
Solar Permitting and Zoning Bylaw Guidance

Funding provided by the
District Local Technical Assistance
program

Prepared for
MAPC Municipalities

December 28, 2014



Prepared by
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Acknowledgements

This project was undertaken with funds from the District Local Technical Assistance program. MAPC wishes to express our thanks to the Governor and the members of the Legislature for their continued support and funding of this program.

This report was produced by the Metropolitan Area Planning Council. Professional technical assistance and project coordination was provided by Cammy Peterson, Manager of Clean Energy. Additional project support was provided by Axum Teferra, Energy Planner; Ani Krishnan, Energy Planner; Patrick Roche, Energy Coordinator, and Cate Mingoya and Kate Ito, Clean Energy Division Interns. Project oversight was provided by Rebecca Davis, Director of Clean Energy.

Special thanks for presentations, technical advice, and program support from The Department of Energy Resources; The Cadmus Group; Robert Luongo, Town of Saugus; and staff and volunteers in the participating cities and towns who made this project possible.

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Executive Summary

The purpose of this project was to develop guidance and best practices for cities and towns in Massachusetts that would help them to reduce solar soft costs through streamlined and standardized permitting and zoning policies for solar photovoltaic (PV) installations.

The National Renewable Energy Laboratory (NREL) reports that soft costs are now the largest cost of a solar installation. NREL defines soft costs as those that are not directly affiliated with physical construction; examples include design, permitting, zoning, and inspection costs. Nationally, soft costs account for 64% of residential, 52% of small commercial, and 57% of large commercial solar installation costs.¹

Increased use of solar energy fosters reduced carbon emissions, better air quality, greater energy resilience, and lower energy costs for consumers. However, permitting for the installation of rooftop and ground-mounted photovoltaic (PV) systems can be expensive, complex, and time-consuming; and inconsistencies among permitting processes and local regulations throughout the Commonwealth can be prohibitively challenging for installers that work in multiple communities. Streamlining and shortening the permitting process will not only reduce the time that homeowners and developers wait for a permit, but it will also reduce the time that municipal employees spend on administering the permitting process. By having solar zoning bylaws in place, municipalities can create an encouraging environment for solar and reduce siting challenges that often result from the absence of zoning specifications for solar energy systems.

Cities and towns across Massachusetts have begun to recognize the importance of adopting zoning bylaws for solar so that local regulations are clearly presented and disputes are minimized. As-of-right siting of solar installations, as modeled by the Department of Energy Resources' (DOER) Green Communities program,² is an important provision in solar bylaws that prohibits the requirement of special permits for solar projects. This feature allows any installation that meets the solar overlay bylaw's requirements to receive approval, reducing uncertainty and risk. Criterion 1 of the Green Communities program requires the use of As-of-Right Siting to remove barriers to installation, and Criterion 2 builds on that by directing municipalities to expedite permitting processes for renewable energy systems that have been developed under as-of-right siting.

Demand for PV systems, both ground-mounted and rooftop, is expected to rise as the price of panels continues to decrease. This trend offers municipalities a tremendous opportunity to harness the social, economic, and ecological benefits of solar technology. Reducing the time, money, and effort needed to undertake and execute permitting for a solar project is a low-cost way to promote the expansion of solar energy in a community.

¹ <http://www.midwestenergynews.com/2013/12/04/soft-costs-grow-as-portion-of-the-price-for-solar-power/>

² <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/solar-model-bylaw.pdf> and <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/criterion-2-guidance-2013.pdf>

Technical Assistance

MAPC offered technical assistance to communities that sought support in developing solar bylaw or permitting best practices. In addition to providing recommendations and guidance documents to numerous communities, MAPC worked with the Town of Saugus to draft a new solar overlay bylaw. MAPC was helping Saugus prepare to apply for Green Communities designation through the Department of Energy Resources (DOER). Criteria 1 and 2 of the requirements for designation comprise as-of-right siting of renewable energy and expedited permitting, respectively. In working with MAPC, Saugus decided to utilize a solar overlay bylaw to comply with Criterion 1, and, together, the bylaw was drafted so that provisions included:

- Prohibition of special permits for solar generation
- A dedicated area of town that could host a 250 kW system at minimum
- Reasonable dimension and density requirements

On May 12, 2014, “ARTICLE 20 Large-Scale Ground Mounted Solar Photovoltaic Installations Overlay District” was approved at Saugus’s Annual Town Meeting. See Appendix 1 for the Town of Saugus’s solar overlay bylaw. MAPC is now providing the Town with support in its efforts to have solar installed at the landfill behind the Department of Public Works and the corridor along Route 107.

MAPC also partnered informally with Fraunhofer CSE to introduce a demonstration of its Plug and Play PV System.³ Fraunhofer’s revolutionary Plug and Play PV System strives to simplify installation of solar PV and create more user-friendly systems, so that consumers are encouraged and empowered to install solar on their homes. Still in the demonstration phase, this effort to accelerate the deployment of residential PV will only be enhanced by cities and towns’ adoption of helpful permitting and zoning measures that support solar PV expansion. MAPC directed Fraunhofer to municipal permitting and energy officials who could help in the project demonstration.

