

Getting to Know Solar in Maine:

Frequently Asked Questions for Siting and Hosting Solar Projects at the Municipal Level

Today, Maine is on the cusp of a new era of solar power development. With the passage of a suite of new statewide laws in 2019, Mainers are beginning to experience what other states have been experiencing: a swelling opportunity for more solar installations, more solar jobs, and more solar customers—including large customers like municipalities—that are using solar to lower energy costs. That opportunity brings questions about what solar means for Maine cities, towns and people.

This document was created to provide answers to common questions about solar development that have been raised by municipal officials, landowners, and others considering larger solar projects for their own use or in their communities.

The questions and answers are organized under three general themes:

- A. General background on solar energy projects in Maine
- B. Physical features of solar development
- C. Considerations for municipalities, landowners, and neighbors

A companion document from Maine-based conservation organizations provides guidance to developers on how to responsibly site solar projects in Maine. If you have follow up questions, there is contact information at the end of this document.

A. General background on solar energy projects in Maine

1. What are the different types of solar development?

Broadly speaking, there are large, “grid-scale” projects and small or medium-sized “distributed generation” projects that are more dispersed across the grid. Breaking that down further, there is a spectrum of solar projects.

On one end of the spectrum are projects *located on a consumers’ property to provide power directly to a home, business or government entity*, called “behind the meter” projects. Excess electricity from a behind the meter project may flow onto the grid in exchange for net metering credits on future utility bills. These projects may be on a roof or on the ground, scaled to power a house (4-10 kilowatts) or a superstore (several megawatts).

On the other end of the spectrum are grid-scale projects that provide power to consumers across the electricity grid like a traditional power plant, not specific individual customers.

These ground-mounted projects may be as small as 10 megawatts (MW) or more than one hundred MW.

In between these two ends of the spectrum are projects that *provide power for specific customers (i.e. credits on electricity bills like behind the meter projects) but are not located on the property where the power is consumed*. These projects are most likely to be 1-5 MW and include community solar farms and projects serving a single customer. A landfill solar project providing power for a local school or municipal government is an example. Another example could be a project providing power to dozens of individual people who live in different places.

Municipalities have several options available to them along this spectrum:

- Leasing their land for solar development
- Ensuring land use ordinances and permitting processes encourage solar
- Entering into a contract for behind the meter projects or on landfills and other sites
- Hosting community solar projects and/or becoming an anchor tenant

Cities and towns that have invested in these types of solar projects have successfully been able to reduce electricity costs or receive revenue that contributes to municipal budgets.

2. How well does solar work in Maine?

Solar works great in Maine and the state has an excellent solar energy resource. For example, a solar panel in Portland will generate 90-95% as much energy in a year as an identical panel located in Atlantic City, Savannah, or Houston. This is why an increasing number of companies are competing to install solar here in Maine.

Each year corporations, utilities, government and individuals around the world invest billions of dollars in solar photovoltaics (PV) projects because it is a mature, reliable, affordable technology. New England states like Massachusetts and Vermont are already national leaders in solar development and now Maine has the opportunity to catch up.

3. Why is there so much activity developing solar now in Maine?

After years of efforts and discussion, new laws passed in 2019 helped bring Maine's energy policy up to date by recognizing and encouraging both grid-scale and distributed solar.

- LD 1711¹ directed the Maine Public Utilities Commission (PUC) to initiate a competitive bidding process amongst solar developers and approve long-term contracts for 375 MW of distributed solar (projects under 5 MW), mostly through community solar. The PUC will offer contracts for distributed solar projects starting in *July 2020*.² To qualify for a contract, projects must have

¹ <http://legislature.maine.gov/LawMakerWeb/summary.asp?ID=280073839>

federal, state and local permits, an interconnection agreement with the utility, and meet other substantive requirements. There will be stiff competition to develop projects, meet these requirements in time and get a contract.

The bill also expanded net metering to more easily allow municipal/commercial or community solar projects up to 5 MW. Those projects can be developed at any time.

