

ADAMS CREEK

SOLAR PROJECT

FREQUENTLY ASKED QUESTIONS ON GROUND-MOUNTED SOLAR PHOTOVOLTAIC SYSTEMS



Do solar power facilities in rural areas take farmland out of agricultural commission permanently?

The use of ag land for a solar energy facility is only temporary, and the land can be restored to its original condition after the solar farm is decommissioned. Compared to other forms of development where farmland is paved over (for shopping centers, amusement parks, manufacturing facilities, suburban housing tracts, and highways), solar projects prevent more impactful development from occurring, preserving the land for agricultural use in perpetuity.

The total amount of agricultural land being used for solar energy is minuscule compared to the conversion of agricultural land permanently to residential housing and commercial development.

In arrangements where a landowner has agreed to lease property to a solar project, the ongoing annual lease payments will continue to go to the landowner, who will retain ownership of the land both during and after the lease. At the end of the lease and when the project is responsibly decommissioned, the landowner could resume farming the land. In other development conversions, the farmer sells the land to another party - usually a housing developer or commercial real estate broker.

Solar farms present landowners with an opportunity for a higher value use on their land. This also allows the landowner to diversify their income away from agricultural products alone, better weather economic downturns, and to keep the land in the family.

Farmland has gotten more productive over the years with better farming equipment and techniques, resulting in higher yields on the same amount of land. This is also due to improvements in seed varieties, fertilizers, pesticides, machinery, reduced tillage, irrigation, crop rotations, and pest management systems.¹

How much farmland is utilized by a solar project?

Only a portion of farmland is suitable for solar energy generation. And, even as installations of utility-scale solar continue to expand, they still do not pose a significant risk to the loss of agricultural land. To generate enough electricity to power the entire country, solar facilities would need to occupy roughly the same area devoted to surface coal mining. In fact, solar projects allow land to recover by letting the soil rest. In the future, when a solar project is decommissioned, farming can once again resume on that land. This starkly contrasts other development, which often leaves land unable to convert back to agricultural use easily.

Solar projects give farmers and landowners an opportunity to utilize their land to harvest another stable cash crop—the sun. Many farmers who host a solar project have not made a choice to give up farming completely, but have taken a small acreage out of agricultural production for renewable energy production. For some landowners, this can be a hedge against shifting commodity prices that can sustain the rest of their agricultural production.²

How can solar power facilities enhance rural ecosystems?

There are many important components to preserving and enhancing a healthy environment for farming, and a solar facility may support a rural community over generations through: **Improved Soil Health** - a solar facility can passively enhance the soil through the establishment of regionally appropriate perennial vegetation underneath and around the solar panels. **Reduced Nutrient Runoff** - vegetation at solar sites does not typically require routine applications like fertilizer, and perennial grasses further stabilize soil, which decreases runoff by intercepting sediment. **Enhanced Stormwater Management** – once operational, a typical solar project will maintain permanent vegetation on site, and the spacing between the panels and rows enables water to flow underneath and between the panels. **Soil Formation and Retention** – during construction, compaction may occur at select parts of a solar project site. Therefore, developers may aerate or till the soil or plant deep-rooted vegetation to mitigate these impacts - consistent with federal and state construction permits. After construction, tillage of the soil does not occur. **Reduced Pesticide Use** – solar development does not require insecticides and herbicides may only be used during the site preparation but is applied more targeted once the project is operational. **Reduced Water Use** – solar sites typically require little water during construction and operations, and rainfall is generally sufficient to settle dust and clean panels. **Preserving Future Farm Opportunities** – land leases for solar can help families preserve their farm for the next generation through stable income to support farm operations and relieve pressure of selling to permanent land use development like residential or commercial real estate.³

Why build solar projects on farmland?

Most farmland is flat, cleared, is typically located in proximity to transmission lines and substations, and offers stable, consistent, long-term revenue for landowners willing to lease some or all of their property for solar development. The parcels leased are often parts of farmland that have degraded over time from intensive agricultural practices.

