

KANSAS SKY
ENERGY CENTER

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, highways), a de-commissionable solar farm is a far more favorable option.³
- 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.³
- In the arrangements where a landowner has agreed to lease property to the 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 land is sold by the farmer to another party – usually a housing developer or commercial real estate broker.³
- 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 keep the land in the family.³
- 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.³

³ David G. Loomis, Ph.D. (2020). *Economic Impact and Land Use Analysis of Mark Center Solar*. Bloomington: Strategic Economic Research.

How much farmland is utilized by a solar project?

Only a portion of farmland is suitable for solar energy generation. According to the National Renewable Energy Laboratory (NREL), if the United States were to meet 100% of its electricity needs with solarenergy, it would require about 0.6% of America's total land area. (*Solar Energy Industries Association (SEIA), 2019*)

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 the choice to give up farming completely, but rather 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.

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 is a stark contrast to other development, which often leaves land unable to easily convert back to agricultural use. (*Solar Energy Industries Association (SEIA), 2019*)

Cleaning Protocol

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 not necessary, but there will be operations and maintenance personnel monitoring the solar panel array and can remove snow if necessary.

What is the best way to clean solar panel arrays?

The most effective way to clean solar panels is with natural weather sources such as rain. Should lack of rain or extreme dust conditions warrant cleaning, a water truck is typically used to wash dirt and natural buildup from the panels.

Solar Panel Design / Visual Impacts

What are the visual impacts of the solar array once constructed?

Large solar projects have similar characteristics to a greenhouse or single-story residence. They are often enclosed by fencing and/or landscaping to minimize visual impacts.

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

Solar panels are designed to absorb solar energy and convert it 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 glare from direct sunlight. Many projects throughout the U.S. and the world have been installed near airports with no impact on flight operation. 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 in a way that minimizes any potential glare to surrounding areas.¹

1 Massachusetts Department of Energy Resources; Massachusetts Department of Environmental Protection; Massachusetts Clean Energy Center June 2015

Why was this area selected for a solar project?

The project area is suitable for utility-scale solar facility development based on the following factors: proximity to available transmission capacity, significant energy demand within the electrical grid, landowner and community interest, significant local economic benefits, and a form of development that maintains the rural character of this area.

End-of-Life Decommissioning

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.¹

1 Massachusetts Department of Energy Resources; Massachusetts Department of Environmental Protection; Massachusetts Clean Energy Center June 2015

Can solar panels be recycled at end of life?

According to Green Tech Media research, modern photovoltaic crystalline silicon panels (PV panels) are largely composed of glass (76%), and also include plastic (10%), aluminum (8%), silicon (5%), and very small amounts of copper, silver, tin, and lead (collectively, 1%).

Nearly 85% of the materials in PV solar panels are fully recyclable at the end of the project's life. Importantly, 100% of the metals in the solar panels are reusable. The 10% plastic component of the panels is consumed in the recycling process, so less than 6% of the of the total panel materials may actually need to be disposed of at a regulated waste facility.

In addition to environmental reasons for responsible disposal of PV panels, solar operators have economic incentives to reuse and recycle PV panels at the end of the project life. While the percentage of PV panels that can be recycled varies based on the type of panel and recycling process used, approximately 85% of PV solar panels are fully recyclable. In general, glass and metal components are entirely reused to make new solar panels. Plastic components melt, evaporate, and are then reused as a heat source in the recycling process.

Sound

Is there sound associated with the solar project?

A: 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 array generates electricity. Any sound will be inaudible at the fence line. Sound impacts can be mitigated through the use of proper siting procedures. Medium voltage power inverters are one of the few but most numerous sound-emitting sources within the project.

The specific inverters proposed for the project have rated sound pressure levels of 67.0 db(A) at 32 feet from the inverter. In addition, the inverters are typically located within the interior of the Project's solar arrays, not along the perimeter, and with a minimum 500 foot setback from residential structures. In the proposed Site Plan, the inverters will be sited and their noise emissions studied in specific directions and distances from each inverter location to the adjacent property lines or, if closer, at 500 feet from any existing residences to ensure the noise levels at those distances are at or below, if not well below, the 60.0 db(A) maximum limit per county regulations.

Efficiency

Where does the power go?

Think of solar energy just like the other crops, like corn, wheat, and dairy that are currently harvested in your community. 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 from producing that energy, such as tax revenues created, stay local.

How will the project produce energy through the winter and on cloudy days?

The project will be able to produce energy throughout the entire year, even on cloudy days. And while the output will be maximized on clear, sunny days, even when there are clouds in the sky, there is still solar radiation hitting the solar panels as the sunshine gets through the clouds.

Modern panels feature technology that is bifacial, meaning they are able to produce electricity by absorbing sunshine radiation on the front and rear sides of the panels. So, the rear side of the modules absorbs sunshine radiation that is 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.

