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Land Use:

When a Good Thing Becomes Complicated– Navigating Land Use and Community Compatibility Issues for Solar Photovoltaic Development

Presented by:

Eric R. Coffman, CEM, CEP, LEED-AP

Office of Energy and Sustainability

Department of General Services

Montgomery County, Maryland

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When a Good Thing Becomes Complicated– Navigating Land Use and Community Compatibility Issues for Solar Photovoltaic Development

Eric R. Coffman, CEM, CEP, LEED-AP
Office of Energy and Sustainability
Department of General Services
Montgomery County, Maryland

Abstract:

The solar industry has grown rapidly over the last several years with large solar farms that were rare just 10 years ago becoming common. General public support for clean energy is high, but when solar is incorporated into local communities, developers may need to navigate complex local regulations to ensure success. Many of these laws and regulations were developed before solar became common at scale or were designed to address other environmental priorities that may be extremely important amongst local stakeholders. A savvy developer will fully research these requirements at the jurisdiction level before proceeding with a project. This paper provides an overview of Montgomery County, Maryland's solar imitative and relevant local regulations and requirements that must be, and have successfully been met to ensure success.

Background:

In a very short span, solar photovoltaic systems (solar) have emerged from a minor energy source to being one of the dominant sources of new energy generation on a nameplate basis. Collectively, the United States has installed nearly 22,700 megawatts (MW) of solar, accounting for over 40% of recently installed capacity. This dramatic solar ramp-up can largely be tied to aggressive incentives, reduced equipment costs, improved financial options and mandates. While the general consensus is that solar is "good" at the national level, the local perspective might be quite different at the local level.

At face value, solar seems like the perfect energy source, it is essentially zero emissions when it is installed, its largely silent, it does not require noisy or intrusive fueling or maintenance and the shimmering blue panels look fantastic on the horizon (depending who you ask). However, like many projects, large solar projects can encounter the same "not in my backyard" (NIMBY) issues that many other public or private projects encounter when they seem different or outside what is historically accepted for a community. When large projects are planned, perceptions may be different with local residents, planners and others may either support or oppose either development of specific projects.

In general, solar projects located out of view on the roofs of retail stores, government buildings, stores raise positive press and little concern. Using wasted space, typically on buildings that are in commercial industrial zones or as ground mounts on brownfields makes sense and is applauded. When a project is proposed for mounting in a vacant field, community support may evaporate, especially in urban or denser communities.

Further complicating matters are local land use policies or codes that may have been developed before solar technology became common, be unclear, contradictory or inflexible. In many cases, these policies can be successfully navigated with care and attention to local stakeholders.

Economics of Solar:

Ten years ago, an average customer paid over $10/watt to install solar, while prices have declined a rooftop system will still cost $3/watt to $6/watt installed on roofs over 150 kW. Compared to systems mounted via scaffolding on the ground, roofs are expensive to build on and require the mobilization of equipment to crane solar panels; structural and electrical analysis; specialized staff, and care to maintain roof condition and warranty. When working on a roof mounted solar project, installers typically loose a significant amount of usable space to International Fire Protection Codes, and existing mechanical or structural interference. It's not unusual for the useable space on an 80,000 square foot roof to become less than 40,000 square feet of installable area after all of these factors are considered. On roofs across the country, each one requires extensive permitting, magnifying "soft" costs and reducing system payback.

On the opposite end of the spectrum is the ground mount, on clear, open land of reasonable slope, it's not unusual to be able to install solar at $1/watt to $2/watt or even less. Ground mount solar systems do not have to plan for issues such as roof age, condition, weight bearing. Utility infrastructure is usually installed with the system at scale, blending the cost into the much larger capital costs of the project. While soft costs for permits, land use approvals, and engineering may be high, they often become less significant at scale. Project costs can be concentrated on one site instead of the same capacity being spread across an aggregate portfolio of facilities.