Siting solar on these lands allows soil to “rest” while providing payments to landowners. And, by leasing portions of their land to solar developers, many farmers have the financial stability to continue farming their unleased parcels, and upon project decommission, the land can be returned to its previous use.

Ambient Temperature

Does the presence of ground-mounted solar arrays cause higher ambient temperatures in the surrounding neighborhood (i.e., the “heat island” effect)?

All available evidence indicates that there is no solar “heat island” effect caused by the functioning of solar arrays. Solar panels absorb photons from direct sunlight and convert it to electricity, minimizing the likelihood of substantially changing temperatures at the site or the surrounding neighborhood. Because solar PV modules are thin and lightweight, they do not store a large amount of heat. This and the fact that panels are shown to cool to ambient air temperature as soon as the sun sets, a study by Sunpower, a private solar manufacturer, concludes that the area surrounding a large-scale solar array is unlikely to experience a net heating change from the panels.⁵

Cleaning Protocol

What is the best way to clean solar panel arrays?

Panels are typically only cleaned a few times a year based on soiling levels, though areas that receive regular rainfall can significantly reduce the need for deliberate cleaning of the panel. Should a lack of rain or extreme dust conditions warrant cleaning, a water truck is typically used to wash dirt and natural buildup from the panels. However, in the right situation, an arrangement with a participating landowner may be made to use their water supply.

Cost of Power

Will a solar project in my community lower my utility bills?

A benefit of solar power is that it provides a long-term hedge against increasing prices. Solar power does not consume any fuel and allows utilities to purchase energy at stable long-term rates, which may help reduce future electricity price increases. Customers will save money in the long term, and once built, this solar project will be an important contributor to the county's tax base. This will provide more money for schools and essential government services.

End-of-Life Decommissioning / Recycling

How are solar panels managed after they are no longer in use? Can they be recycled, and do hazardous waste disposal requirements apply?

The average life of solar PV panels can be 20-30 years or longer after initial installation. At the time of decommissioning, panels may be reused, recycled, or disposed of. There are a few different types of solar panels used in ground-mounted PV Systems. Solar module manufacturers typically provide a list of materials used in their product, which may be used to determine the proper disposal requirements at the time of decommissioning.⁵

What happens during the decommissioning phase?

Upon completion of the economic life of a project, the decision to decommission the facility can be made. Decommissioning refers to removal of equipment (panels, racking, wires, and inverters and transformers) as well as other operational structures (foundations and fencing) and restoration of the site. Depending on specific project decommission agreements, during this process, the site may be revegetated to help with erosion and dust control, and access roads may be removed. Unlike some other forms of development, a decommissioned solar site can be repurposed for other uses, such as agriculture production.⁶

Efficiency

Where does the power go?

Think of solar energy just like the other crops that are currently harvested in your community, perhaps corn, wheat, or dairy. While some of those resources stay local, many are shipped outside your community but provide valuable income and jobs locally. Solar energy is no different. While it is impossible to know where exactly the electrons flow once they enter the electrical grid, the benefits of producing that energy, such as tax revenues, stay local.

Do solar panels still work on a cloudy day?

Before constructing any solar project, we evaluate historical meteorological data to determine the facility's expected output. Photovoltaic panels can use direct or indirect sunlight to generate power, though they are most effective in direct sunlight.

Solar panels will still work even when the light is reflected or partially blocked by clouds.⁷

Will my neighbors and I be eligible for service from this solar project?

The electricity generated by a utility-scale solar project will be injected into the high-voltage electric grid and wholesale electric market at the local substation. From there, it will follow the grid to areas of demand. It will not be available for direct purchase by retail electricity customers.

How do solar panels perform in extremely high heat?

Solar panels are designed to perform in extreme heat or cold. There are many reputable solar panel manufacturers, but all produce panels with similar operational requirements. For bifacial solar panels, -40 degrees to 185 degrees Fahrenheit module temperature is acceptable.