RE: Plug and Play PV/AHJ discussions

[Peterson, Cameron](#)

Sent: Wednesday, November 05, 2014 11:11 AM

To: [Jacqueline Ashmore \[jashmore@fraunhofer.org\]](mailto:Jacqueline.Ashmore@fraunhofer.org)

³ <http://cse.fraunhofer.org/pnp/project>

Cc: [Christian Hoepfner \[choepfner@fraunhofer.org\]](mailto:choepfner@fraunhofer.org)

Hi Jacqui,

I'd be happy to provide some outreach ideas for nearby municipalities whom would be good to involve in this process. I think it's very smart to give them insight into the entire scope of the system - not just the equipment but also the soft costs - and to involve the utilities directly.

I would recommend reaching out to:

- **CAMBRIDGE:**
 - **Susanne Rasmussen;** Director of Environmental & Transportation Planning, srasmussen@cambridgema.gov, 617/349-4607
 - **Bronwyn Cooke;** Sustainability Planner, bcooke@cambridgema.gov, 617/349-4604
- **SOMERVILLE:**
 - **Oliver Sellers-Garcia;** Director of Sustainability and Environment, ogarcia@somervillema.gov, (617) 625-6600 ext. 210
- **WINCHESTER:**
 - **Susan McPhee;** Energy Conservation Coordinator, sgmcphee@me.com, 781-507-5880,
- **BROOKLINE:**
 - **Lara Curtis Hayes;** Senior Planner, lcurtishayes@brooklinema.gov, 617-730-2618
- **MELROSE:**
 - **Martha Grover;** Energy Manager, MGrover@cityofmelrose.org, 781-979-4195
- **MEDFORD:**
 - **Alicia Hunt;** Director of Energy & Environment, ahunt@medford.org, (781)393-2137

Just let me know if I can provide any additional support. I'd be happy to facilitate any of this outreach, in the initial stages or in the pre-demo meetings. Feel free too to use my name when connecting to these folks. I look forward to learning more about the permitting, inspection, and interconnection process for the system and seeing it in action!

All the best,
Cammy

Cammy Peterson
Manager | Clean Energy

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www.mapc.org/clean-energy

-----Original Message-----

From: Jacqueline Ashmore [mailto:jashmore@fraunhofer.org]
Sent: Wednesday, November 05, 2014 10:10 AM
To: Peterson, Cameron
Cc: Christian Hoepfner
Subject: Plug and Play PV/AHJ discussions

Dear Cammy,

As you know, Fraunhofer's Plug and Play Demo Day is coming up on November 19th - we look forward to seeing you then. In the meantime, I am writing to ask for your ideas on who we might reach out to to get additional feedback from local jurisdictions. The context is as follows.

In the days before the system demonstration, we will be meeting with representatives of jurisdictions and utilities at the demonstration site, showing them the Plug and Play PV System we have installed in our practice run, and discussing the permitting, inspection, and interconnection process. Representatives of City of Boston representatives are already covered, but we are interested in getting suggestions of other people we might contact in other nearby jurisdictions such as Cambridge, Somerville, and Winchester. Please would you let me know who you suggest we contact? I would like to reach out to them by the end of the week.

Please let me know if it helps for me to give you a call to discuss ideas by phone.

Best wishes,

Jacquie

Jacqueline Ashmore, PhD
Engineering Program Manager
Fraunhofer Center for Sustainable Energy Systems CSE
5 Channel Center Street, Boston, MA 02210 Tel. 617-575-7251
Email jashmore@fraunhofer.org<<mailto:jashmore@fraunhofer.org>>
<http://cse.fraunhofer.org/>

Toolkit and Guidance Development

MAPC researched and collated various national and state-specific materials on best practices for permitting and zoning to encourage solar installations and reduce soft costs. By assessing the recommended practices, policies, case studies, and lessons learned from a large number of useful sources, we were able to select the most valuable and applicable guidance for this toolkit. The toolkit successfully aggregates and contextualizes this knowledge concisely and clearly.

The goal of the toolkit is to equip municipal permitting and zoning offices with best practices to facilitate and encourage the development of solar photovoltaic systems in the Commonwealth. Municipalities can implement the practices that make the most sense for their structure and capacity. Ultimately, regional consistency in PV permitting and zoning regulations will reduce the time and costs associated with solar and attract more highly-skilled developers to all parts of Massachusetts. In turn, municipal, residential, and business consumers will have more choices when considering solar energy systems and will have access to lower prices for a clean, stable form of energy for their homes and facilities.

Educational Workshop

On January 20, 2015, MAPC will present a workshop entitled “Streamlining the Solar Permitting Process and Developing Supportive Zoning Bylaws Workshop for MAPC Cities and Towns.” The workshop will focus on improving solar permitting and zoning bylaws with DOER and a sampling of municipalities. It will introduce municipal stakeholders to the new MAPC toolkit developed to help municipalities streamline solar PV permitting processes and adopt supportive bylaws. During the course of the workshop, MAPC will walk participants through the toolkit; DOER will discuss its model zoning bylaws and other available resources for municipalities. The workshop will also feature two municipalities – the City of Cambridge and Town of Framingham have been asked – as they share their experiences developing efficient permitting policies and/or bylaws.

