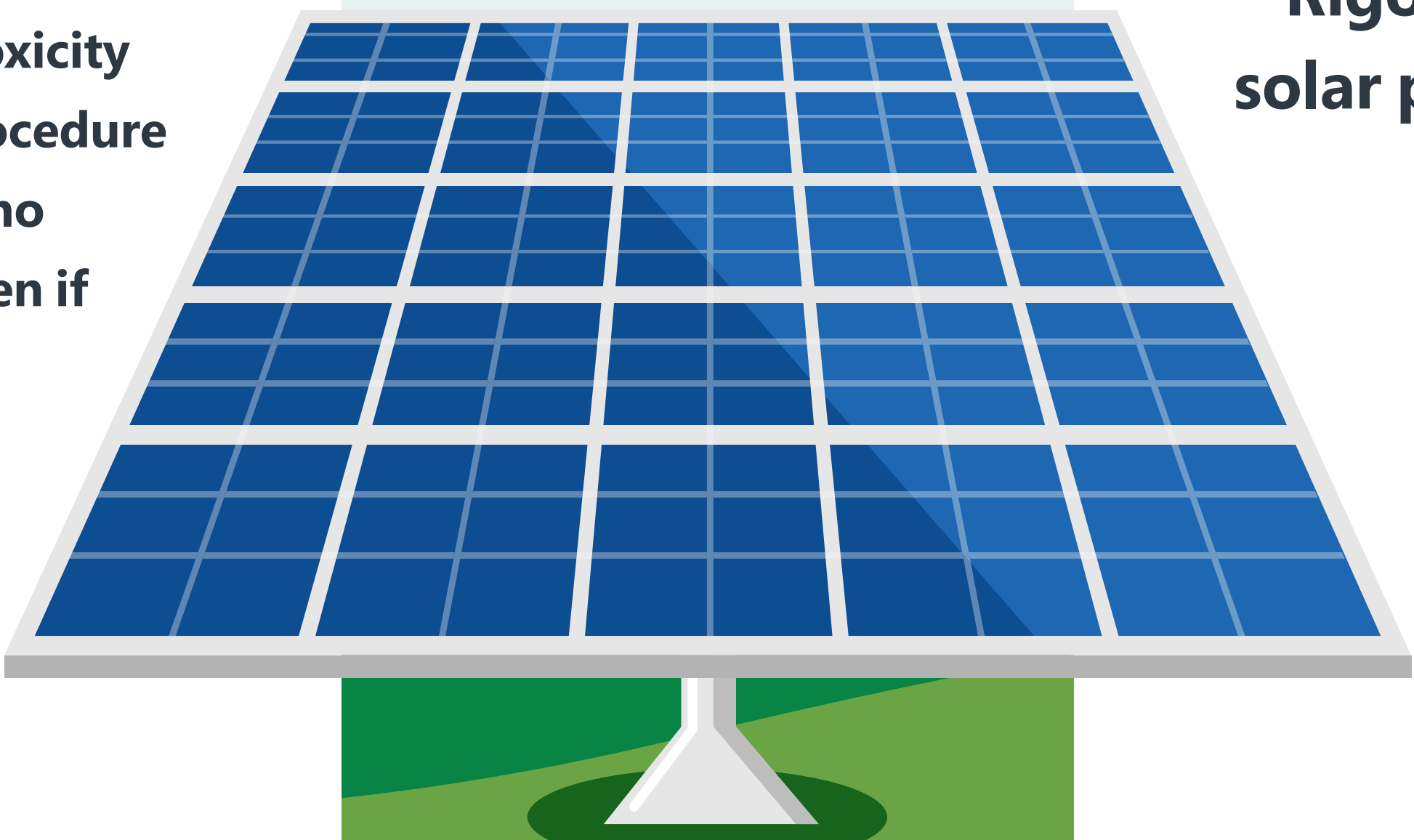


Solar Panels & Hail: Ensuring Community Safety

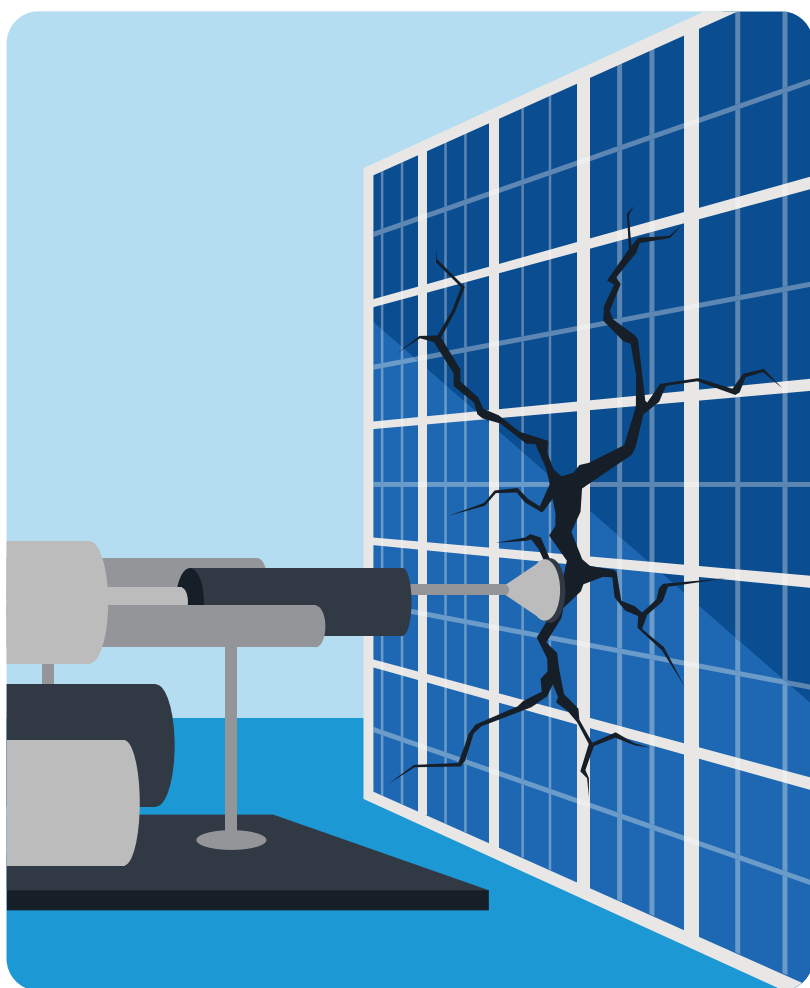


DESIGN

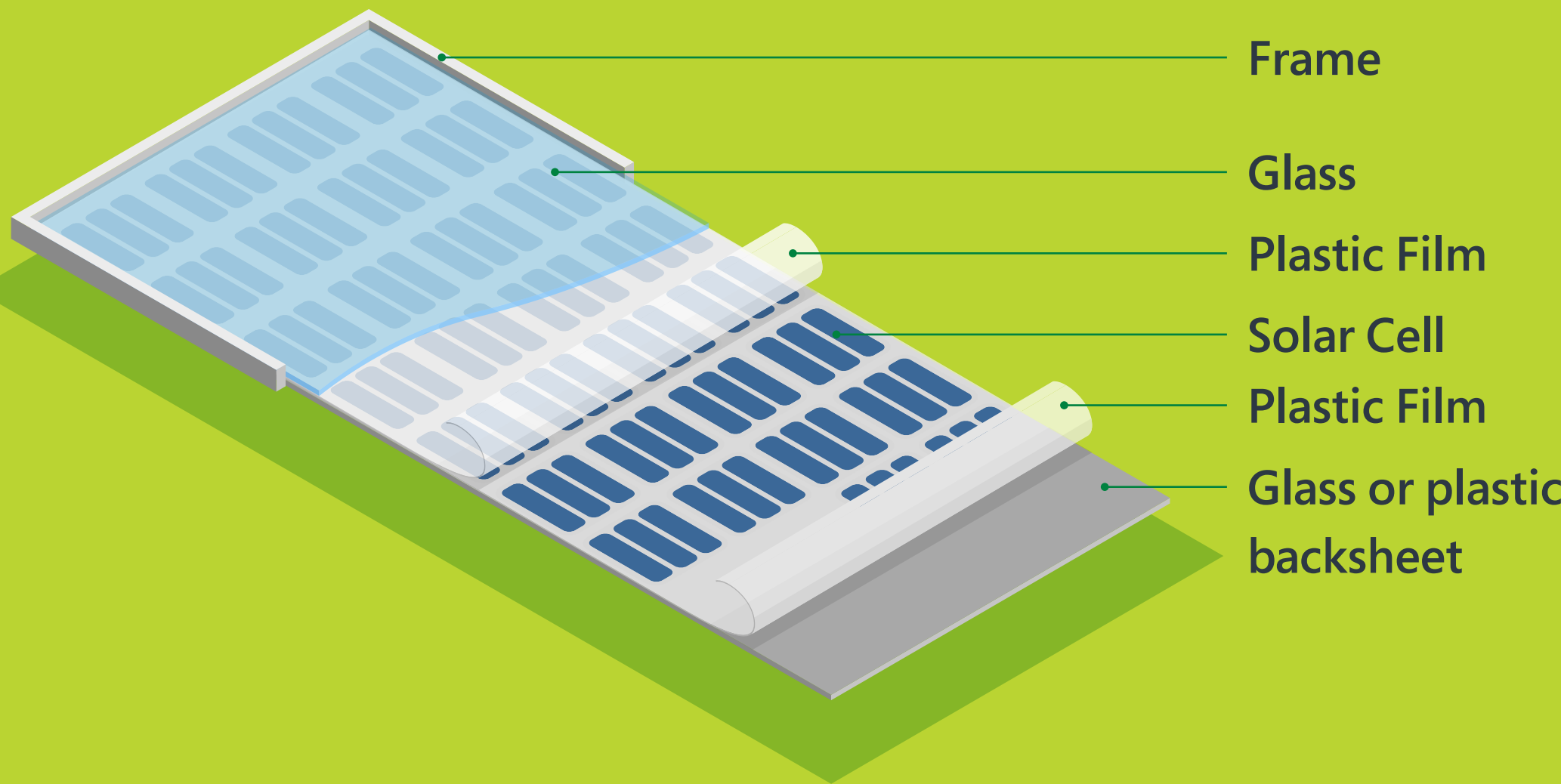
Clearway currently requires that all solar panels undergo EPA toxicity Characteristics Leaching Procedure (TCLP) testing^{1,2,3} to ensure no toxic leaching can occur, even if heavily damaged.



Rigorous testing ensures solar panels can withstand hail impacts.



Solar panels are made with materials that are safe for the public & environment.



