First Steps Guide: Working with Utility-Scale Solar.[1]

Background

A number of large "utility-scale[2]" (generally 5 megawatts or above) solar projects are in various stages of completion in Maine, several of them in the Mid Maine region. (Figure 1.) In 2017 the utility-scale sector accounted for nearly 60% of all new solar capacity in the United States, and is expected to maintain its market-leading position for at least another six years. This guide is intended to answer such basic questions as: Why are so many projects being introduced now? How do they work? How would municipalities be affected?

Why is the Number of Utility Scale Projects Increasing so Fast?

Three[3] main factors are involved: the downward trend of the cost of producing solar, aggressive state policies in the region to increase the share of their electricity produced from renewable resources and the federal investment tax credit.

1. Due to innovations that have cut the costs of solar panels while increasing their efficiency, utility-scale solar has become much more economically competitive. Median installed utility-scale photovoltaic (PV) project prices have steadily fallen by two-thirds since the 2007-2009 period.[4]
2. Several states and some organizations have established goals increasing the % of their electricity that is required to come from "specified" renewable sources. This increases the demand for utility-scale solar, which is a specified source. Massachusetts and Connecticut are the main state examples of aggressive renewable resource goals in our region.[5]
3. The federal government passed a 30% investment tax credit for solar projects in 2015. This rate lasts only through 2019. It falls to 26% in 2020, 22% in 2021 and 10% from

[1] First-step guides are designed to help municipal decision-makers explore new or emerging energy options. Because costs and specific technologies change and one size does not fit all, these guides do not attempt to suggest specific choices, but rather help define the options, provide some basis for deciding whether further exploration is worthwhile and provides a series of further references to facilitate a deeper exploration. These guides are supplied by the Sustain Mid-Maine Coalition, a nonprofit group of volunteers, that aims to promote energy conservation and alternative energy use for Kennebec Valley area residents, businesses, and municipal operations, thereby reducing energy costs for taxpayers while also cutting harmful greenhouse gas emissions.

[2] As the name implies theseprojects are normally designed to supply power to the grid.

[3] A fourth factor (the Trump tariffs on imported solar panels), which was expected to have an inhibiting effect, has turned out to be less important than expected. Many developers had stockpiled cheap panels in anticipation of the import fees. Additionally China slowed the pace of domestic installations, creating a surplus of cheap panels that spilled into global markets and U.S. consumers have a big incentive to install solar panels in the next 18 months, before U.S. tax incentives begin to phase out. (https://insideclimatenews.org/news/20082018/trump-solar-panels-tariffs-clean-energy-economy-jobs-united-states-market)

[4] https://emp.lbl.gov/publications/utility-scale-solar-empirical-trends

[5] The discerning reader might ask "how can Massachusetts get credit for projects built in Maine"? The answer is provided by renewable energy credits (RECs). For a succinct description of how REC markets work see https://www.mass.gov/service-details/program-summaries.

2022 and onwards. These impending declines create an additional incentive to complete as many projects as possible that can qualify for the higher rates.

What State and Federal Permitting is Involved?

Under the Maine Site Location Law (38 M.R.S.A. Section 48) a permit is required for any "development of state or regional significance that may substantially affect the environment". It further specifies that "Development of state or regional significance that may substantially affect the environment" is defined "as any federal, state, municipal, quasi-municipal, educational, charitable, residential, commercial or industrial development" that: "Occupies a land or water area in excess of 20 acres" among other criteria. No such site can be developed unitl the Department of Environmental Protection issues a permit and the developer demonstrate compliance with the terms of that permit. Depending on the nature of the project some federal permitting may be required. Some projects, for example, have had to investigate the impact on endangered species and the Waterville project is sufficiently near the airport that it had to do tests on possible glare effects on aircraft. In general municipality permitting occurs after the others and hence can to some extent depend on it in its own permitting process.

Figure 1 Maine built or Planned Utility Scale Projects **(4 megawatts or higher)**[1]

Clinton	20 megawatts	NextEra Energy
Fairfield	20 megawatts	NextEra Energy
Fairfield	5 megawatts	Gizos energy
Farmington	75 megawatts	NextEra Energy
Pittsfield	9.9 megawatts	Cianbro Corp.
Sanford	50 megawatts	NextEra Energy
Waterville	20 Megawatts	Gizos Energy
Waterville	5 Megawatts	Gizos Energy

How Do these Projects Work and What are the Effects on Municipalities?[6]

1. Because their production capacity usually dwarfs local consumption needs, utility-scale projects are generally built by private developers who sell electricity in the ISO-NE wholesale market. Most of the buyers of that energy are currently in Southern New England.

[6] We are highly indebted to Michelle Flewelling, the Town Manager of Fairfield, and Garvan Donegan, the Director of Planning and Development for the Central Maine Growth Council for very helpful conversations sharing their experience. These conversations helped us better understand the outstanding issues for municipalities in these projects. We have also benefited from a conversation with Liz Peyton, regional manager for NextEra, who helped to clarify the mechanics of the wholesale market.

2. Utility-scale projects can generate significant new revenue for the municipalities in which they are located. Projects located on private land will generate real estate tax revenue for its useful life and provide a new opportunity to raise revenue from a completely new source. Additionally some of these projects are sited on municipally-owned land, such as abandoned landfills. For sites located on municipal land the municipality can also profit by leasing the land to the solar developer. Lease contracts typically run for 10-20 years.

