

Solar Energy FAQ

How do the panels capture energy?

When the sun hits the solar array, the photovoltaic (PV) cells in the panels absorb the sunlight. This energy then gets converted into electricity. The power produced by the panels then flows into the existing utility transmission system and is distributed to power homes, businesses, and more.

What kind of equipment is installed as part of a solar project?

The specific components used in a solar project depend on specific project needs as well as local regulations and building codes. A solar energy generation facility typically includes the following components:

- **Solar Panels:** Solar panels are responsible for converting sunlight into electricity. They are usually made of photovoltaic cells, which generate electricity when exposed to sunlight.
- **Inverters:** The inverter is responsible for converting the direct current (DC) electricity generated by the solar panels into alternating current (AC) electricity that we use in our homes.
- **Structural Components:** The solar plus storage system will also include various structural components, such as mounting systems and electrical conduit, to securely attach the panels and battery system to the roof or ground, and to ensure that the electrical components are properly connected and protected.
- **Electrical and Power Management System:** This system is responsible for controlling and optimizing the energy flow between the solar panels, the battery storage system, and the grid. It ensures that the energy generated by the solar panels is used efficiently and effectively, and that the battery system is charged and discharged in a way that maximizes its lifespan.
- **Monitoring System:** A monitoring system is used to monitor the performance of the solar plus storage system, including the generation of electricity, the charging and discharging of the battery system, and overall energy production. Remote monitoring of the facility occurs 24 hours a day, 365 days a year.

How much land is required for a solar project?

Each project is unique and dependent on the land constraints within the project property. Typically, each megawatt of solar requires approximately 5 acres of land. In a larger context, the total land required to meet the United States power demand is less than 1% of the total contiguous U.S. surface area.

Where are the solar panels made?

Similar to many products used in our daily lives, solar panels are often sourced from the global supply chain. For the first time in decades, the solar supply chain is coming home, positioning the United States to lead the global clean energy future. Since 2022, there have been over 50 announcements for new or expanded solar manufacturing facilities to drive in manufacturing jobs. The transformational buildout of the domestic solar supply chain will help the United States gain greater control of its energy resources and reduce dependence on foreign imports.

How do solar energy generation systems interact with the local power grid?

Utility scale solar energy generation systems typically connect to the power grid by directly interconnecting with the utility substation. Large solar energy generation projects are required to fund and build upgrades to the transmission system prior to securing the approval to inject power at the local substation. The power output from a large solar farm is very predictable, allowing grid operators to reliably integrate this generation. Numerous utilities and grid operators across the country have successfully adapted their processes and procurement plans to manage the intermittency of solar energy generation.

What are solar panels made of?

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The majority of solar panels are made from silicon, which is a semiconductor that converts the sunlight into electricity through the photovoltaic (PV) effect. Silica is the second most abundant element on earth (primarily found in the form of quartz sand) and is non-toxic in all its natural forms. Protective glass sheets are placed over the PV cells to provide durability. The metal frames are typically made of aluminum that protects the panels from weather and is used to mount the panels to the racking system. Other materials include small amounts of plastics, copper, silver and other metals that ensure the proper function of the solar panels.

Can solar panels leach chemicals or metals?

No. Solar panels do not cause any contamination to the water or land. Solar energy projects do not emit any air particulates or contaminants, require no underground storage or water to operate, and do not discharge any byproducts into the local water well. Solar panels are designed and manufactured to withstand harsh environmental conditions and extreme weather events. All of the materials that comprise a solar panel are tightly bound within the structure and even if the panels are damaged (e.g., hail or hit by machinery) no chemical or metal will leach from the panels. Therefore, solar panels pose no risk of leaching during construction, operation, removal and disposal.

Will pesticides be used to manage vegetation and keep dirt off of the solar panels?

As part of the final stages of construction, native seed mixes are spread across all disturbed areas. These seed mixes often include pollinator-friendly grasses and clover to create a robust new habitat for bees, birds, insects, small mammals and other wildlife. This ground cover will be low-growing and require little maintenance (i.e., mowing/trimming.) A limited spot use of herbicides may be required to control any noxious weeds around the equipment. This would be done in accordance with local and state regulations.

As for cleaning of the panels, there is typically enough precipitation so that panels rarely need to be cleaned, if at all. If panels are cleaned, it will be done only with water and a brush.

Do solar projects emit electromagnetic fields?