Workshop Details:

Date: Tuesday, Jan 20, 2015, from 9:00 – 11:30 am

Location: MAPC, 3rd Floor Conference Room

Expected audience: Municipal staff from cities and towns of the MAPC region

Streamlining the Solar Permitting Process and Developing Supportive Zoning Bylaws Workshop for MAPC Cities and Towns

This interactive workshop, presented by the Metropolitan Area Planning Council (MAPC), in collaboration with the Massachusetts Department of Energy Resources (DOER), will present MAPC's newest toolkit, "Streamlining the Solar Permitting Process and Developing Supportive Zoning Bylaws." The workshop will walk participants through this helpful toolkit and provide additional guidance from DOER as well as municipalities that have instituted some of these practices on the ground. Workshop presenters will demonstrate steps municipalities can take to streamline and standardize the solar permitting process and create effective zoning bylaws that further encourage the adoption of solar energy systems and reduce the time, effort, and money spent to implement them. Presentations will be followed by Q&A and time for knowledge sharing and networking.

9:00 – 9:30 am	Introduction: Developing Effective Local Zoning Bylaws for Solar PV Growth
	Why and How to Streamline the Solar Permitting Process
	MAPC's New Solar Permitting and Zoning Bylaws Toolkit

9:30 – 10:00 am	Developing Effective Local Regulations for Solar
10:00 – 10:45 am	Case Study of Two MAPC Municipalities
10:45 – 11:15 am	Q&A with Presenters
11:15 – 11:30 am	Wrap-up and Closing Remarks

Appendix 1- Town of Saugus Solar Overlay Bylaw

To see if the Town of Saugus will vote to amend the Town's Zoning By-Laws by adding a new Article 20 entitled "Large Scale Ground Mounted Solar Photovoltaic Installations Overlay Districts" that would provide as follows:

A. Amend the Zoning By-law text by adding the following Article 20

B. Amend the Zoning Map by adding the Overlay Maps entitled "Route 107 Overlay-Large-Scale Ground Mounted Solar Photovoltaic Installations Overlay District, Dated March, 2014" prepared by the MAPC, and "DPW Overlay- Large- Scale Ground Mounted Solar Photovoltaic Installations Overlay District Dated March, 2014" prepared by the MAPC, to designate the locations of the Large-Scale Ground Mounted Solar Photovoltaic Installations Overlay Districts.

Proposed text and map are as follows:

ARTICLE 20

Large-Scale Ground Mounted Solar Photovoltaic Installations Overlay District

20.0 Purpose

The purpose of Large-Scale Ground Mounted Solar Photovoltaic Installations Overlay District Bylaw is to encourage the use of solar energy systems and protect solar access consistent with M.G.L. 40A Section 9B and with the Green Communities Act in M.G.L. 25A Section 10, to increase our local renewable energy production, to decrease our reliance on fossil fuels to produce electricity, and to improve local air quality.

This promotion of commercial solar photovoltaic installations is to be accomplished pursuant to the standards set forth herein for the placement, design, construction, operation, monitoring, modification and removal of such installations that address public safety, scenic, natural and historic resources and provide adequate financial assurance for the eventual decommissioning of such installations.

The provisions set forth in this section shall apply to the construction, operation, and/or repair of large-scale ground-mounted solar photovoltaic installations (LSGMSPI).

20.1 Applicability

This bylaw applies to large-scale (minimum 250kW rated nameplate capacity) ground-mounted solar photovoltaic installations proposed to be constructed after the effective date of this section. This section also pertains to physical modifications that materially alter the type, configuration, or size of these installations or related equipment. The requirements of this bylaw shall apply to a solar photovoltaic installation regardless of whether it is the primary use of the property or an accessory use.

This bylaw is not intended to regulate systems of less than 250kW or roof mounted systems.

20.2 Definitions

As-of Right Siting: As-of Right Siting shall mean that development may proceed without the need for a special permit, variance, amendment, waiver, or other discretionary approval. As-of-Right development shall be subject to site plan review to determine conformance with section 12.6 of the Saugus Zoning Bylaw as well as Section 3.4 below.

Building Inspector: The Inspector of Buildings, by the Saugus Zoning Bylaw, charged with the enforcement of the zoning bylaw.

Building Permit: A construction permit issued by the Building Inspector; the building permit evidences that the project is consistent with the state and federal building codes as well as Saugus Zoning Bylaws, including those governing ground-mounted large-scale photovoltaic installations.

Designated locations: The locations designated by this bylaw, in accordance with M.G.L. Chapter 40A, section 5, where ground-mounted large scale solar photovoltaic installations may be sited as-of-right. Said locations are shown on Zoning Maps titled; “Route 107 Overlay-Large-Scale Ground Mounted Solar Photovoltaic Installations Overlay District, Dated March, 2014” prepared by the MAPC, and “DPW Overlay- Large- Scale Ground Mounted Solar Photovoltaic Installations Overlay District Dated March, 2014” prepared by the MAPC, to designate the locations of the Large-Scale Ground Mounted Solar Photovoltaic Installations Overlay Districts, pursuant to M.G.L. 40A section 4. These maps are hereby made a part of this Zoning Bylaw and are on file in the Office of the Town Clerk.

