

FREQUENTLY ASKED QUESTIONS ON GROUND-MOUNTED
SOLAR PHOTOVOLTAIC SYSTEMS



Ag Land Use

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. Supplying the entire U.S. with 100% PV solar energy would require about 0.6% of America's total land area.²

When a project is decommissioned, the land is returned to its original state, and farmers have the opportunity to go back to farming the land if they choose.

Ambient Temperature

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

There is no evidence of higher ambient temperatures in neighborhoods surrounding a solar project. Peer-reviewed studies indicate that there is a very limited temperature increase (up to 5 degrees F within approximately five meters above the solar array and up to 1 degree F within approximately 300 meters of the solar array), but this minimal increase does not extend to surrounding neighbors.³

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.

Porchlight Solar is a utility-scale solar energy facility that will serve customers within the MISO regional transmission organization. This means that the electricity generated by the solar project will be injected into the high-voltage electric grid and wholesale electricity market at the Golden Sands Substation. From there, the energy will be distributed to every consumer that is connected to that substation and line.

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.⁴

How will the project produce energy throughout the winter or on cloudy days?

The project will be able to produce energy throughout the entire year, even in the winter or on cloudy days. While the output will be maximized on clear days, solar radiation will still hit the solar panels as sunshine beams through the clouds.

Modern panels also feature technology that uses bifacial modules on the front and rear sides of the panels so they can absorb radiation to generate electricity. The modules' rear side absorbs sunshine radiation reflected from the ground. When there is snow on the ground, the additional sunshine reflecting off the snow amplifies the sunshine radiation absorbed from the ground.

Health / Materials

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).⁶

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.⁷

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 it is 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 will be well insured with plans to make repairs.

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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.

Public Safety

Can electrical and other solar-related equipment cause fires?

Only a small portion of the materials in the panels are flammable, and those components cannot self-support a significant fire. The flammable components of PV panels include the thin layers of polymer encapsulates surrounding the PV cells, polymer back sheets (framed solar panels), plastic junction boxes, and insulation on wiring. The rest of the panel is composed of non-flammable components, including layers of protective glass that make up three-quarters of the panel's weight.⁹

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 important are reflectivity and potential visual impacts from solar projects, especially near airports?

Solar panels are designed to absorb and convert solar energy into electricity. They reflect only about 2 percent of incoming light, so issues with glare from PV panels are rare. Solar module glass has less reflectivity than water or window glass, and reflected light from solar panels will have a significantly lower intensity than the glare from direct sunlight. Many projects throughout the U.S. and the world have been installed near airports with no impact on flight operations. There have been no U.S. aircraft accident cases in which glare caused by a solar energy facility was cited as a factor. Proper siting procedures can ensure panels are placed to minimize any potential glare to surrounding areas.⁸

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.

Property Values

How do ground-mounted solar PV arrays adjacent to residential neighborhoods influence the property values in those neighborhoods?

Reported by American Clean Power, research shows that there is no evidence that solar projects have adversely impacted neighboring properties. The solar industry drives economic development, especially in rural communities, and can benefit all property owners through tax payments for roads, schools, and community services. Various studies have been completed in the U.S. and are shared on CleanPower.org.

Sound

Is there a 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.

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.

If it snows, does the snow need to be actively removed from the panels?

Snow can serve as a natural cleaning agent that wipes away any dirt as it melts and slides away. In most cases, snow removal is unnecessary, but operations and maintenance personnel will monitor the solar array and may remove snow if necessary.

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.¹⁰

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

² The Regional Per-Capita Solar Electric Footprint for the United States, Technical Report NREL/TP-670-42463, prepared by The National Renewable Energy Laboratory (Golden, CO, 2007), page 20.

³ Analysis of the Potential for a Heat Island Effect in Large Solar Farms. Department of Earth and Environmental Engineering. Columbia University, 2013.nt.

⁴ Solar 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>

⁵ Clean Energy Results Questions & Answers Ground-Mounted Solar Photovoltaic Systems, prepared by Massachusetts Department of Energy Resources, Massachusetts Department of Environmental Protection, and Massachusetts Clean Energy Center (June 2015, page 20).

⁶ Clean Energy Results Questions & Answers Ground-Mounted Solar Photovoltaic Systems, prepared by Massachusetts Department of Energy Resources, Massachusetts Department of Environmental Protection, and Massachusetts Clean Energy Center (June 2015, page 10).

⁷ NC State University. Health and Safety Impacts of Solar Photovoltaics. NC Clean Energy Technology Center, May 2017, page 12.

⁸ Clean Energy Results Questions & Answers Ground-Mounted Solar Photovoltaic Systems, prepared by Massachusetts Department of Energy Resources, Massachusetts Department of Environmental Protection, and Massachusetts Clean Energy Center (June 2015, page 22).

⁹ NC State University. Health and Safety Impacts of Solar Photovoltaics. NC Clean Energy Technology Center, May 2017, page 14.

¹⁰ Massachusetts Department of Energy Resources. Clean Energy Results Questions & Answers Ground-Mounted Solar Photovoltaic Systems. Massachusetts Department of Environmental Protection. Massachusetts Clean Energy Center, June 2015, page 7.