



RENEWABLE ENERGY

a series on alternative energy sources

What is a solar farm?

Solar farm development projects are being proposed in municipalities throughout Montgomery County. Montgomery County gets enough sunlight per year, has large parcels available for development and is well-connected to the electric grid. All these factors make the county an attractive location for solar farm developments.

A solar farm is a term commonly used to describe a collection of photovoltaic solar panels. There is no official number of panels installed or acres of land used that qualify a project as a solar farm, though a peak output of one megawatt of power has been cited as a common standard. Due to the lack of a standardized definition for solar farms, most industry representatives and government agencies refer to solar farms as **utility-scale solar applications**. When this publication refers to solar farms, it means only those projects that can be categorized as utility-scale solar applications.



Crayola's 1.9-megawatt solar facility. Built in partnership with PPL Renewable Energy and UGI Energy Services Inc. Courtesy of Crayola.

The definition of a solar farm is not based on the number of panels or energy generated, but on the purpose of the energy. If the primary purpose of power from a solar application's is the sale for commercial gain, then it is considered a utility-scale solar application. Energy generated by a solar farm is typically sold to energy companies, rather than end-users. The owners of the solar application obtain a permit from the State of Pennsylvania and are listed by the Department Of Energy as a power generation source.

If a solar application primarily powers a residence or business, then it is not utility-scale, even if it sells back any excess electricity through net metering. In this application, the energy derived is used to run the primary use of the property. This type of application is commonly seen on houses and businesses in the county.

A solar farm can be located many places throughout a municipality. It can turn a closed landfill, a brownfield site or even some superfund sites into economically productive parcels. It can be placed on large commercial properties either on the ground or possibly on rooftops. There may even be instances where it can also be placed on farm land or unprotected open space, though the municipality, community, and developer should all agree that this is the best use for the land before the development proceeds. No matter what kind of land is being used, the site must have the correct solar orientation, geology, topography and should be close to an area where there is a sufficient demand for electricity and a means to distribute it are available. The information presented

in this publication will help municipalities understand the issues surrounding the development and implementation of a solar farm.

Role of a zoning ordinance

The municipal zoning ordinance can be used to direct utility-scale solar projects to appropriate areas of the municipality and regulate certain aspects of them. A municipality that receives a land development application for a solar farm but has no ordinance in place to regulate such activity should anticipate a complicated variance process. The municipality should enact an ordinance, or amend an existing solar ordinance, to regulate the development of utility-scale solar applications as a conditional use in appropriate zoning districts. This will benefit both the municipality and the developer. The municipality will be able to require the developer to meet certain conditions that will ensure a project is completed responsibly. The developer will understand the municipality's requirements before the project begins, allowing them to plan appropriately, saving time and money throughout the regulatory process.

Municipal considerations

Financing: While financing is not under municipal purview, it is a critical aspect of a utility-scale solar project that can have an immense impact on the municipality. Many of these projects are financed through a solar power purchase agreement (SPPA). A SPPA can be a very complicated lease and purchasing agreement, including multiple parties such as the host site, a



Calpine Corporation owns and manages Vineland Solar One, a 4-megawatt array that provides power to nearly 500 residents of Vineland, NJ, through a partnership with Vineland Municipal Electric Utility and Landis Sewerage Authority.



Top photo: A 2-megawatt PSEG and Mars Chocolate SPPA project in Hackettstown, NJ.

Middle Photo: A 3-megawatt facility that powers Pocono Raceway through a SPPA.

Bottom Photo: Aqua's Ingram's Mill Wastewater Treatment Plant in East Bradford, PA is the site of a 1.1-megawatt solar project. Courtesy of Keares Electrical Contracting, Inc.

solar developer, financial backers, and power purchasers. The Environmental Protection Agency has information explaining this topic on its website at www.epa.gov/greenpower/buygp/solarpower.htm. Obtaining the financing for a project of this scale can be difficult and ensuring that it will be funded through to completion can be even more difficult. This difficulty is due to the many entities involved and the possible financial risks that come with a long-term, multi-million dollar project requiring the sale of energy in an emerging market. A municipality should become knowledgeable about the complexities of a SPPA to be better prepared for the development process.