Least cost-effective are canopy mounted solar photovoltaic systems over ground level parking or garages. These systems, though often desirable in terms of using space that otherwise would be unusable except for car storage, are often prohibitively expensive due to the cost of the canopy mounting systems and additional engineering requirements. While canopy systems are often broadly "hailed" as the ideal location for solar by land conservation advocates as they take advantage of already "impervious" surfaces, they may face opposition for impacting viewshed where adjacent to residential neighborhoods. Similarly, canopy systems on garages, in addition to being expensive, may exceed height limitations in some communities.

Montgomery County Government Solar Projects:

Montgomery County, Maryland located outside of D.C. has a population of approximately 1,000,000 and is one of the largest counties in the United States. Public services are extensive and the County owns or leases approximately 400 facilities ranging from administrative buildings, to recreation centers, public safety, libraries, correctional facilities, care facilities, theatres, parking garages etc.

In 2014, as part of a White House sponsored initiative, the County committed to installing at least 6 MW of solar on its facilities. The County is currently pursuing one of the largest solar initiatives in the Country in terms of both capacity and the number of facilities. The County anticipates approximately 10 MW (DC) will be installed by the end of calendar year 2017,

possibly more. Currently, 17 solar photovoltaic projects are under contract on 15 sites, with 4 rooftop systems complete and operating as of April 4, 2016. The majority of the other projects are "physically complete" and awaiting permission to operate by the utility.

The County competitively bid the project. In 2014, the County issued a solicitation for a partner to plan, design, finance, build, own, and operate projects on County facilities. The County offered a long term solar power purchase agreement (SPPA) combined with a site license offering use of the site. The County received ten bids, and ultimately awarded the contract to SolarCity Corporation based on cost and quality. A subsequent project reserved for local small businesses was issued approximately one year later and is still being negotiated as of April 4, 2016.

The term of the first phase projects was 20 years each, with the total lifetime anticipated savings from the first 6 MW (DC) of facilities being approximately $11 million. Another $2 to $3 million in total savings is expected from the next 4 MW (DC) of projects.

Community Opinion and Acceptance:

The Montgomery County projects have received broad support due to proactive community engagement. The County has a number of assets to smooth relations with the community and ensure the intent of a project combined with the community's desires.

Government staff implementing the project held stakeholder meetings with the community at each step of the project in several areas of the County. Simultaneously, the County leveraged the heads of "Regional Service Centers" to meet with local thought leaders. Regional Service Centers (RSCs) were developed to centralize County services such as aid, programs, community meeting space, and other features into "one stop shops" each RSC has a Director who serves as ambassador to the community. The Directors were key ambassadors during this process.

The community was generally accepting, with strong caveats about construction disruption, operation, and protection of watershed and biodiversity. The County has been able to mitigate these concerns through careful planning and project execution.

County staff prepared the agendas for these meetings to carefully articulate the project scope, environmental and economic benefits. Perhaps more important at the local level, the County incorporated community desires for construction hours and carefully explained how any ground mounted projects would be built with minimal disturbance and every effort would be made to preserve habitat and avoid the removal of mature trees.

Land-Use and Zoning:

A common and unexpected barrier to solar deployment can be the zoning code. Theoretically, zoning codes were established to divide incompatible land uses. In practice, zoning is typically used to prevent harm to new construction to residents and businesses.

Solar would seem straightforward. However, where solar photovoltaic systems on the small or large scale fit into zoning schemes is often fractured or difficult to navigate. For example, in most of Montgomery County solar photovoltaic solar systems are permitted as accessory structures and tied to the primary use of the property. Therefore a system is generally considered acceptable if it meets less than 120% of the adjacent building or campuses' annual electricity use. This limits the ability of large scale solar developers to implement solar "remotely" or as "merchant facilities". More complicated, it also limits programs that enable shared solar resources such as community solar from being developed. An owner can still pursue the special exception, a lengthy and expensive process. County government facilities are zoning exempt but the County makes best efforts to adhere to the codes and standards of a community.

