

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, 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 Laboratory (NREL), if the United States were to meet 100% of its electricity needs with solar energy, 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 a choice to give up farming completely but rather have taken acreage out of agricultural production for renewable energy 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 starkly contrasts other development, which often leaves land unable to convert back to agricultural use easily. (*Solar Energy Industries Association (SEIA), 2019*)

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 an active solar project. Photovoltaic (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 over \$1 billion in tax revenue for Wasco County, which goes towards schools and essential government services such as first responders.

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, stay local.

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

The project will produce energy throughout the year, even on cloudy days. While output will be maximized on clear, sunny days, solar radiation still gets through the clouds to hit the panels on cloudy days.

Modern panels feature technology that uses bifacial modules meaning they can produce electricity by absorbing sunshine radiation on the front and rear sides of the panels. 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.

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.

Sound

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

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.

Health / Materials

Can chemicals that may be contained in solar panels 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.¹

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

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.

Can solar panels be damaged by hail and strong winds?

Solar panels are designed to withstand extreme weather, including hail and thunderstorms. However, just as your car windshield can get damaged, the same can happen to solar panels, although it is very rare. If the solar panel glass were to be damaged by severe weather or any other reason, there would be no risk of exposure to the contents of the panel. The Savion team has extensive experience developing solar projects in high-wind zones. Savion's projects have been directly hit by CAT 3 storms with virtually no sustained damage. If a storm were to damage the solar panels, the solar farm will be well insured with plans to make repairs.

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

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

Historic Preservation

What are the appropriate standards for land with historical or archaeological significance when developed for large-scale solar PV arrays?

Some communities have local preservation ordinances or established local historic districts that require approval for new construction visible from a public way. Developers will work with local planning and historical or historic district commissions regarding required approvals.¹

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

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

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

During construction, there will be increased traffic associated with the construction activities. However, once the construction is complete, and the site is operational, there will only be 1-2 vehicular trips per day to and from the site.

Cleaning Protocol

What is the best way to clean solar panel arrays?

Panels are cleaned only with water, and no chemicals are used. They are cleaned only a few times a year based on soiling levels. Typically, water is trucked in. However, in the right situation, an arrangement with a participating landowner might be made to use their water supply. Areas that receive significant and regular rainfall can significantly reduce the need for deliberate cleaning of the panels.

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 panel array and can remove snow if necessary.

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.

Property Values

Do ground-mounted solar PV arrays negatively impact property values?

In examining property values in states across the U.S., recent studies show that living near a solar project does not deter the sales of agricultural or residential land sales. According to the Solar Energy Industries Association (SEIA), large-scale solar arrays often have no measurable impact on the value of adjacent properties. This is likely due to the fact that solar farms are quiet, odorless, and do not add traffic or burden local infrastructure, unlike more intensive types of development.

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 not to 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 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 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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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.

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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. A few different types of solar panels are 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

In the U.S., end-of-life disposal of solar products is governed by the Federal Resource Conservation and Recovery Act (RCRA) and state policies in some situations.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