8	7	3	0	0	4	5	0	0	36
Solon	9	0	0	8	7	0	0	0	4	5	0	0	33
Panasonic	0	7	5	0	0	3	0	0	0	5	5	5	30
Astronergy	4	6	5	2	0	0	0	0	0	5	4	3	29
Samsung	0	4	5	0	0	0	0	0	0	5	5	5	24
Calyxo	5	0	0	2	7	0	0	0	3	5	0	0	22
Motech	4	0	0	0	7	0	0	0	3	5	0	3	22
Sharp	0	3	5	0	0	0	0	0	0	5	3	5	21
Solopower	5	0	0	4	0	3	0	0	3	5	0	0	20
Kyocera	4	4	5	0	0	0	0	0	0	5	2	0	20
Eurener	9	0	0	0	0	0	0	0	3	5	0	0	17
Solar Frontier	0	0	0	0	0	0	10	0	0	5	0	0	15
Hareon Solar	4	0	0	0	0	0	0	0	0	5	0	0	9
Hyundai	4	0	0	0	0	0	0	0	0	5	0	0	9
Jinko	4	0	0	0	0	0	0	0	0	5	0	0	9
Hanwha SolarOne	4	0	0	0	0	0	0	0	0	5	0	0	9
Fluitecnik	0	0	0	0	0	0	0	0	3	5	0	0	8
JA Solar	0	0	0	0	0	0	0	0	3	5	0	0	8
Canadian	2	0	0	0	0	0	0	0	0	5	0	0	7
Miasole	2	0	0	0	0	0	0	0	0	5	0	0	7
China Sunergy	0	0	0	0	0	0	0	0	0	5	0	0	5
Gintech	0	0	0	0	0	0	0	0	0	5	0	0	5
Nanosolar	0	0	0	0	0	0	0	0	0	5	0	0	5
NBSolar	0	0	0	0	0	0	0	0	0	5	0	0	5
Sungen	0	0	0	0	0	0	0	0	0	5	0	0	5
Suniva	0	0	0	0	0	0	0	0	0	5	0	0	5
Westinghouse	0	0	0	0	0	0	0	0	0	5	0	0	5

2013 Solar Scorecard Analysis

In 2013 SVTC augmented its research methodology for the Solar Scorecard to include prior survey responses and additional sources such as interviews, news stories, and publicly available data and information. Using this method, SVTC has scored 40 companies in the 2013 Solar Scorecard, representing an estimated 82.8% of the PV industry market share. Overall, 49.5% of the 2013 PV industry (based on market share) has responded to at least one SVTC Solar Scorecard survey.

Ten companies, representing 34.6% of the PV module market share, responded to the 2013 survey. This is a decline from 51.1% in 2012, due largely to the bankruptcy of several former participants and declining market shares of other major producers.

Results compiled from SVTC's 2013 survey and research include the following:

- The number of PV companies with fully funded EPR programs went from one to zero. First Solar, for years the only major company with a fully funded EPR program, has eliminated its EPR program for most of the volume of its sales.
- Two PV manufacturers (Trina and Upsolar) have written letters to SEIA seeking action on EPR for PV modules in the US. Over the past three SVTC surveys, 13 companies have said they would support public EPR policy for PV modules.
- Seven companies (Astronergy, Sharp, SolarWorld, SunPower, Suntech, Trina, Yingli) have comprehensive internal policies that addresses worker rights, health, and safety.
- Two PV manufacturers (REC, SolarWorld) do extensive chemical emissions disclosure and reporting do extensive chemical emissions disclosure and reporting.
- Three PV manufacturers have signed the SEIA Environmental & Social Responsibility Commitment, eight other companies have similar internal policies, and nine other companies have commitments that lack several important elements. In all, 20 companies have some level of engagement with environmental and social responsibility guidance.
- Nine companies manufacture PV modules with amounts of cadmium or lead below regulatory thresholds set by the European Union, the world's most stringent (Yingli, Trina, SunPower, Upsolar, Axitec, Mitsubishi, Renesola, LDK, Solar Frontier). 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.
- Three 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, SolarWorld, Trina). Note that not all companies build, own, or operate PV power plants.
- Twenty companies include information about PV recycling on their websites in varying degrees of depth. Most companies have links to PV Cycle 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.

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.

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