Large-Scale Ground-Mounted Solar Photovoltaic Installation: A solar photovoltaic system that is structurally mounted on the ground and is not roof-mounted, and has a minimum nameplate capacity of 250 kW DC.

On-Site Solar Photovoltaic Installation: A solar photovoltaic installation that is constructed at a location where other uses of the underlying property occur.

Rated Nameplate Capacity: The maximum rated output of electric power production of the Photovoltaic system is Direct Current (DC).

Site Plan Review: review by the Site Plan review Authority to determine conformance with Saugus zoning ordinance.

Site Plan Review Authority: For purposes of this bylaw, Site Plan Review Authority refers to the Saugus Planning Board.

Zoning Enforcement Authority: The Building Inspector is the Zoning Enforcement Authority for Saugus

20.3 General Requirements for all Large Scale Solar Power Generation Installations

The following requirements are common to all solar photovoltaic installations to be sited in designated locations.

20.3.1 Compliance with Laws, Ordinances and Regulations

The construction and operation of all large scale photovoltaic installations shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable environmental, safety, construction, electrical, and communications requirements. All buildings and fixtures forming part of a solar photovoltaic installation shall be constructed in accordance with the State Building Code.

All requirements of the underlying zoning district(s) shall remain in effect except where these regulations supersede or provide an alternative to such requirements. If the provisions of this bylaw are in conflict with any other section of the Saugus Zoning Bylaw, the regulations of the LSGMSPIOD shall govern.

20.3.2 Building Permit and Building Inspection

No large scale solar photovoltaic installation shall be constructed, installed or, modified as provided in this section without first obtaining a building permit.

20.3.3 Fees

The application for a building permit for a large scale solar photovoltaic installation must be accompanied by the fee required for a building permit.

20.4 Site Plan Review

The construction, installation or modification of large scale solar photovoltaic installations shall be subject to site plan review by the Planning Board in accordance with this bylaw. Together with the requirements of Section 12.6 of the Saugus Zoning Bylaw (Site Plan Review), the site plan review authority shall consider and apply the requirements set forth in this bylaw in reviewing and deciding an application for site plan approval. If the provisions of Site Plan Review under this bylaw are in conflict with the Site Plan Review (Section 12.6) of the Saugus Zoning Bylaw, the regulations pertaining to Site Plan Review of the LSGMSPIOD shall apply.

The Planning Board may impose reasonable terms and conditions on the construction, installation or modification of large scale photovoltaic installations, but it shall not have discretionary power to deny the use. The Planning Board shall grant approval with reasonable condition unless, despite best efforts, no form of reasonable conditions can be devised to satisfy the problem with the plan.

20.4.1 Required Documents

Pursuant to the site plan review process, the project proponent of a Large-Scale Ground-Mounted Solar Photovoltaic Installation shall provide the following documents in addition to the requirements of Site Plan Review, Section 12.6, of the Saugus Zoning Bylaw:

- a) Blueprints or drawings of the solar photovoltaic installation signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts showing the proposed layout of the system and any potential shading from nearby structures;

- b) One or three line electrical diagram detailing the solar photovoltaic installation, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and overcurrent devices;
- c) Documentation of the major system components to be used, including the PV panels, mounting system, and inverter;
- d) Name, address, and contact information for proposed system installer;
- e) Name, address, phone number and signature of any agents representing the project proponent, as well as all co-proponents or property owners, if any;
- f) The name, contact information and signature of any agents representing the project proponent;
- g) Documentation of actual or prospective access and control of the project site (see also Section 3.5);
- h) An operation and maintenance plan (see also Section 20.6);
- i) Zoning district designation for the parcel(s) of land comprising the project site (submission of a copy of the zoning map with the parcel(s) identified is suitable for this purpose);
- j) Proof of liability insurance; and
- k) Description of financial surety that satisfies Section 20.12.3

Upon receipt of an application for site plan review, the Planning Board may engage at the applicant's cost professional and technical consultants including legal counsel to assist with its review of the application in accordance with the requirements of Section 53G of Chapter 44 of the Massachusetts General Laws. The Planning Board may direct the applicant to deposit funds with the Planning Board for such review at the time the application is accepted and to add additional funds as needed upon notice. Failure to comply with this section shall be grounds for denying the application. Any excess amount in the account attributable to that project, including any interest accrued, shall be repaid to the applicant per their written request.

The Site Plan Review Authority may waive documentary requirements as it deems appropriate.

20.5 Site Control

The project proponent shall submit documentation of actual or prospective access and control of the project site sufficient to allow for construction and operation of the proposed solar photovoltaic installation.

20.6 Operation & Maintenance Plan

The project proponent shall submit a plan for the operation and maintenance of the large-scale ground-mounted solar photovoltaic installation, which shall include measures for maintaining

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safe access to the installation, storm water controls, as well as general procedures for operational maintenance of the installation.

