How do solar panels work?

Solar photovoltaic (“PV”) panels typically consist of silicon, tempered glass, aluminum, copper, and semiconductor materials. Silicon, an element most commonly found in sand, has conductive properties that allow it to absorb and convert sunlight into electricity. When light interacts with a silicon cell, it causes electrons to be set into motion, which initiates a flow of electric current in a process known as the “photovoltaic effect”.[1]

What will these projects look like?

A solar farm is a large group of solar panels that operate together as one power generation facility, delivering electricity to the existing electric grid. Solar farms are typically arranged in parallel rows with approximately 8 feet wide access buffers between each row.

A panel array, which includes both PV panel and rack mounting, typically stands around 12 feet tall. The mounting racks are supported by steel pile foundations generally set up to 8 feet into the ground without the use of concrete. Panel designs currently being evaluated by ConnectGen include fixed mounting, which are fixed at a set angle, and single-axis tracking mounting, which rotate slowly from east to west once a day, keeping the sun at a 90-degree angle from the panels to ensure maximum energy is absorbed. Each section of solar panels is typically fenced off to ensure security and safe operation.

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SOLAR FREQUENTLY ASKED QUESTIONS

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Frequently Asked Questions

What other equipment is usually present at a solar farm?

Other project infrastructure present at a solar farm includes common electrical equipment such as inverters and transformers and the electrical equipment necessary to deliver energy to the existing electrical grid such as underground and overhead transmission lines. ConnectGen's projects may also include a battery storage facility.

Are solar panels safe?

Yes. Because the PV panel materials are enclosed and do not mix with water or vaporize into the air, there is little-to-no risk of chemicals, including greenhouse gases, being released into the environment during normal use. Crystalline silicon PV panels, an extremely common panel variant used around the world, "do not pose a material risk of toxicity to public health and safety."[2] Additionally, any Electromagnetic Fields (EMF) produced by solar panel systems are in the same extremely low frequency range as those induced by household appliances.[3]

All solar facilities are designed to strict electrical safety standards to ensure safe operation. Product safety standards, installation requirements, and building codes for solar facilities are addressed by the National Fire Protection Agency's National Electrical Code, the International Code Council's International Fire Code, the International Association of Firefighters, and several other safety and product standards groups.[4]

ConnectGen will be fully responsible for the security of the facility and for maintaining consistent safety standards within the project area.

What benefits do utility-scale solar farms bring to local communities?

Utility-scale solar farms represent a significant investment into the local and surrounding communities. Host landowners will receive annual lease payments for thirty years or more. The projects also benefit communities by contributing millions of tax dollars to towns, counties, and local school districts that host the projects.

Utility-scale solar farms also benefit communities by creating local construction jobs, generating revenue for local businesses, and supporting community organizations through sponsorships and donations.

Do solar farms affect agriculture?

Solar farms are low impact and coexist well with agriculture, operating without any impact to adjacent agricultural properties. During the solar farm's thirty-year or more lifespan, the land hosting the project gets a recovery period, allowing the soil to rest and rebuild, which can increase the value of the land for agriculture in the future.[5] At the end of the solar farm's useful life, the project is decommissioned, and the land can be returned to agricultural use.

Who will be responsible for maintaining the solar farms once they are constructed?

ConnectGen will be fully responsible for maintaining the solar facilities and any properties within the projects' boundaries. Landscape maintenance at the solar farms will be performed by companies contracted directly by ConnectGen.

Will herbicides be used during maintenance activities?

ConnectGen will develop and implement a Vegetation Management Plan that establishes vegetation goals and identifies the specific treatments that may be used to ensure safe and reliable operation of the facility. Common practices to control and manage vegetation will involve mechanized and agrarian means; however, herbicides may be employed, depending on the target plant species, land use activities and landowner input. ConnectGen is committed to the conscientious use of appropriate management techniques to control vegetation in a way that is designed to minimize the risk of unreasonable adverse effects on human health and the environment.

What happens if a solar panel gets hit by lightning?

Solar farms are designed with lightning protection on all system components, which protect against damage in the event of a lightning strike. The ground grid will be designed in consideration of the conductivity of soils in the area as well as any other nearby conductive materials that are buried or connected to the ground, such as water or natural gas pipes.