- LD 1494³ directs the PUC to solicit and approve long-term contracts for grid-scale renewables, including solar, for an estimated 500 MW⁴. Those projects are likely in development now to bid for two rounds of contracts in 2020 and 2021.

4. Who gets the power from solar projects in Maine?

It depends which type of solar project it is (see Question 1). It might be the town or business that works with an installer or developer on an individual project, or it might be all utility consumers for a grid-scale project. Grid-scale projects located in Maine can provide power to consumers in other states, however all of New England shares a common electricity grid, so power generated and consumed anywhere within the region affects all of us to some degree.

5. What is community solar?

Any customer can get direct bill savings from participating in a *community solar project*, including homeowners, renters, municipalities, nonprofits, and corporations.

There are different financial arrangements used by community solar projects. In general, participants subscribe to a project and then receive a credit on their utility bill from their share or subscription with the community solar project. The most common arrangement is likely to be large community solar projects where a third-party owns the project. Subscribers would pay no upfront costs to participate and will then pay an amount which is equal to or less than their current electricity bill over the course of their subscription.

The new law *requires* 10% of each community solar project that gets a long-term contract from the state to serve low to moderate income households. Only large electricity consumers (including municipalities) are likely to be able to sign onto community solar projects *before* the projects are awarded contracts (starting July 2020). Smaller consumers such as households and small businesses will be able to sign on later in the development process, and several thousand will have an opportunity to sign up.

6. How does solar power benefit Maine's electricity customers?

² The first 75 MW will be awarded through an auction, which will set an automatic declining price for the remaining 300 MW.

³ <http://legislature.maine.gov/LawMakerWeb/summary.asp?ID=280072983>

⁴ <https://www.synapse-energy.com/project/maine-rps-study>

Solar provides significant benefits to the grid, to electricity consumers, and to the environment, benefits that accrue to all Mainers.

- Solar arrays produce a lot of their power at the times of the day and the year when the electric grid needs power the most, displacing the need for some of the most expensive and polluting fossil-fuel power plants that would otherwise operate at those times.
- Because there are no volatile fuel costs, solar provides a very stable and predictable source of power that can last for decades.
- Distributed solar also represents a shift from centralized to distributed generation, which reduces the strain on the electricity grid and lowers the costs ratepayers must pay over time for wires, poles, and substations.
- All solar power, especially distributed solar, makes our energy system more resilient.
- To the extent connecting a solar project imposes costs on the electricity grid, those are borne by the developer or owner of the project, not other consumers.
- The environmental benefits of solar are well established, including major reductions in carbon and other pollutants from conventional fossil fuel power plants. Add resiliency benefits.

7. How does solar development benefit Maine's economy?

The development of solar PV systems directly benefits the state's economy by creating jobs for engineers, electricians, construction workers, site maintenance crews, etc. Maine currently has the lowest number of solar jobs per capita of any state in the region, but that is poised to change as the industry grows. Solar also provides electrical rate stability and savings for consumers, which generally translate into more spending in the rest of the Maine economy. Solar projects may also create a valuable source of revenue for landowners that host projects.

B. Physical features of solar development

1. How big are solar projects?

Solar projects can range from several kilowatts (i.e. enough to power a home or two) to many megawatts. The projects being considered under the new law will typically range from 2 to 5 MW's, which would require 12 to 30 acres.

The largest solar installation in operation in Maine is currently Cianbro's 10 MW project in Pittsfield, on 57 acres. There are two dozen larger grid-scale projects in planning across Maine, a few of which would be over 100 MW.

[Include photos of different sized projects, e.g.

<https://www.nrcm.org/programs/climate/clean-energy/solar-power-in-maine/>]

2. Why is solar sometimes installed on rooftops and sometimes on the ground?

In many cases, rooftops are suitable for solar and provide a ready, unused surface area that may not be as available on the ground. However many roofs are incapable of hosting larger scale solar projects due to the roofs load bearing capacity, orientation, and obstructions such as air handling equipment. Ground mounted systems are typically the lowest cost to install if there is land available.