20.7 Utility Notification

No large- scale ground – mounted solar photovoltaic installation shall be constructed until evidence has been given to the Site Plan Review Authority that the utility company that operates the electrical grid where the installation is to be located has been informed of the solar photovoltaic installation owner or operator’s intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

20.8 Dimension and Density Requirements

20.8.1 Setbacks, lot frontage, height

For large-scale ground-mounted solar photovoltaic installations, minimum lot frontage, minimum front, side and rear setbacks, maximum height, and maximum stories shall be the same as required in the Industrial 1 (I1) zoning district-Table of Dimensional and Density Regulations, Saugus Zoning Bylaw Section 6.8-Other General Dimensional and Density Provisions and accompanying footnotes.

20.8.2 Minimum building lot area coverage

The minimum lot areas shall be the same as required in the Industrial 1 (I1) zoning district.

20.8.3 Maximum Building Area

Maximum building area coverage shall be 85%.

20.8.4 Appurtenant Structures

All appurtenant structures to large- scale ground-mounted solar photovoltaic installations shall be subject to reasonable regulations concerning the bulk and height of structures, lot area, setbacks, open space, parking and building coverage requirements. All such appurtenant structures, including but not limited to, equipment shelters, storage facilities, transformers, and substations, shall be architecturally compatible with each other. Whenever reasonable, structures should be shaded from view by vegetation and/or joined or clustered to avoid adverse visual impacts.

20.9 Design Standards

20.9.1 Lighting

Lighting of solar photovoltaic installations shall be consistent with local, state and federal law. Lighting of other parts of the installation, such as appurtenant structures, shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties. Where feasible, lighting of the solar photovoltaic installation shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.

20.9.2 Signage

Signs on large-scale ground-mounted solar photovoltaic installations shall comply with the Town of Saugus sign by law. A sign consistent with the Town’s sign bylaw shall be required to identify the owner and provide a 24-hour emergency contact phone number.

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Solar photovoltaic installations shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the solar photovoltaic installation.

20.9.3 Glare

Solar panels, to the maximum extent feasible, shall be positioned and landscaped so as not to create glare and minimize glare on surrounding occupied structures.

20.9.3 Utility Connections

Reasonable efforts, as determined by the Site Plan Review Authority, shall be made to place all utility connections from the solar photovoltaic installation underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Electrical transformers for utility interconnections may be above ground if required by the utility provider.

20.10 Safety and Environmental Standards

20.10.1 Emergency Services

The large scale photovoltaic installation owner or operator shall provide a copy of the project summary, electrical schematic, and site plan to the local fire chief. Upon request the owner or operator shall cooperate with local emergency services in developing an emergency response plan. All means of shutting down the solar photovoltaic installation shall be clearly marked. The owner or operator shall identify a responsible person for public inquires throughout the life of the installation.

20.10.2 Land Clearing, Soil Erosion, Habitat Impacts and landscaping

A landscaping plan shall be submitted detailing all proposed changes to the landscape of the site, including temporary or permanent roads or driveways, grading, vegetation clearing, planting, screening, vegetation, and lighting. Clearing of natural vegetation shall be limited to what is necessary for the construction, operation, and maintenance of the large – scale ground-mounted solar photovoltaic installation or otherwise prescribed by applicable laws, regulations, and bylaws.

20.11 Monitoring and Maintenance

20.11.1 Solar Photovoltaic Installation Conditions

The large – scale ground-mounded solar photovoltaic installation owner or operator shall Maintain the facility in good condition. Maintenance shall include, but not be limited to, painting, structural repairs, and integrity of security measures. Site access shall be maintained to a level acceptable to the local Fire Chief and Emergency Medical Services. The owner or operator shall be responsible for the cost of maintaining the solar photovoltaic installation and any access road(s), unless accepted as a public way.

20.11.2 Modifications

All material modifications to a solar photovoltaic installation made after issuance of the required building permit shall require approval by the Site Plan Review Authority.

20.12 Abandonment or Decommissioning

20.12.1 Removal Requirements

Any large –scale ground-mounted solar photovoltaic installation which has reached the end of its useful life or has been abandoned consistent with Section 3.12.2 of this bylaw shall be removed. The owner or operator shall physically remove the installation no more than 150 days after the date of discontinued operations. The owner or operator shall notify the Building Inspector by certified mail of the proposed date of discontinued operations and plans for removal. Decommissioning shall consist of:

- (a) Physical removal of all large-scale ground-mounted solar photovoltaic installations, structures, equipment, security barriers and transmission lines from the site.
- (b) Disposal of all solid and hazardous waste in accordance with the local, state, and federal waste disposal regulations.
- (c) Stabilization or re-vegetation of the site as necessary to minimize erosion. The Site Plan Review Authority may allow the owner or operator to leave landscaping or designated below-grade foundations in order to minimize erosion and disruption to vegetation.

20.12.2 Abandonment

Absent notice of a proposed date of decommissioning or written notice of extenuating circumstances, the solar photovoltaic installation shall be considered abandoned when it fails to operate for more than one year without the written consent of the Building Inspector. If the owner or operator of the large- scale ground-mounted solar photovoltaic installation fails to remove the installation in accordance with the requirements of this Section within 150 days of abandonment or the proposed date of decommissioning, the town may enter the property and physically remove the installation.