The municipality should require proof that all the financing is in place before any land development begins. A project that removes trees, grades land and builds roads but then lacks the funding to install the solar panels can leave many acres of land in a distressed state.

Insurance: A municipality should require proof that all the necessary insurance is in place before land development begins. This is especially important if the project is going to take place on a landfill or brownfield.

Connections: Just because a project can be financed and built does not mean that the electric grid has the capacity to support the energy generated. It is important to know that the project can get all the necessary connections. The developer should follow all the interconnection regulations required by the local network operator, probably PECO or PPL, and by the Public Utility Commission (PUC). The PUC publishes its interconnection rules on its website at www.puc.state.pa.us; under the electric tab, select "alternative energy," and scroll down to "interconnections" for the most recent information. The municipality should require proof that the interconnections are possible before allowing land development to begin. It is also possible that the interconnections may need new transmission lines to be run to the site and that these lines may require new easements, property purchases, etc. The municipality should be made aware of any impacts stemming from the interconnection.

Pennsylvania Natural Diversity Inventory (PNDI) and Cultural Resource Notice (CRN): A municipality should require the completion of these two common state forms before any land development begins to help ensure the

protection of any plant or animal species of concern, and any historical resources on the parcel.

Stormwater: It is commonly thought that solar panels are not an impervious surface due to the fact that they are elevated, tilted, and allow the stormwater to flow onto the ground. While that may be the case, large areas of solar panels will definitely have an impact on how stormwater flows. The panels may channelize the flows and create higher velocities of stormwater. The footings for the panels, the conduit trenches, and the associated service roads may also affect the stormwater flows on and leaving a site. A municipality should pay special attention to the stormwater management on a solar site and require best management practices (BMPs) be installed. This may include meadow mixes under the panels instead of gravel, vegetated swales, or naturalized basins. The owner/operator of the site should be required to create and follow a maintenance/operations guide for the BMPs.

Fencing: The developer and municipality may want to require fencing around the site to ensure the panels are not damaged and no one is accidentally injured on the site. Consideration should be given as to the type of fencing to ensure it serves its purpose while also attempting to fit into the character of the surrounding area.

Viewshed/glare: This is an important issue to help avoid complaints from neighbors. A municipality could require the applicant to demonstrate that the proposal will not have an adverse effect on neighboring properties. Information provided by the applicant should include aerials of the site, graphic renderings of the project, and/or pictures from the

site of surrounding parcels demonstrating sight lines. The municipality could also require renderings of the proposed project site as viewed from nearby public right-of-ways, open space, parks, trails, etc. Appropriate vegetated buffers could also be required to help limit the visual impact of the site and possible glare issues.

Tree replacement: If trees must be removed from the site the municipality should require that a tree replacement policy be followed to minimize the environmental impact of the project.

Construction standards: Because the profitability of the site is directly correlated to the solar site's quality of construction, most developers will work diligently to ensure it is built properly. The municipality should take steps to ensure that the site is inspected by all necessary municipal authorities, PECO, and state authorities.

Community resource: A utility-scale solar project's primary goal is to produce power, but it can also be a community resource. A municipality can encourage the project to integrate educational opportunities such as partnerships with schools and the provision of educational materials at the site as appropriate. The project site may also be suitable for open space and trail opportunities which would allow the public to use a portion of the site for recreation while becoming educated about the benefits of solar energy.



An 815,000 kW installation at Fort Dix in New Jersey. The installation is part of a Honeywell energy conservation contract. Courtesy of Honeywell International.

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For more information, please contact the Montgomery County Planning Commission at 610.278.3722 or visit our site online at www.planning.montcopa.org to see the complete renewable energy series and other resources.



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