3. Some municipalities in Maine (for example, Bar Harbor and South Portland) are developing solar projects to produce electricity for municipal consumption. Currently these typically are smaller projects (under 5 megawatts) rather than utility-scale projects simply because a typical municipal electricity demand is too low for it to economically compete in the wholesale market with bigger buyers. As the technology advances and costs continue to fall the opportunities for "self-consumption cutouts" from these projects drawn from the grid are likely to grow. Since projects focused mainly on self-consumption rather than export currently raise somewhat different issues and commonly arise from different financing models, we will address those types of projects in a subsequent first-step guide.

4. The speed with which utility-scale solar opportunities arise is likely to be quite fast. The tax break is scheduled to decline, so later projects will reap less economic reward. The number of suitable sites is limited so developers are anxious to identify and start work on those that are most suitable.

5. The impetus for selecting a particular site can come from a landowner, the municipality or the developer. The most suitable sites for these projects are those that have adequate land (Nextera suggests 5-6 acres per megawatt and the Waterville and Fairfield 5 megawatt projects involve roughly 25 acres each), have easy access to a 3-phase power line (to export the power to the grid) and have land that is generally flat or sloping gently south and free of trees, wetlands and land use restrictions. Community support is more likely to be forthcoming if the project does not necessitate either taking prime agricultural land out of production or transforming a highly visible, locally cherished pastoral landscape.

6. Getting the power to the grid can be very expensive in the absence of a near-by 3-phase line. Lines carrying 3-phase power are usually transmission lines or distribution lines to an industrial facility that uses quite a bit of electrical power. Substations also provide access to 3-phase lines. Since the existing 3-phase lines have a fixed capacity, as new projects are started the available capacity of the existing lines will be used up. A first-come, first-served process for using the existing available capacity provides an additional motivation for developers to act quickly.

7. The benefits to the developer of getting this power to market fast means that municipalities who are prepared to respond quickly are likely to have a competitive advantage. One policy area where being prepared matters involves land use control in

the municipality. Does the current ordinance consider the possibilities of large solar projects? Does it have a fee schedule that is appropriate for this type of project? If changing the ordinance and fee schedule is necessary and that process results in delay, that municipality may be disadvantaged in attracting these kinds of projects.

8. It is possible that one of these projects could have TIF implications if the site is in an established or newly created TIF district.

9. For some sites the municipality may have to think about new types of liability risk and their possible insurance implications. Suppose, for example, that a site is located on an old landfill and some years into the project a sink hole develops, causing damage to the panels. How is the liability for the resulting damage to the project allocated between the municipality and the developer? Is the municipality's current insurance adequate in terms of whether these specific risks are covered and the current amount of coverage?

10. If local municipalities wished to take advantage of the lower prices (due to economies of scale) possible with utility-scale solar, they would have to participate in the wholesale market. One way for a municipality to have a high enough demand to compete with other wholesale customers is for it to become an "aggregator" for its citizens. An electric aggregator gathers consumers for the purpose of negotiating a lower rate for generation service from an electric supplier and negotiates with suppliers on behalf of the customers it represents. As such, an aggregator acts as the customer's agent. Connecticut and Massachusetts, for example, have systems of municipal aggregators for electricity,[7] but Maine does not. Access to this avenue in Maine would presumably require a new state law authorizing the practice.

An Assessment Strategy

1. Does your community and/or municipal government have large land parcels next to an electrical substation or a 3-phase line?
2. Does your municipality have a large closed and capped landfill?

IF you can answer "YES" to either of the above, then reviewing opportunities for the development of a utility-scale solar project in your area may be worthwhile.

Additional Resources

National Renewable Energy Laboratory
https://www.nrel.gov/solar/
A major source of information on developments in this field.

[7] For more information on the Connecticut aggregator system see https://www.energizect.com/electric-aggregator. For contact information for their municipal aggregators see: http://www.dpuc.state.ct.us/electric.nsf/$FormByMunicipalAggregatorsView?OpenForm. For more information on the more comprehensive Massachusetts system see the reference section below.

Nextera Energy (a developer)

A website that contains the answers to frequently asked questions from those seeking to find out if a particular site might be suitable as well as contact information:
https://www.nexteraenergyresources.com/landowners/faq.html

Gizos Energy (a developer)

A website that describes their Fairfield and Waterville projects:
https://www.gizos-energy.com/projects.html

A website describing the characteristics of suitable sites
https://www.gizos-energy.com/landowners.html

Persons with Experience in the Area

Michelle Flewelling, Fairfield Town Manager
mflewelling@fairfieldme.com
(207) 453-7911

Garvan Donegan, Director of Planning and Economic Development
Central Maine Growth Council
A key person in the Waterville and Fairfield utility-scale solar projects
gdonegan@centralmaine.org
(207) 680-7300

Articles

Gabrielle R. Lichtenstein and Indiana Reid-Shaw University of New Hampshire Sustainability Institute "Community Choice in Aggregation (CCA) in Massachusetts".

Community Choice Aggregation (CCA) is a strategy for purchasing electricity in which a single municipality or county, or group of these entities, combines the electricity demands of participating residents within their jurisdiction. This bulk purchasing power can be harnessed to both decrease costs and to stimulate growth in the renewable electricity market. At its core, CCA gives communities greater control over how they source and price their electricity.
For a report on this approach see
https://sustainableunh.unh.edu/sites/sustainableunh.unh.edu/files/media/Fellows/lichtenstein_-_aggregation_in_ma_report.pdf