Health / Materials / Water Issues

Can chemicals that might be contained in solar PV threaten public drinking water systems and/or wetland resources?

All solar panels are contained in a solid matrix, are insoluble, and are enclosed. Therefore, releases are not a concern. Rules are in place to ensure that ground-mounted solar arrays are installed in a way that protects public water supplies, wetlands, and other water resource areas.⁵

Are there health risks from the electric and magnetic fields (EMF) from solar panels?

Solar energy produces no emissions, waste, odor, or byproducts. Silicon solar cells were produced commercially in the 1950s, and the first solar power plant was built over 35 years ago in southern California. PV arrays generate EMF in the same extremely low frequency (ELF) range as electrical appliances and wiring found in most homes and buildings.

The extremely low-frequency EMF from PV arrays is the same as the EMF people are exposed to from household electrical appliances, wiring in buildings, and power transmission lines (all at the power frequency of 60 hertz). In comparison, EMF produced by cell phones, radios, and microwaves is at much higher frequencies (30,000 hertz and above).⁵

A person outside of the fenced perimeter of a solar facility is not exposed to significant EMF from the solar facility. In 2005, a task group of scientific experts convened by the World Health Organization (WHO) concluded that there were no substantive health issues related to electric fields at levels generally encountered by members of the public.⁸

Can solar panels be damaged by hail and strong winds?

Solar panels are designed to withstand extreme weather, including hail and thunderstorms. However, just like your car windshield can get damaged, the same can happen to solar panels (though rare). If a solar panel were to become damaged from severe weather or any other reason, it would likely be the glass that has become damaged, and there would be no risk of exposure to the contents. The Savion team has plenty of experience developing solar projects in high-wind zones. Our projects have shown to be virtually undamaged by direct hits from CAT 3 storms in the past. But, even if something were to hit the area and damage the solar panels, the solar project would be well-insured, with plans to make repairs.

Will a solar farm create stormwater runoff and water drainage issues?

In many situations, during the development phase of a solar project, drainage studies and calculations may be conducted by third-party experts. It is typical to find that a solar project area's post-construction condition will create less stormwater runoff than the current pre-construction condition of cultivated land.

Ecological benefits are expected to accrue over time from the temporary but long-term conversion of agricultural land to native plant communities. Native plant species tend to have deeper and more complex root systems, which allow for improved water absorption and retention than in soil on agricultural land. As a result, erosion and stormwater runoff will be reduced.

What is inside a solar panel?

Solar panels consist of glass, aluminum, copper, and semiconductor materials. Solar cells are made of either connected silicon atoms or thin layers of photovoltaic material that have been placed onto glass or metal and are responsible for converting energy from sunlight into electricity. The thin layer of solar cells is sealed on both sides and covered with glass and an aluminum frame. The primary solar cell technologies used are Crystalline silicon (c-Si) and thin film Cadmium telluride (CdTe). While several different solar cell technologies exist, over 90% of the U.S. solar market uses Crystalline silicon (c-Si) cells.⁸

Are the materials inside a solar panel safe?

Yes. Modern commercial solar panels do not contain sufficient hazardous material to pose a danger to the environment and human health. The primary component in crystalline silicon solar cells is silicon, the second-most common element on earth.⁸

Solar Panel Design / Visual Impacts

How high are the panels off the ground? How tall do the panels stand?

Solar panels sit approximately 4' off the ground, depending on site conditions. Considering a common solar panel size is 36' x 66', the approximate total height of the panels at the highest point is typically 7-8' but does not exceed a height of 10'.

How does the traffic associated with large solar projects impact nearby residential and agricultural properties?

During construction, there will be increased traffic associated with construction activities. However, after the construction phase is complete, operating solar projects do not attract high volumes of additional traffic.

Why was this area selected for a solar project?

The project area is suitable for utility-scale solar facility development due to its proximity to available transmission capacity and significant energy demand within the electrical grid. The project also provides significant local economic benefits and is a form of development that will maintain the rural character of the area.