Electric and magnetic fields (EMF) are invisible areas of energy, that are associated with the use of electric power. Everything that we plug in that requires electricity in our homes emits EMF. The typical background level of magnetic fields in our homes is 4 milligauss (mG). Appliances such as microwaves, computers, TVs and hair driers emit 100s of mG. Although we are exposed to EMF in our everyday lives, it's far below a level that causes any health impacts.

Solar projects emit low levels of EMF around the wiring, the inverters and at the substation. However, the levels of EMF even within the fenced solar area are far below any level of health concern. Levels of EMF at the fence line of solar projects are typically within the background level we find in our homes.

Will the panels cause glare that would reflect on nearby public roads and housing?

PV solar panels are designed to absorb sunlight and only reflect about 2% of the sun's rays. Any light reflected from PV panels will have a significantly lower intensity than glare from sunlight reflecting on water, window glass, car windshields and even snow in the fields. It does not pose a safety concern for motorists or neighbors. In fact, the Federal Aviation Administration (FAA) requires glare analysis only for solar projects that will be located in the line of sight of airport control towers.

How much noise is generated by a solar project?

The solar panels themselves do not emit any noise. However, there is sound emitted from the inverters and the project substation. This is accounted for by placing the inverters within the interior of the project and proper siting of the substation.

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Project sound levels are modeled to ensure that the noise levels will be low and comply with all local and state requirements for neighboring properties.

How much traffic is generated by a solar project?

Solar projects are excellent neighbors and generate far less traffic than a single-family home when operational. The Institute of Transportation Engineers provides that one single family home, on average, generates 9.5 vehicle trips per day. A solar facility, once operational, would generate similar traffic to a single home. Large trucks are used to deliver equipment approximately 6-9 months during construction and construction personnel need to access the site, which results in a temporary increase in traffic. However, a traffic management plan and road use agreement will be developed in co-operation with the County prior to construction to minimize the impact of this traffic.

How long will the solar panels last?

Solar panel performance degrades at approximately 0.5% per year, resulting in less and less electricity production over time. Solar module manufacturers generally warranty performance for 20 to 25 years. Solar panels are able to produce power after their warranty has expired, but they may be replaced with newer, higher performing solar panels.

What happens at the end of a solar project's life, during the decommissioning stage?

At the end of a solar project's working life, expected to be at least 35 years, the land will be restored to its original state in accordance with applicable law and land use regulations in effect at that time of decommissioning. Decommissioning proceeds in reverse order of the installation. Equipment and materials will be salvaged or recycled whenever possible, with remaining materials disposed of at authorized sites. The recycling process for the power electronics is similar to that of traditional e-waste. Some equipment such as inverters and transformers have the potential for refurbishment and reuse, which would be the preferred alternative. Solar panels will be recycled or disposed of in accordance with applicable regulations at the time of decommissioning. While the solar panel recycling industry is still growing, recycling is already established in the glass, metals, and electronics industries, which can accommodate solar panels. Further details on solar panel recycling and reuse and recycling facilities can be found on the USEPA website <https://www.epa.gov/hw/solar-panel-recycling>

Following removal of Project equipment, the site will be restored such that the physical conditions of the area are returned to their natural state. These activities will include removal of gravel and other aggregate material, localized grading and diking to match surrounding elevations, replacement of topsoil from on-site stockpiles, and revegetation of disturbed areas with an appropriate native seed mix. Given that the soil beneath the solar panels has been fallow for decades, its productivity will be as good, if not better than at the time of installation and can be returned to agriculture or pasture use.

Is solar energy expensive?

Despite requiring substantial financial outlay upfront, utility-scale solar projects are cheap to run once they are operational. Sunlight is free and solar energy generation systems have low upkeep, operational, and maintenance costs, making them exceedingly cost-effective in the long run. The long-term availability and costs of fossil fuels are uncertain. Solar energy offers an opportunity to keep energy costs consistently low over the long term.

How does the U.S. government subsidize solar energy projects?

Similar to the fossil fuel industry, the U.S. tax code offers tax deductions and credits that benefit renewable energy investors. The U.S. Government extended the tax credits available to renewable energy investors in 2022 to help drive deployment of renewable energy in the United States. The tax credits are now structured to ensure (i) the associated construction jobs meet prevailing wage and registered apprenticeship requirements, (ii) projects meets certain domestic content requirements, (iii) projects are located on brownfields or areas previously serving the coal industry, and (iv) projects are located in areas of low employment to drive job creation.