What's in a solar panel?

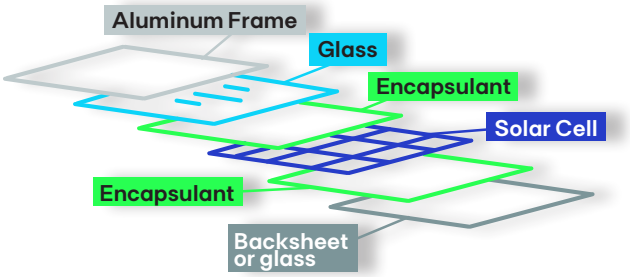
Solar energy powers millions of businesses, schools, and households every day with clean electricity, safely produced on American soil. Utility-scale solar projects have a total capacity equal to the power needs of more than 22 million homes.[1]

Solar panel composition

By mass, solar panels are **90% glass and aluminum**.

Beneath the glass is an encapsulant, usually a polymer similar to the material used in car windshields.

The encapsulant completely seals the interior components from air and moisture.[2, 3]



Photovoltaic cells are **largely made of silicon**, the second-most common element on Earth. It is used in most consumer electronics, from cell phones to computer chips.[4]

Inside the encapsulant is the **silicon solar cell**, and copper to wire the cells together. The underside of the panel is either a foil backing or, if bifacial, a second sheet of glass. The thin layer of solar cells is sealed on both sides and **covered with glass inside an aluminum frame**.[5]

> **Solar panels are safe.**
>
> There are no liquids or hazardous chemicals inside a solar panel. **The panels pose no risk to humans or animals.** Everything inside the panels remains securely contained throughout their operation."
>
> Bob Broussard
> Global Procurement
> EDP Renewables North America

Solar cell manufacturing

How silicon solar cells are made

Most solar projects today are built using crystalline silicon panels.

Quartz is mined and heated to produce silica, the primary component of beach sand. The silica then reacts with carbon to create metallurgical silicon, which is further purified and recrystallized into ingots.

At this stage, the silicon is pure enough to be used in solar panels. The crystalline silicon ingots are sliced into thin wafers in preparation for being converted to solar cells.

To become solar cells, silicon wafers go through several processing steps: cleaning, texturization, emitter diffusion, application of an anti-reflective coating, and contact metallization. Once these steps are complete, the wafers are transformed into functioning solar cells.

To create a functional solar panel, individual cells are interconnected using conductive solder. The connected cells are then sealed between layers of glass and transparent encapsulation polymers, all enclosed within a durable metal frame. This design protects the cells from environmental exposure, ensuring the panel remains sealed and operational for its 30- to 35-year lifespan.

A junction box is then fitted to the panel to carry the electrical current it generates to an inverter. The power travels through collection cables to the substation and onto the electric grid.

Solar panel safety

Built for extreme weather

EDPR NA's solar panels are built to endure extreme weather for decades. Designed to withstand storm winds and hail, they undergo rigorous impact and wind tunnel tests, including resistance to hail up to 2.2 inches in diameter.

Projects are monitored 24/7: local operations teams are on-site during the day, and our Remote Operations Control Center in Houston continuously monitors the fleet in near real-time to quickly identify and respond to any issues.

Fully sealed against leaching

All components inside a solar panel are fully sealed within a polymer encapsulant and sandwiched between glass or backing, with no liquids present. If a panel is damaged, the glass remains intact thanks to the encapsulant—similar to a phone screen—preventing any materials from leaching out.

In the unlikely event of severe damage, there is still insufficient material inside the panels to pose an environmental risk.

EDPR NA only uses panels that are demonstrably proven to be safe and non-hazardous over decades under extreme conditions.

Any damage sustained to EDPR NA's solar panels would be promptly remediated and repaired.

Scan the QR code to explore educational resources on renewables and how we are empowering local economies, while meeting America's energy demands.

[1] U.S. Department of Energy, "Solar Photovoltaic Cell Basics," 2023.
[2] Maurizio Dikdan, MSc., Solar PV Energy. Solar PV Technology Engineer. EDPR Subject Matter Expert for Solar PV Modules. 2024.
[3] U.S. Department of Energy, "Solar Photovoltaic Manufacturing Basics," 2025.
[4] American Clean Power Association, "Solar Panels and Your Community," 2022.
[5] First Solar, "Our Technology," 2023.
[6] U.S. Department of Energy, "Cadmium Telluride," 2025.
[7] National Renewable Energy Laboratory. "CdTe-based thin film photovoltaics: Recent advances, current challenges and future prospects." 2023.
[8] Matsuno, Yasunari. December 2013. Environmental Risk Assessment of CdTe PV Systems to be considered under Catastrophic Events in Japan. First Solar.

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About Cadmium Telluride (CdTe) panels [6,7]

Some solar panels—most commonly those manufactured in the U.S.—use cadmium telluride (CdTe) instead of crystalline silicon. This technology is equally safe, rigorously tested, and offers specific advantages that make it well-suited for certain projects.

The decision to use CdTe panels rather than crystalline silicon is dependent on multiple factors, such as project location and climate.

Cadmium Telluride (CdTe) safety

1. Like polysilicon panels, CdTe solar panels are fully encapsulated and sealed in laminated glass to keep the surrounding environment safe, even if cracked.

2. CdTe is not the same as cadmium. Unlike cadmium, CdTe is a strongly bonded compound with three times the melting point of cadmium. It does not dissolve in water, making it even less likely to contaminate water through leaching, which is already highly unlikely because of the sealed panel construction.

3. Oil and gas-powered generation rely on cadmium. For every five megawatts of solar power installed, it is estimated that 157 grams of cadmium are prevented from being released into the environment that would otherwise have been released by oil and gas.[8]

Benefits

Superior performance in **hot and humid** climates and in **shaded** conditions.

Resiliency rate: on average, the modules are able to retain **89% of their original performance** after 30 years.