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.

Ambient Temperature

Does the presence of ground-mounted solar arrays cause higher ambient temperatures in the surrounding neighborhood?

All available evidence indicates that there is no solar “heat island” effect caused by the functioning of solar arrays. PV panels are off the ground and surrounded by air, so the heat is dissipated very rapidly. It does not build up and become stored as with rooftops or pavement.

Cost of Power

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

An important benefit of solar power to ratepayers is that it provides a long-term hedge against increasing prices because it does not consume any fuel and allows utilities to purchase energy at stable long-term rates. This may help to reduce future increases in electricity prices. This saves money for ratepayers in the long term, and once built, this solar project will be an important contributor to the county’s tax base, providing more money for schools and essential government services such as first responders.

Public Safety

What public safety issues arise from accessing areas where solar arrays are installed? Can electrical and other solar-related equipment cause fires?

Large-scale ground-mounted arrays are enclosed by fencing. This prevents children and the general public from coming into contact with the installations, thus preventing unsafe conditions. The National Electric Code has mandatory requirements for the electrical safety of solar PV arrays. It requires that conductors, which are part of solar PV, be installed to not be readily accessible.¹

In addition, warning signs and sometimes alarm systems are installed to deter unauthorized individuals from entering the solar array area. Only a small portion of 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 backsheets (framed solar panels), plastic junction boxes, and insulation on wiring. The rest of the panel is composed of non-flammable components, including the layers of protective glass that make up three-quarters of the panel's weight.²

1 Massachusetts Department of Energy Resources; Massachusetts Department of Environmental Protection; Massachusetts Clean Energy Center June 2015

2 NC Clean Energy Technology Center. North Carolina State University. Health and Safety Impacts of Solar Photovoltaics white paper. 2017

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Hunting

How will solar PV arrays impact deer or other hunting?

During construction, it is possible there would be a temporary impact on uses to areas adjacent to the project. Once operational, there is very little activity at a solar project, and deer, and other wildlife quickly return. It's not a matter of deer staying away; it's more a matter of keeping them out of the solar facility area where they like to graze on the grasses. Hunting outside the project area is not affected, and hunting rights of non-participating landowners are not impacted by the presence of the solar project.

Health / Materials

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, although it is very 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 farm will be well insured with plans to make repairs.

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

Solar energy produces no emissions, waste, odor, or byproducts. The extremely low-frequency EMF from PV arrays and transmission lines is the same as the EMF people are exposed to from household electrical appliances and wiring in buildings.

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 actually create LESS stormwater runoff than current pre-construction condition of cultivated ad 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 allows for improved water absorption and retention than in soil at agricultural land. As a result, erosion and stormwater runoff will be reduced.

General

What is the potential for flooding or standing water impacts on the project area?

The Engineer of Record has assessed the potential for flooding and standing water from a 100-yr/24-hr storm event based on advanced hydrology studies and is currently designing the site layout to avoid inundated areas in line with standard industry practice. These hydrologic study results are also being used to design and engineer the site drainage features and Best Management Practices for Stormwater Management. A stormwater management plan will be submitted with the project's Conditional Use Permit application detailing how stormwater will be managed.

What impacts will the train traffic have on the road traffic around the project?

The train traffic in the area is minimal, and is expected not have an impact on the operations of the project. During the temporary construction phase, a traffic and haul route plan will be submitted with the project's Conditional Use Permit Application based on a traffic study as well as recommendations from the Kansas Department of Transportation, County Engineer, and Township Trustee.

General

What impacts does the vibration of the passing trains have on the project panels and components?

There are no anticipated impacts. Setback for the project panels and components from the railroad track well exceeds the minimum setback distance guidelines of the USDOT in evaluating impacts to vibration-sensitive equipment.

What will the setbacks be from the project to residential structures and roads?

The project will setback a minimum of 500 feet from all residential structures per county regulations. Setbacks from roads vary between 85 to 225 feet based on road traffic volume and lot orientation.

What will be the ratio of panels to vegetation inside the project boundary?

The entire Site Area, including under the PV panels, will be seeded with a native seed mix. The ratio of PV panels to the Site Area is currently ~35% (total PV panel area / Site Area), which is still subject to change.

Will the metal piles corrode and leak toxins into the ground over 20+ years?

No. The metallurgy and any corrosion-preventing coatings on the structural steel piles will be in compliance with all applicable codes and standards for this type of application. Overall, there should be little to no concern regarding zinc leaching into the environment from galvanized piles.

In terms of zinc in the water environment, the temporary addition of zinc minimally alters the naturally occurring background zinc level, keeping it far below the criterion level established by the USEPA in the Water Quality Act of 1972 and all its revisions. Hot-dip galvanized steel is ideally suited for use over even the most sensitive waterways and habitats.