3. How close do solar projects need to be located to the electricity grid?

Project sites less than a mile from an existing electricity connection point will be most competitive for solar projects. This has a positive side effect of keeping distributed solar generation closer to existing development, not sprawling into Maine’s North Woods. Placing systems far from substations is cost prohibitive for distributed solar projects. The cost of connecting a solar project to the electricity grid quickly increase based on circuit size or distance from a substation. Upgrading connection lines can exceed \$500,000 per mile. Natural limitations in options for grid connection also are likely to significantly limit the number of multi megawatt-scale projects in any given town.

4. Does the equipment create noise and glare?

Solar arrays have virtually no moving parts to make noise. Inverters and other electrical equipment make some noise, but solar systems generate little, if any, detectable noise outside of the project area. The noise generated is similar to that of a modern air conditioning unit--if standing next to it you’ll hear a subtle “hum” but if further away there should be no noise disturbance.

Sunlight that is reflected as glare is sunlight not producing electricity, so solar modules are constructed to minimize glare by using low glare glass to maximize absorption. Because glare is not an issue, there are now many solar projects located near or at airports.

5. Are there hazardous materials present in solar panels or other equipment?

The solar projects installed in Maine present no meaningful risk from hazardous materials. Panel materials don’t dissolve into water or vaporize into the air, so there is little, if any, risk of chemical releases to the environment. At the end of their 30+ year lifespan, solar panels--like everything else--should be recycled to the greatest extent possible.

Transformers used at solar installations are similar to the ones used throughout the electricity grid all along the streets of Maine towns and cities. Modern transformers typically use non-toxic coolants, such as mineral oils, and have encasements to control leaks. Potential releases from transformers using these coolants at solar installations are not expected to present a risk to human health, and release of any toxic materials from solid state inverters is unlikely when properly installed.

Thin-film solar panels, which are less common and not currently being used in Maine, contain materials like cadmium, which can present health and environmental problems if it burns at a high temperature or are disposed of improperly.

6. Do solar developments impact wildlife habitat or water quality?

Solar arrays are generally a very low impact form of development. Maine's largest environmental organizations and others have published a brief set of recommended siting practices that can be followed to minimize impacts to natural and agricultural resources [link.]

Rooftop solar projects should have virtually no negative environmental impacts. Ground mounted projects must almost always perform some environmental review, including for sensitive wildlife habitat and wetlands. In particular, should not significantly change watershed conditions, although this must be evaluated for individual projects above a certain size (see state permitting below). In some cases, wildflowers and other native plants have been planted around ground mounted solar projects to support bees, butterflies, and other wildlife.

C. Municipal, landowner and neighbor considerations

1. How will towns and cities benefit from hosting a solar project?

Towns and cities can directly benefit from solar in two primary ways:

- By receiving annual property tax payments from solar development, without increasing the need for additional services.
- By getting power from a solar project, either as the sole owner or through a community solar project. Solar power offers affordable electricity costs that are stable or fixed for very long terms (sometimes more than 20 years), which eases strain on municipal budgets. In the case of community solar projects, residents and local businesses can also participate. Solar projects can be located on areas without other productive uses, such as rooftops or landfills.

2. How should a municipality or large customer start the process of getting solar installed for their own use?

Large customers can solicit quotes or bids from multiple developers or installers in several ways. Local governments may want to issue a Request for Proposals, others may solicit project quotes in less formal ways. Municipalities may receive unsolicited proposals or inquiries from developers. While those may serve to educate and inspire municipalities about the potential to participate in solar power, it is likely that towns will want proposals from multiple developers. To get the most from a competitive bid or quote, it is important to identify the goals and key parameters for a solar project, including to make apples-to-apples comparisons. For example, is there a specific piece of land in mind or should the solar developer propose one? Could the solar project serve multiple units of government (e.g. the school and the town hall)? Are you trying to achieve environmental or emission reduction goals or financial goals?