Solar Cells

Crystal Silicon Panels

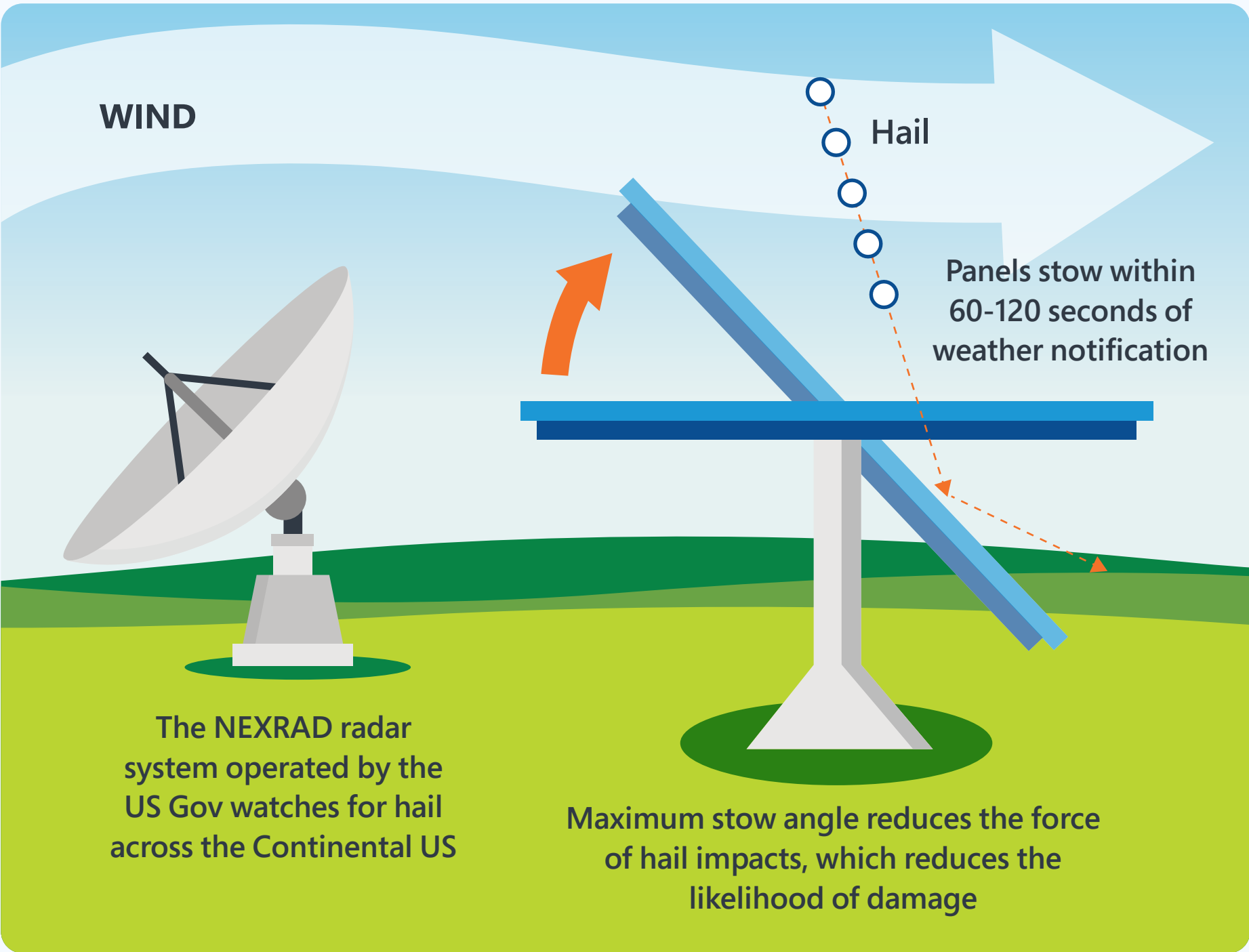
Solar cells are made from sand. Small amounts of lead on solar cells are encased in glass & plastic layers that prevent leaching.

Thin Film Panels

Solar cells that contain solid Cadmium Telluride crystals are chemically bonded together and therefore cannot leach.⁴

OPERATIONS

Operators use weather monitoring services to predict hailstorms & tilt solar panels before a storm to avoid damage.

