

Solar panels are not toxic and are safe for the environment. **Myths** mentioned at the May 15, 2024, Senate Water, Agriculture & Rural Affairs Committee hearing are *not* supported by **facts** or available data.



✗ *“Panels containing cadmium telluride, and others using lead, pose a threat to the surrounding environment.”*

✓ The cadmium telluride (CdTe) layer of the solar panel is 3% of the thickness of a human hair and is sealed between two sheets of heat strengthened glass that are bonded together by an industrial laminate at greater than 700 pounds of pressure per square inch. **The encapsulated panel design and the fact that CdTe does not dissolve in water prevents leaching in the event of panel breakage or natural disasters.**

- Solar panels are consistently characterized as non-hazardous under the EPA's Toxicity Characteristic Leaching Procedure (TCLP) which tests leaching of toxic chemicals. Such testing creates conditions much more extreme than in the field: chopping up solar panels into tiny pieces, submerging them in an acidic solvent, then agitating them. Even in these extreme conditions, solar panels do not represent a significant risk.¹

The lead needed to join the crystalline silicon (c-Si) cells is roughly 1/750 of the amount used in a conventional car battery, or half of the amount in a single 12-gauge shotgun shell. These leaded portions of the panel are enclosed in nonporous, non-toxic substances like glass, which prevent the lead material from escaping or leaching into the ground.²

SOLAR PANEL SNAPSHOT

As of 2022, 72% of utility scale solar photovoltaic projects use crystalline silicon (c-Si) and 27% use cadmium telluride (CdTe).³ Both are tremendously safe to the surrounding environment.

Crystalline Silicon Solar Panels

- c-Si modules are 77% glass, 10% aluminum, 3% silicon and 9% polymers, with less than 1% copper, silver and tin, and less than 0.1% lead.
- **Silicon is the second most abundant element on earth**, trailing only oxygen.
- **Silicon is the most common semiconductor material** used in computer chips, cell phones, and other consumer electronics.⁴

Cadmium Telluride Solar Panels

- CdTe modules are 80–85% glass, 11–14% aluminum, 2–4% polymers, less than 0.4% copper, and less than 0.1% tellurium and cadmium.
- **Cadmium telluride is a compound that is 99% less toxic than elemental cadmium** and has a melting point of nearly 2000° Fahrenheit.
- **Cadmium telluride is a stable compound that does not dissolve in water**, preventing leaching and groundwater contamination.⁵

¹ North Carolina State University. 2017. “Health and Safety Impacts of Solar Photovoltaics.”

² Ohio Department of Health. 2022. “Ohio Department of Health Solar Farm and Photovoltaics Summary and Assessments.”

³ Energy Information Administration (EIA). 2022. “Form EIA-860 Data - Schedule 3, Solar Technology Data.”

⁴ US Department of Energy. Date unknown. “Solar Photovoltaic Cell Basics (website).”

⁵ Journal of Materials Research. 1998. “Cadmium-telluride-Material for thin film solar cells.”

LAND USE



“155GW of solar in the ERCOT interconnection queue would use 1.5 million acres, while 220k acres are already used by operational facilities.”



This claim is misleading and dramatically overstates the land use of utility-scale solar in ERCOT.

- According to analysis by ERCOT, only **17%** of the planned MWs of solar in the ERCOT interconnection queue reach commercial operations.⁶
- Lawrence Berkeley National Laboratories (LBNL) found median land use values for power density of **2.8 acres/MW** for fixed-tilt and **4.2 acres/MW** for tracking systems.⁷ While site-specific variables may affect land use, these values are much more representative of likely land use for utility-scale solar.

Even a more aggressive estimate of **7.5 acres/MW**, and **40%** of planned megawatts in ERCOT’s interconnection queue reaching commercial operation, would still only pencil out to **465k acres** – about one-quarter of one percent of Texas Land.

PANEL CLEANING & WATER USE



“6.5 – 338 billion gallons of water (annually) would be needed to clean panels across over 1.5 million acres.”



Utility-scale solar uses little water in normal operations, as panels are not regularly cleaned as a part of maintenance and operations. Rainfall is generally sufficient to clean the panels and cleaning on a regular basis would not be cost-effective.⁸



“Harmful chemicals are used to clean panels, that then leach into the ground below and adjacent waterways.”



Rainfall is generally sufficient to keep panels clean. On the rare occasion that unique conditions require more intense cleaning, operators utilize soft brushes and distilled water, often automated by advanced cleaning systems. Chemical agents or cleaning solvents are not used, as panel manufacturers warn that their use may damage panels, affect performance, and may void the product warranty.

STORMWATER



“Flat, impervious surfaces cause runoff issues.”



Stormwater is regulated at the federal level under Section 402(p) of the Clean Water Act (CWA). Like all construction projects that will disturb more than one acre of land, **solar projects must comply with the conditions of a Construction General Permit (CGP) from TCEQ and develop a Stormwater Pollution Prevention Plan (SP3).** Stormwater violations are subject to enforcement by EPA and TCEQ.

⁶ ERCOT System Planning and Weatherization Update, February 27, 2023.

⁷ Bolinger, M. and G. Bolinger. 2022. “Land Requirements for Utility-Scale PV: An Empirical Update on Power and Energy Density.” IEEE Journal of Photovoltaics.

⁸ National Renewable Energy Laboratory, Sandia National Laboratory, SunSpec Alliance, and the SunShot National Laboratory Multiyear Partnership (SuNLaMP) PV O&M Best Practices Working Group. 2018. “Best Practices for Operation and Maintenance of Photovoltaic and Energy Storage Systems; 3rd Edition.” NREL/TP-7A40-73822.