20.12.3 Financial Surety

Proponents of large-scale ground-mounted solar photovoltaic projects shall provide a form of surety, either through escrow account, bond or otherwise, to cover the cost of removal in the event the town must remove the installation and remediate the landscape, in an amount and form determined to be reasonable by the Site Plan Review Authority, but in no event exceed more than 125 percent of the cost of removal and compliance with the additional requirements set forth herein, as determined by the project proponent. Such surety will not be required for municipally- or state-owned facilities. The project proponent shall submit a fully inclusive estimate of the costs associated with removal, prepared by a qualified engineer. The amount shall include a mechanism for calculating increased removal costs due to inflation.

Appendix 2 – MAPC Toolkit

Guide to Streamlining the Solar PV Permitting Process and Developing Supportive Zoning Bylaws

Introduction

Increasing Solar Use Across Massachusetts

Since 2010, the cost of solar panels has decreased over 50%¹ while energy costs have continued to rise.² As a result, solar energy has become a desirable option for many homeowners, municipalities, commercial entities, and industrial facilities searching for price stability and eco-friendly energy sources. Increased use of solar energy fosters reduced carbon emissions, better air quality, greater energy resilience, and lower energy costs for consumers. However, permitting for the installation of rooftop and ground-mounted photovoltaic (PV) systems can be expensive, complex, and time-consuming; and inconsistencies among permitting processes and local regulations throughout the Commonwealth can be prohibitively challenging for installers who work in multiple communities.

The goal of this guide is to equip municipal permitting and zoning offices with best practices to facilitate and encourage the development of solar photovoltaic systems in the Commonwealth. Municipalities can implement the practices that make the most sense for their structure and capacity. Ultimately, regional consistency in PV permitting and zoning regulations will reduce the time and costs associated with solar and attract more highly-skilled developers to all parts of Massachusetts. In turn, municipal, residential, and business consumers will have more choices when considering solar energy systems and will have access to lower prices for a clean, stable form of energy for their homes and facilities.

¹ SEIA and GTM Quarterly Report Q1 2013

² <http://www.eia.gov/forecasts/steo/report/electricity.cfm>

Contributing to the Growth of Solar PV Adoption: Fraunhofer CSE's Plug and Play PV System

Fraunhofer's revolutionary Plug and Play PV System strives to simplify installation of solar PV and create more user-friendly systems, so that consumers are encouraged and empowered to install solar on their homes. Still in the demonstration phase, this effort to accelerate the deployment of residential PV will only be enhanced by cities and towns' adoption of helpful permitting and zoning measures that support solar PV expansion.

Source: <http://cse.fraunhofer.org/pnp/project>

Why Change Existing Solar Permitting and Zoning Policies?

Opportunities

Demand for PV systems, both ground-mounted and rooftop, is expected to rise as the price of panels continues to decrease.³ This trend offers municipalities a tremendous opportunity to harness the social, economic, and ecological benefits of solar technology. Reducing the time, money, and effort needed to undertake and execute permitting for a solar project is a low-cost way to promote the expansion of solar energy in a community.

Cities and towns across Massachusetts have begun to recognize the importance of adopting zoning bylaws for solar so that local regulations are clearly presented and disputes are minimized. By having solar zoning bylaws in place, municipalities can create an encouraging environment and reduce siting challenges that often result from the absence of zoning specifications for solar energy systems.⁴ As-of-right siting of solar installations, as modeled by the Department of Energy Resources' (DOER) Green Communities program,⁵ is one important provision in solar bylaws that prohibits the requirement of special permits for renewable projects. This feature allows any installation that meets the solar overlay bylaw's requirements to receive approval, reducing

³ SEIA and GTM Quarterly Report Q1 2013

⁴ <http://www.bostonglobe.com/metro/regionals/south/2013/05/04/solar-farm-projects-hit-roadblocks-some-communities-solar-projects-meet-resistance-locally/jUFUAxSZEpK4swEcCa9hPM/story.html>

⁵ <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/solar-model-bylaw.pdf> and <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/criterion-2-guidance-2013.pdf>

uncertainty and risk. Criterion 1 of the Green Communities program requires the use of As-of-Right Siting to remove barriers to installation, and Criterion 2 builds on that by directing municipalities to expedite permitting processes for renewable energy systems that have been developed under as-of-right siting.

The Soft Cost Factor: Time and Money

The National Renewable Energy Laboratory (NREL) reports that soft costs are now the largest cost of a solar installation.⁶ NREL defines soft costs as those that are not directly affiliated with physical construction; examples include drafting, permitting, and inspection costs. Nationally, soft costs account for 64% of residential, 52% of small commercial, and 57% of large commercial solar installation costs.⁷ Permitting and inspection fees range nationally from \$0 to over \$2,500.⁸

In addition to application costs, permit approval time can be a significant barrier. In the United States, the 126-day average wait time to get a solar permit approved and panels installed is much longer than the average of 35 days in Germany.⁹ A long wait-time from application to installation can be dissuasive to even the most ardent clean energy supporter.