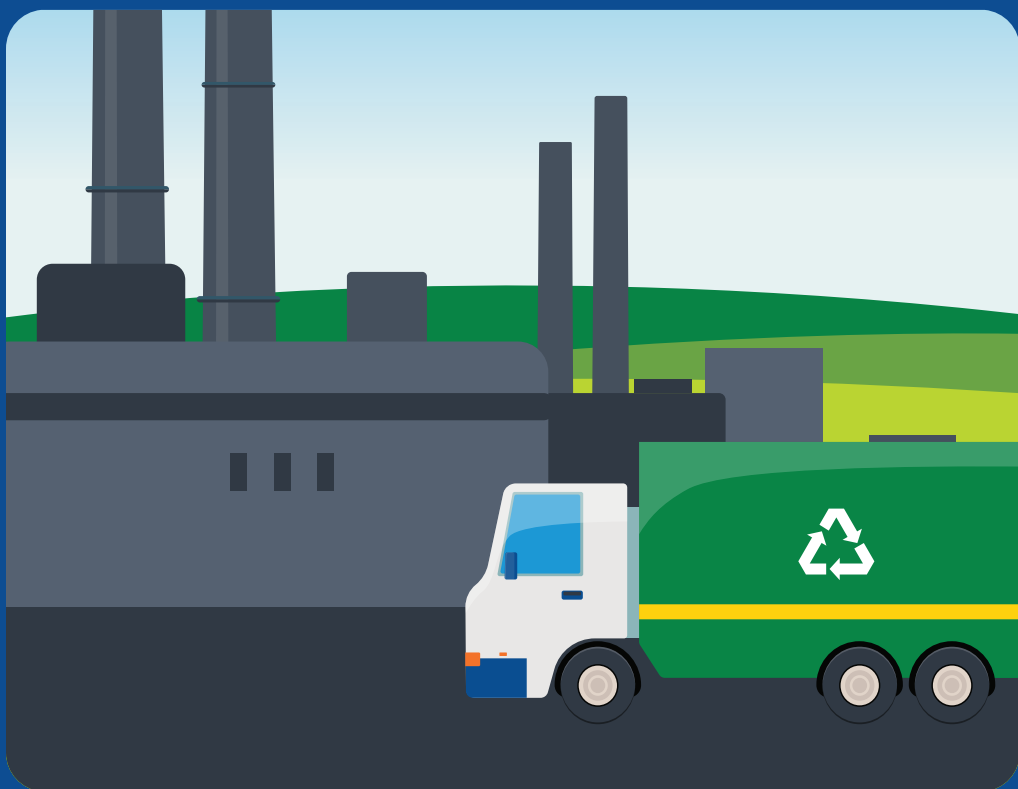


RECOVERY



If hail damage happens, trained professionals remove cracked solar panels & pieces following safety protocols.

Cracked pieces are then transported to recycling facilities.^{5, 6, 7, 8, 9}



1. Tamizhmani, G., Libby, C., Shaw, S., Krishnamurthy, R., Leslie, J., Yadav, R., Tatapudi, S., & Bicer, B. (2018). Evaluating PV Module Sample Removal Methods for TCLP Testing. 2018 IEEE 7th World Conference on Photovoltaic Energy Conversion (WCPEC), 2610-2615.
2. Tamizhmani, G., Shaw, S., Libby, C., Patankar, A., & Bicer, B. (2019). Assessing Variability in Toxicity Testing of PV Modules. 2019 IEEE 46th Photovoltaic Specialists Conference (PVSC), 2475-2481.
3. U.S. Environmental Protection Agency. (1992). Method 1311 - Toxicity Characteristic Leaching Procedure (TCLP).
4. Electric Power Research Institute (EPRI). (2022). Improving PV Sampling Methods for End-of-Life Leach Testing. Product ID: 3002014825, Project ID: 1-111335. EPRI, Palo Alto, CA.

5. Curtis, T. L., Buchanan, H., Heath, G., Smith, L., & Shaw, S. (2021). Solar Photovoltaic Module Recycling: A Survey of U.S. Policies and Initiatives. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-74124.
6. IRENA and IEA-PVPS. (2016). End-of-Life Management: Solar Photovoltaic Panels. International Renewable Energy Agency and International Energy Agency Photovoltaic Power Systems.
7. Li, F., Shaw, S., Libby, C., Preciado, N., Bicer, B., & Tamizhmani, G. (2024). A review of toxicity assessment procedures of solar photovoltaic modules. Waste Management, 174, 646-665.
8. Solar Energy Industries Association. (2020). End-of-Life Management for Solar Photovoltaics: Recycling.
9. Vetter, D. (2023, October 12). These Two Myths About Solar Power Are Slowing The Energy Transition. Forbes.