How are solar panels designed to adapt in extreme weather?

Solar panels are highly capable of withstanding extreme weather conditions due to their solid state and limited number of moving parts. The best practices, codes, and standards to which utility-scale photovoltaic ground-mounted systems are built include a site-specific assessment of the seismic, wind, and flooding risk that drives decisions on the materials, components, and engineering details of the facility. Solar panels that include tracker systems that allow for changing the positioning of the panels to be more resilient to extreme weather by positioning in such a way that may limit or minimize damage from things such as hail or wind. For example, panels can be angled to reduce exposure to hail and facilitate the removal of snow or the accumulation of ice. Following extreme weather, a solar facility is inspected to assess energy production and identify any instances of broken glass, detached modules or frames, warped modules, or detached electrical cabling. If any damage is detected, the affected modules are disconnected, and corrective repairs are made. Modern commercial solar panels do not contain hazardous materials that pose a danger to the environment and human health.⁹

Public Safety

What happens during project construction?

Construction of a solar facility can take up to two years or more in total for large utility-scale projects. The basic types of activities that will take place include site preparation, construction, revegetation, and operations. Once solar projects are built, there is little traffic in and out of the site.¹⁰

Is there sound associated with the solar project?

Solar projects have little to no sound audible outside of the fence line of the project. Inverters and transformers make a humming sound during the day when the facility is generating electricity. Any sound will be inaudible at the fence line. Sound impacts can be mitigated through the use of proper siting procedures. Transportation and maintenance equipment, like cars, trucks, lawnmowers, and string trimmers, are common sources of sound on solar projects that most people are accustomed to hearing elsewhere. Construction of a solar project is typically between 10-12 months.

How does the sound of large solar projects impact nearby residential and agricultural properties?

Solar projects are effectively silent, except for the tracking motors and inverters that might produce an ambient hum. This is typically not audible from outside the project enclosure.

¹David G. Loomis, Ph.D. Economic Impact and Land Use Analysis of Mark Center Solar. Bloomington, IL: Strategic Economic Research, December 2020, page 22.

²Solar Energy Industries Association, "Solar & Agricultural Land Use," SEIA.org, July, 2019, <https://www.seia.org/research-resources/solar-agricultural-land-use>

³American Clean Power, "How Solar Power Enhances Rural Ecosystems," CleanPower.org, February 2023, https://cleanpower.org/wp-content/uploads/gateway/2023/03/ACP_Solar_and_Farmland.pdf

⁴American Clean Power, "Solar Energy & Farmland FAQ," CleanPower.org, February 2024, <https://cleanpower.org/resources/solar-energy-farmland-faq/>

⁵Massachusetts Department of Energy Resources. Clean Energy Results Questions & Answers GroundMounted Solar Photovoltaic Systems. Massachusetts Department of Environmental Protection. Massachusetts Clean Energy Center, June 2015.

⁶American Clean Power, "What Happens When a Solar Facility is Decommissioned?," CleanPower.org, December, 2021, <https://cleanpower.org/resources/what-happens-when-a-solar-facility-isdecommissioned/>

⁷Solar Energy Industries Association, "What happens to solar panels when it's cloudy or raining?," SEIA.org, 2023, <https://www.seia.org/initiatives/what-happens-solar-panels-when-its-cloudy-or-raining>

⁸American Clean Power, "Solar Panels and Your Community," CleanPower.org, August 30, 2022, https://cleanpower.org/wpcontent/uploads/gateway/2022/08/ACP_FactSheet_SolarCommunity_220830.pdf

⁹American Clean Power, "Designing and Adapting for Extreme Weather," CleanPower.org, August 2024, https://cleanpower.org/wp-content/uploads/gateway/2024/08/ExtremeWeather_FactSheet_240909.pdf

¹⁰American Clean Power, "Solar as a Neighbor: Living Near a Solar Project," CleanPower.org, July 2024, <https://cleanpower.org/resources/solar-as-a-neighbor-living-near-a-solar-project/>