Streamlining and shortening the permitting process will not only reduce the time that homeowners and developers wait for a permit, but it will also reduce the time that municipal employees spend on administering the permitting process. U.S. municipalities spend an average of 14.5 hours reading and approving each solar installation permit while German municipalities spend an average of 20 minutes.¹⁰

Small Changes, Big Impact

The Department of Energy Resources' Green Communities program requires expedited permitting¹¹ to enable interested parties to install renewable energy generation systems, including PV systems, from start to finish in less than 1 year. However, governments across the state and country have utilized best practices to reduce that time from one year to less than 60 days.¹² For example, the Town of Harvard was able to reduce the steps needed

⁶ <http://www.nrel.gov/news/press/2013/5306.html>

⁷ <http://www.midwestenergynews.com/2013/12/04/soft-costs-grow-as-portion-of-the-price-for-solar-power/>

⁸ http://energy.gov/sites/prod/files/2014/01/f6/sunshot_webinar_20130226.pdf

⁹ <http://emp.lbl.gov/sites/all/files/german-us-pv-price-ppt.pdf>

¹⁰ <http://emp.lbl.gov/sites/all/files/german-us-pv-price-ppt.pdf>

¹¹ <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/criterion-2-guidance-2013.pdf>

¹² http://projectpermit.org/wp-content/uploads/2013/04/Expanded-Best-Practices-7.23.13_VSI.pdf

for permitting by consolidating two required documents, the electrical permit application and the building permit application, into one form.¹³

Municipalities have the opportunity to make a big impact on the solar market by simplifying the solar permitting process. With cheaper and easier permitting procedures, a greater number of qualified solar installers will be able to participate in meeting solar demand. This will provide homeowners, municipalities, and commercial and industrial facilities with greater choice and decrease the time before installation can begin.

Best Practices to Encourage Solar Development in Massachusetts

1. Conduct a Permitting and Zoning Bylaws Audit

Conduct an audit of your municipalities' zoning regulations and permitting procedures to identify inconsistencies and inefficiencies in the permitting process and to eliminate excessive reviews and inspections of PV systems. Processes that do little to ensure public health and wellbeing should be eliminated. A streamlined process will reduce unnecessary costs and expedite permit issuance.

Questions to Ask in an Audit of Zoning Bylaws

Asking questions during the audit such as “can a person unfamiliar with the permitting process easily understand the types of documents required to apply?” or “is solar permitting information listed on our website easy to find?” can help to expose parts of the process that are unclear or unnecessarily complex.

2. Develop/Amend Solar Zoning Bylaws to Expedite PV Installations

As Solar PV installations have seen tremendous growth over the last few years, it is important to ensure that these systems can continue expansion and are supported in local

¹³ <http://www.mass.gov/eea/docs/doer/renewables/solar/recommended-model-permitting.pdf>

regulations throughout Massachusetts. Municipalities can encourage the adoption of solar energy systems by setting in place bylaws that help eliminate barriers and reduce uncertainties in zoning requirements. Zoning Bylaws and Ordinances are the most appropriate mechanism for regulating solar PV, because solar energy systems are recognized as a type of land use. This statutory language can be found in Chapter 40A.

Updating Zoning Bylaws: Easton, MA

The Town of Easton's Planning and Zoning Board examined its zoning bylaws and determined it would need to update its bylaws in order to allow ground-mounted solar facilities at certain sites. The Board held several Zoning Subcommittee meetings and a public hearing beginning in the Spring of 2011, and by May of 2011, the updates to the zoning bylaws were approved at Town Meeting.

Source: http://www.easton.ma.us/departments/planning_and_community_development/click_here.php

Solar Zoning Bylaws: Cambridge, Saugus, and Framingham

These municipalities have developed zoning bylaws that encourage solar PV installations at the local level by providing guidelines to ease the planning and development of new projects.

City of Cambridge (population > 105,000):

http://www.cambridgema.gov/~media/Files/CDD/ZoningDevel/Ordinance/zo_article22_1359.ashx

Town of Saugus (population > 26,000):

<http://www.saugus-ma.gov/Pages/FV1-0002421A/FV1-0004CF7D/Econ%20Deve%20Saugus%20solar%20overlay%20district%202-26-14%20%283%29.pdf>

Town of Framingham (population > 68,000):

<http://www.framinghamma.gov/DocumentCenter/View/15505> (p. 61)

DOER published a model zoning document in December 2014. This document updates the Department's effort to supply municipalities with a template from which they can adopt new bylaws to make solar PV regulations more clear and aligned with other municipalities across the state. The *"Model As-of-Right Zoning Bylaw: Allowing Use of Large-Scale*

*Ground-Mounted Solar Photovoltaic Installations*¹⁴ and *“Policy Guidance for Regulating Solar Energy Systems”*¹⁵ guides apply to all solar energy systems at various scales.

The model zoning language should be adjusted to meet the needs of each municipality, and the draft language should be reviewed by municipal counsel before formal adoption.

3. Provide Permitting Checklists

Provide a clear checklist to guide site owners, solar installers, and other participants through the solar PV permitting process. This will reduce errors and inefficiencies while minimizing permit submission and approval time. Additionally, a checklist can reduce the amount of time that permitting staff must spend on fielding questions from applicants, which may free up time for them to handle other tasks.

Permitting Checklists: Harvard, MA

In addition to making relevant permitting information available online in the form of a PDF, the town of Harvard, MA, includes an application checklist and estimated timeline as part of its solar building permit application.