Sedimentation Permits and Water Quality Protection Plans:

Communities with municipal sanitary sewer system (MS4) permits and other protections for waterways may have additional restrictions that affect the implementation of solar at scale in communities. Solar Photovoltaic Systems have been ambiguous as to how they are treated. Historically, thresholds for whether panels are impervious and how solar photovoltaic systems relate to sedimentation permits have been ambiguous. Is a panel impervious if it's sited over undisturbed soil? What about the footings and pads for electrical gear such as inverters. In 2014, the Maryland General Assembly enacted legislation (Section 701[1]) defining the impervious portions of a solar project as the footers of the system etc. This legislation limited local government ability to be more stringent. Disturbance is usually minimal depending on the developer's processes. The County carefully designed its projects to minimize disturbance below the "trigger" thresholds for sedimentation permits as part of its proactive standards for environmentally sensitive design.

Forest Conservation:

Jurisdictions may have requirements to protect forest and trees. This may limit the placement of solar photovoltaic systems where there is existing forest or a certain number of trees over a certain caliber (inches trunk diameter) per acre. In Montgomery County, this applies to clearing or grading of forest over 5,000 square feet. Projects over this size may face enhanced sedimentation permits and replanting/afforestation requirements. In the County's project, tree removal beyond a few isolated trees or minor trimming is not anticipated and the County is planning to proactively preserve forest in the surrounding site where tree height does not interfere with the efficiency of the solar projects.

Mandatory Referral:

In Maryland, public agency construction projects are required to submit an application to the Maryland National Capital Park and Planning Commission. Depending on the potential impact of the project, the project will either be reviewed at the staff level or by the commission. The commission will then make comments on how the project can mitigate its impacts, the comments are advisory in nature but carry weight.

[1] Chapter 702 House Bill 1112 http://mgaleg.maryland.gov/2012rs/chapters_noln/Ch_702_hb1117T.pdf

***Utility Interconnection*:**

Utility interconnection is essential to a residential or commercial solar project of any scale. Interconnection is typically dictated by specific codes, fortunately national International Electrical Engineering codes exist, to protect the utility grid as a whole and those who work on them. In most projects, a solar developer will need to submit an interconnection application and then upon being granted an application design and certify the system meets the local utilities criteria. The utility will then issue a permission to operate. Large scale systems may need to offset "upgrid" costs to ensure the local utility grid can handle the capacity.

Conclusions:

Navigating the mix of stakeholder engagement and regulatory concerns regarding solar projects, especially those at a larger scale is complicated and time consuming. While many projects can be successful with sufficient time, planning and communication it is easy to get derailed by specific hurdles. Project developers should carefully take time to understand their local requirements and not assume that requirements are the same amongst local jurisdictions.

Resources for Further Study:

Special Protection Areas-
http://permittingservices.montgomerycountymd.gov/dps/waterresource/SpecialProtectionArea.aspx

Montgomery County Forest Conservation -
http://www.montgomeryplanning.org/environment/forest/

Mandatory Referral -
http://www.montgomeryplanning.org/development/mandatoryreferrals.shtm

Maryland Department of the Environment – Solar Panel Stormwater Guidance -
http://www.montgomeryplanning.org/development/mandatoryreferrals.shtm

About the Office of Energy and Sustainability (OES):

OES was created in 2013 within the Montgomery County Department of General Services to focus on comprehensive efforts to reduce the environmental footprint of County operations. This includes energy and sustainability planning, outreach to County employees and building users, managing the County's portfolio of utilities, and implementing special projects and partnerships. In addition to managing a portfolio of activities, one of OES's headline measures is to develop 6 MW (10 MW expected) of solar across the County's facilities. Additional projects include comprehensive energy efficiency retrofits, clean energy purchasing, and hardening facilities for natural and other disasters.

About Eric Coffman:

Eric R. Coffman, LEED-AP, CEM, CEP is the founding Chief of the Office of Energy and Sustainability (OES) within the Montgomery County Department of General Services. Before

launching OES, Eric was the County's Senior Energy Planner developing climate and clean energy policies for the community at large. Eric deployed over $7.6 million of Recovery and Reinvestment Act funds to over 1,000 residential and commercial energy efficiency projects. He also established the policy foundation for the County's recent benchmarking and disclosure law, property assessed clean energy program, and upcoming Green Bank. Eric is a United States Green Building Council Leadership in Energy and Environmental Design Accredited Professional (LEED-AP), Association of Energy Engineers Certified Energy Manager and Certified Energy Purchasing Professional.