Do large-scale solar projects make noise?

Temporary, elevated noise levels may occur during the construction phase of a solar farm, but once construction is complete, an operating solar farm emits minimal noise during the day and is dormant at night. As part of the Article 10 application process, ConnectGen will submit a detailed study of the potential noise impacts associated with the construction and operation of the facility. The results of the study will assess expected noise levels, and also propose noise limits, which will minimize and mitigate adverse impacts associated with construction and operation of the solar project. In addition, ConnectGen is committed to taking steps to minimize and mitigate visual impacts of the project through vegetative buffers and setbacks from property lines, which will provide additional sound dampening benefits as well.

How are solar projects permitted in New York State?

New York State requires that major electric generation facilities, including solar farms, undergo a rigorous state permitting process, under Public Service Law Article 10, prior to construction and operation. The Article 10 process provides rigorous requirements for the study of the environmental, public health, and public safety impacts as well as the incorporation of extensive public input and local stakeholder engagement into the development, design, and construction of solar energy projects.

How long does it take to complete a large-scale solar project?

The commencement of construction will happen once ConnectGen completes the Article 10 process, which takes approximately 2 to 3 years to complete. Construction of a utility-scale solar project takes between 9 and 12 months, depending on weather constraints and other potential construction limiting factors. ConnectGen expects to start construction on its utility-scale solar projects in western New York in 2022 with a goal to complete construction and begin delivering energy in late 2022 or 2023. Landowners and members of the community will be kept apprised of the projects' milestones and progress throughout the development and construction phases of the projects.

What happens at the end of the project life?

ConnectGen is responsible for the decommissioning and removal of project infrastructure at the end of the project's life. As added protection for project landowners and host municipalities, ConnectGen will put financial security in place early in the life of the project to ensure that host communities and landowners will bear no responsibility for decommissioning or restoration.

Additionally, New York State will require a decommissioning and restoration plan be put in place as part of the state Article 10 permitting process. The decommissioning and restoration plan will outline the various ways in which ConnectGen will safely and responsibly remove installed solar equipment and how the property within the project area will be restored to as close to its state prior to construction as possible.

What happens to the solar panels once they have been decommissioned?

Solar PV panels typically consist of glass, polymer, aluminum, copper, and semiconductor materials[6], which can be safely disposed of in landfills at the end of project life. However, recycling technologies have been implemented in the last several years that have enabled these materials to be recovered and recycled at the end of their useful life.[7] In some cases, over 95 percent of semiconductor material and over 90 percent of the glass used in a solar PV panel can be recycled.[8] In other cases, solar PV components can be reused or refurbished to have a "second life" of generating electricity.[9] The industry continues work with recycling partners and to research and explore additional cost-effective recycling technologies.

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[1] Energy Sage: "How do Solar Panels Work?: https://news.energysage.com/solar-panels-work/

[2] "Health and Safety Impacts of Photovoltaics." N.C. Clean Energy Technology Center at N.C. State University: https://content.ces.ncsu.edu/static/publication/js/pdf_js/web/viewer.html?slug=health-and-safety-impacts-of-solar-photovoltaics

[3] NYSERDA New York Solar Guidebook: https://www.nyserda.ny.gov/-/media/NYSun/files/Model-Solar-Energy-Law-Guidance-Document.pdf

[4] SEIA: Fire Safety & Solar: https://www.seia.org/initiatives/fire-safety-solar

[5] Department of Energy: https://www.energy.gov/eere/solar/farmers-guide-going-solar

[6] SEIA: https://www.seia.org/sites/default/files/2019-05/SEIA-EOL-Considerations-PV-Factsheet-May2019.pdf

[7] International Renewable Energy Agency: https://www.irena.org/publications/2016/Jun/End-of-life-management-Solar-Photovoltaic-Panels

[8] International Renewable Energy Agency: https://www.irena.org/publications/2016/Jun/End-of-life-management-Solar-Photovoltaic-Panels

[9] SEIA: https://www.seia.org/initiatives/recycling-end-life-considerations-photovoltaics