

Considerations Before Selecting A Solar Project Site

Law360, New York (April 03, 2014, 1:09 PM ET) -- Investment in solar energy projects has exploded in recent years. While solar energy represented a small percentage of the overall U.S. electricity generated in 2013, total installed capacity increased over fivefold since the start of the decade, from 2.6 gigawatts of installed capacity in 2010 to roughly 14 gigawatts of installed capacity by the end of 2013.

The growth in solar installations can be attributed to a variety of factors, among them (1) the continued availability of federal and state tax incentives and renewable energy credits, (2) increased investment in solar technology from large energy companies, and (3) a decrease in cost and increase in efficiency of solar energy panels.

However, as developers and investors and their attorneys will attest, development of solar facilities can be a tricky affair, with a host of legal, regulatory and business considerations to take into account. While engineering and procurement costs will comprise the lion's share of development costs, it is the predevelopment and site preparation costs that are often underestimated when budgeting.

Finding the right project site takes more than low-cost, vacant land. Choosing a site that will require less time and effort to make it construction-ready can save developers an immense amount of time and expense. Below are some key legal, regulatory and practical considerations when selecting a utility scale photovoltaic project site.

Site Usage

PV sites make intensive use of the land. Unlike wind projects, which typically need only 1 acre of land per megawatt of electricity produced and permit the landowner to continue to use land near the turbine areas for agricultural or other income-generating uses, utility-scale PV projects typically require between 5 and 10 acres of land for each megawatt of power produced, and require that the developer have exclusive use of the site to ensure that no disruption to solar insolation occurs.

As a result, the rental costs at a PV site are typically higher than those of a wind farm to compensate the landowner for loss of use of the property for other income-producing activities. Thus, finding sites with limited agricultural, mineral or other productive uses will help ensure that the site lease will be cost-effective.

Size

Generally speaking, the larger the system, the lower the unit cost per watt generated and the more power that will be produced. Thus, consideration must be given as to whether a site is large enough to

be economically viable.

The Environmental Protection Agency, in its guide for screening sites for solar PV potential, pegs the minimum useable acreage for a ground mounted system at 2 acres; although based upon our experience, for ground-mounted solar facilities, this is quite low. Most projects we work on encompass sites with at least 6 to 8 useable acres and often significantly more.

Site Limitations

While a larger site should generate more power, when it comes to useable acreage, not all sites are created equal. Generally speaking, useable acreage implies land that is either flat or gently sloped, receives at least six hours of sunlight per day, and has an unobstructed southern exposure. The effectiveness of a solar array may also be limited by surrounding terrain, buildings and other nearby obstructions.

One can make a preliminary determination whether an obstruction might cause shading at a proposed PV area online using the Google Earth Sunlight application, which allows users to analyze the effects of shading at a particular location at different times during the day.

Solar Access

The amount of sun exposure a site receives is also a key concern. Under EPA guidelines, a measure of 3.5 kilowatt hours per square meter per day, which most U.S. locations meet, is the minimum threshold a potential PV site should have, though a middling PV site would receive 4-5 kwh per square meter per day, and a good site will receive 6 kwh per square meter per day or more.

There are several tools to help determine the solar access for a given region or site. The National Renewable Energy Laboratory's Renewable Energy Resource maps, available online, provide users solar insolation information at the regional level while the EPA Renewable Energy "Google Earth" Interactive Mapping Tool can be used to provide more detailed information about a given location.

While these tools can be helpful in providing a preliminary review of a site's solar access, neither online tools nor a physical inspection of a site is enough to determine whether a particular site has sufficient solar resources to be a viable PV site.

Before committing to a PV site, the developer should also investigate whether there are any plans to develop adjacent parcels or preexisting rights of third parties that could inhibit the site's access to solar insolation. There are a variety of ways to attempt to determine this information, including obtaining title reports, reviewing filings at local planning offices, and interviewing landowners and governmental officials.

Connection to Grid

If the PV project will be selling energy to a utility company, consideration must be given to how close the nearest interconnection point will be to the site and whether the existing utility facilities have available capacity for new connections.

Connecting to the grid can be expensive in terms of both infrastructure and soft costs, which can include not only the design and infrastructure costs of the developer, but also network upgrade costs of the

utility company (which are often paid for by the developer), interconnection feasibility studies, the costs of obtaining any necessary governmental approvals, and land rights from third parties to establish the transmission lines. Those costs may be compounded if the point of interconnection is a significant distance away from the site.

Geotechnical Considerations

Geotechnical considerations must also be taken into account, including considerations regarding resistivity, soil load-bearing properties, wind, loss of vegetation, drainage and stormwater management. This is particularly important when siting PV arrays in landfill areas.

In addition to numerous regulatory and liability considerations developers must assess in siting landfills, landfills are prone to settlement and are generally built in a sloped fashion to avoid ponding, which can create additional design and engineering concerns for the developer. Developers must also typically comply with applicable stormwater management and federal Clean Water Act requirements and obtain approval for stormwater management plans as a condition of site plan approval.