Towns may want to use a standing committee or ad hoc committee to guide the process, potentially the expertise of residents to augment that of municipal officials. In some cases,

towns or larger businesses may hire an independent engineer or consultant to assess the potential for benefiting from solar or site specific considerations (e.g. landfill suitability.) It is a good idea to seek advice from other towns or businesses that have gone through the process.

3. What land use issues or impacts are likely to be regulated at the state level?

Solar projects above a certain size or impacting certain natural resources will require a permit from the Maine Department of Environmental Protection, known as a Site Location of Development (or “Site Law”) permit, which typically coincides with a related Natural Resources Protection Act (NRPA) permit. These permits prohibit significant negative impacts to sensitive wildlife habitat, wetlands, water quality, groundwater, soil erosion/stormwater, noise, and scenic character. Site Law permits are required for all projects occupying 20 acres or greater, or meeting wetland or other triggers.

4. What municipal services do solar projects require?

Unlike many types of development that require additional services such as increased enrollment at schools, water and sewer services, road use, or constituent services generally, solar projects require almost no additional services except a small amount of ordinary fire and police protection.

Solar project owners will be responsible for operations and maintenance costs. Those costs will vary based on the type of project. Rooftop projects may require virtually no maintenance for a decade or more, and even more complex ground projects have low operations costs. A municipality, landowner or business that hosts or contracts for power from a solar project should clarify with the developer or installer which party has responsibility for operations and maintenance.

5. Should towns adopt solar ordinances or make solar an allowed use in zoning?

Solar-specific ordinances or permitting requirements are not necessary for well-sited solar projects to be developed, however they can be a tool to encourage appropriate solar development over time. Some of Maine’s municipalities have adopted solar ordinances making it explicit that solar is an allowed use in most zones.

6. How can ground-mounted solar developments be decommissioned?

Most medium and large scale solar projects have a decommissioning plan built into a lease agreement with a landowner. These plans often include language that states that all equipment that was installed for the solar farm will be removed at the time the system is shutdown.

7. How will a solar array impact neighborhood property values?

Solar projects make good neighbors. There is little evidence to suggest that solar projects affect nearby property values one way or the other. Once a ground-mounted solar project is installed, it means no *other* form of development--most of which would have greater

impacts--will be located on that land for thirty years or more. This may be a benefit to neighbors, however it is unlikely to be reflected in property values.

8. Do solar projects generate property tax revenue?

The laws regarding property taxes on solar differentiate between grid-scale projects and solar projects that provide power for individual customers. Grid-scale projects are assessed and taxed like other forms of development, either traditionally or through Tax Increment Financing (TIF) agreements. Under new Maine laws, consumer-oriented solar projects (where the customer receives a bill credit, such as under net metering and community solar projects) do not pay property taxes on solar equipment. Instead municipalities will receive reimbursement from the state for 50% of the tax value. Maine Revenue Service is in the process of developing guidance for fair and consistent valuation of solar projects.

9. What are the added benefits and challenges of solar development on brownfields?

Locating solar arrays on brownfields, including landfills or former industrial sites, is an excellent way to make use of property that might not have any other feasible use. If a municipality is purchasing the solar output (or one of the parties in a community solar farm), then land such as a landfill is essentially free. Re-using brownfields to the greatest extent possible is an efficient use of land and will help Maine achieve its solar energy goals with minimum conversion of forests, farms or other open space.

However, developing on these sites often comes with greater costs of installation, and/or greater technical, legal, or financial complexity. For example, traditional post-mounted solar panel racks cannot be installed on a capped landfill. Sites with hazardous waste contaminants may require additional permits or insurance, which create development risk. Solar should be pursued where a brownfield is located close to an interconnection point with the grid and site challenges are relatively minimal.

Contact information:

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Your regional planning organization or council of government:

https://www.maine.gov/dacf/municipalplanning/technical/regional_council.shtml