Environmental and Permitting Considerations

- ***National Environmental Policy Act.*** While solar energy is one of the cleanest energy sources available, because utility-scale solar electric generating facilities use significant swaths of land, solar projects can have environmental impacts. As a result, many environmental laws and regulations need to be considered when selecting a PV site. Prominent among them is NEPA, which established a mandate for federal agencies to consider and document the potential environmental consequences of their proposed actions and make this information available to the public for comment prior to implementation. The scope and applicability of NEPA can be tricky, as it extends beyond just using land owned by the Bureau of Land Management or other federal agencies as a PV site, and can be triggered in a variety of contexts, including a developer needing federal approval or permits, tapping into a federally owned transmission line, or seeking federal grants for the project. Depending on the proposed federal actions and potential environmental impacts, federal agencies may have to prepare site assessments or impact statements assessing the environmental impact of, and alternatives to, the proposed action.
- ***Endangered Species Act.*** Developers must also investigate the environmental impact projects may have on rare, threatened or endangered species and their habitats. The Endangered Species Act requires that agencies verify that permitting solar and wind development “is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification” of the habitat of such species. If the project has any predicted impacts on a federally listed species, the developer or applicable agency may have to prepare a biological assessment to comply with the Endangered Species Act, which assessment would be reviewed and opined upon by the U.S. Fish and Wildlife Service.

These considerations can prove quite costly. For example, the environmental impact report for the Ivanpah Solar Electric Generating Systems project, a massive concentrating solar plant in the Mojave Desert, determined that developing the project at its proposed location would significantly impact the desert tortoise, a threatened species. To build at that site, the developer had to follow meticulous

protocols for collecting and relocating the tortoises, construct new tortoise burrows, and implement a five-year monitoring program after the tortoises were relocated — at a cost of approximately \$56 million.

- **Wetlands.** Developers should also determine as early as possible whether the proposed solar facility site would impact any wetland areas, as these environmentally-sensitive areas are heavily regulated by both state and federal law. Visual inspection alone is insufficient to determine if a site may be located in a wetland area as many wetland areas may appear arid. Lenders often require wetlands delineation reports or detailed surveys of wetlands areas, and governmental authorities may require analyses of wetland impacts as part of site approvals. A preliminary review of a given site can be done via the mapping tool provided on the U.S. Fish & Wildlife Service's website.
- **State and Local Permitting Issues.** In addition to the federal regulatory considerations noted above, developers will also need to obtain approvals and permits from various state and local authorities to address environmental, zoning and other site-related concerns. Developers should factor in the time and cost for these items in their planning as certain tasks, such as obtaining a conditional use permit to build a PV facility in an area that is not zoned for that use, can be a time-consuming and sometimes expensive process.

Archaeological, Cultural and Historic Resources

State and federal laws also govern the protection of archeological, historic and cultural resources, including the National Historic Preservation Act, the Department of Transportation Act and the Archaeological Resources Protection Act. Many governmental agencies will require, as a condition of site plan approval, preparation of an archaeological survey of the site to determine the presence of historically significant materials, and require developers to create a detailed program of mitigation for impacts on cultural resources pre- and post-construction. A review of title reports, municipal master plans and related ordinances may help to identify historically significant areas located within a proposed PV site.

Oil, Gas and Mineral Rights

Developers of PV projects must also be wary of the existing rights of oil, gas and mineral rights holders as these rights can interfere with the financeability of the project. Title insurers may provide some affirmative coverage for mineral extraction rights, but these coverages often omit damage caused by subsidence, casualty or the negligence by the person extracting the minerals for the PV system.

However, absent obtaining affirmative coverage for the mineral extraction rights, developers may need to seek alternatives to satisfy their lenders' and investors' concerns, including providing evidence of abandonment or waiver of such rights.

Rights of Third Parties

In addition to restrictions by governmental agencies, the site may be subject to the rights of third parties. Even if a lender will not be involved, it is critical to determine as early as possible in the site

review analysis whether there are any title matters that pose significant barriers to the development or financing of the project to avoid costly corrective action.

A developer should obtain a title report to determine who owns the property and become familiar with encumbrances affecting the property, such as mortgages, liens, easements and natural resource rights. Sites may also be part of state and local land conservation or agricultural programs, such as California's Williamson Act, that can restrict site development.

A survey of the land is critical to verify the location of preexisting use rights or other impediments to site development and will be required by nearly all lenders. If the PV site will encroach upon the rights of others, consent agreements may be required, which can be expensive and time-consuming to obtain. If the landowner has mortgaged its property, project lenders will often want recognition from the landowner's lender that its leasehold interest will be superior to any fee mortgage or otherwise unaffected by any fee mortgage foreclosure.

Additional Considerations

To assist developers in locating potential PV sites, the Bureau of Land Management has identified hundreds of thousands of acres of publicly managed land across southwestern states as Solar Energy Zones to encourage development in areas without environmental or cultural conflicts.

Developing in Solar Energy Zones should help make PV site evaluations faster and should reduce the likelihood of significant design adjustment or mediation activities, thereby reducing development costs. Further, these sites have been prioritized by the BLM as areas for solar energy and associated transmission infrastructure development and have been curated by the BLM as sites that should be both economically and technically feasible and with good potential for connecting new electricity-generating plants.

Conclusion

According to the U.S. Energy Information Administration, solar generation capacity should quadruple to 4 percent of the United States' overall energy mix by 2040. Given the continued availability of federal tax credits through 2016 and other incentives, solar energy is an attractive option for many developers and investors.

However, as noted herein, there are many factors to be considered in selecting a PV site to help ensure that predevelopment costs are manageable and that the project becomes a financial success. Developers and their investors, in consultation with their professional advisers, will do well to invest time and energy up front to learn as much as possible about a potential PV site prior to committing to develop there.

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