Source: http://www.harvard.ma.us/Pages/HarvardMA_Building/Solar%20Permit%20Application.pdf

4. Utilize Narrow Inspection Time Windows

To promote the health and safety of the community, municipalities typically require the inspection of solar installations. Post-installation inspection windows can be as long as 8 hours, leading to frustration from site owners and developers who must wait on site, often missing other employment opportunities and increasing labor costs. Require inspections to occur within a narrow timeframe, for example within a 2 to 3 hour block, in order to reduce both consumer and contractor costs.

¹⁴ <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/model-solar-zoning.pdf>

¹⁵ <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/model-solar-zoning-guidance.pdf>

Limited Inspection Time Windows: San Jose, CA

The City of San Jose, California, schedules post-installation inspections within a 2-hour time block to increase productivity and decrease wait time for contractors.

Source: <http://sanjoseca.gov/DocumentCenter/View/21882>

5. Develop a Permitting Website

Build a website dedicated to solar permitting. A dedicated website can create an easily accessible space for developers and homeowners to find up-to-date resources, track the progress of permits, and increase their understanding of the process. Hosting permitting materials online allows applicants to begin the permitting process at home or in the office, saving time and costly trips to permitting offices. Moreover, online materials further diminish the time that municipal staff must spend fielding questions in-person.

Permitting Websites: Cambridge, MA

On its Community Development Department website, the City of Cambridge posted a comprehensive guide to solar permitting. This PDF walks applicants through each step of the online permitting process with screen-shot visualizations and narrative text. The Cambridge solar permitting brochure contains an application checklist, a guide on how to identify whether your installation will require a special permit, and examples of what required reports and documents should include.

Source: <http://www.cambridgema.gov/cdd/~media/382D911FDEB34A1DAE5D15D8B893E66A.ashx>

6. Offer Online Permitting

Allow the submission, payment, review, and printing of applications to reside online in order to eliminate the burden of travel to permit offices and ensure consistency in application format. A standardized online template lessens opportunities for user error and expedites turnaround time.

Online Permitting: Boston, MA

In addition to posting a comprehensive handbook for solar permitting on its website, Boston offers short-form building permits for residential buildings with three or fewer units; this process can be completed entirely online and has a same-day turnaround. Commercial and industrial facilities and residential buildings with more than three units can have their permits processed online usually in no more than seven days.

Source: https://www.cityofboston.gov/images_documents/SolarPermittingBrochureHZEv4_tcm3-37565.pdf

7. Explore Options for Permitting Fees

Permitting fees are a significant part of the cost associated with installing a solar PV system. In order to create a solar market that is more attractive to site owners and developers, municipalities should consider ways in which they can reduce permitting costs. For example, they could:

- **Eliminate permitting fees** for solar development. This option increases the accessibility of solar by removing a cost barrier. Note that it also reduces revenue gained in the permitting process.
- **Cap permitting costs** to allow residents greater flexibility in choosing the size of their solar system. Residents may choose to install a larger system without increased costs due to permitting.
- **Tie the permitting fee directly to the processing time.** List a clear pricing schedule for varying system sizes and consider creating a separate fee schedule for expedited permitting if resources allow.
- **Base the permit fee on PV installer labor costs,** creating an easy-to-use and transparent system by which fees are calculated. For example, permitting offices may choose to charge a permitting fee equal to a percentage of the labor costs associated with installing the PV system.

Permitting Fees: Canton, MA

The town of Canton, MA, sets their photovoltaic permitting fee at \$50 plus 2% of the value of the installation labor. The electrical inspector reserves the right to establish a fair market value of work or request to view the contract in order to calculate the appropriate permitting fee. Choosing to utilize a hybrid fee structure gives Canton the flexibility to retain a minimum level of revenue from permitting while creating a fee schedule that logically scales with the size of the PV system.

Source: <http://www.town.canton.ma.us/189/Fee-Schedules>

References and Resources

The California Center for Sustainable Energy & The Energy Policy Initiatives Center, USD School of Law. "Best Practices for Permitting Processes: Southern California Rooftop Solar Challenge." February 2013: <http://energycenter.org/sites/default/files/docs/nav/policy/research-and-reports/Permitting%20Best%20Practices%20web.pdf>

Issued by the City of Cambridge, MA. Solar Permitting Handbook. http://www.cambridgema.gov/cdd/~/_media/382D911FDEB34A1DAE5D15D8B893E66A.ashx

Cusick, Daniel. "'Soft Costs' Grow as Portion of the Price for Solar Power" Midwest Energy news. December 2013. <http://www.midwestenergynews.com/2013/12/04/soft-costs-grow-as-portion-of-the-price-for-solar-power/>

Massachusetts Department of Energy Resources. "Model Zoning for Regulation of Solar Energy Systems." December 2014. <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/model-solar-zoning.pdf>

Massachusetts Department of Energy Resources. "Policy Guidance for Regulating Solar Energy Systems." March 2014. <http://www.mass.gov/eea/docs/doer/green-communities/grant-program/model-solar-zoning-guidance.pdf>

Interstate Renewable Energy Council. "Streamlining the Solar Permitting Process." February 2013 http://votesolar.org/wp-content/uploads/2013/02/Solar-Permitting-Best-Practices_Feb2013.pdf

Interstate Renewable Energy Council. "Solar Permitting Process Checklists." April, 2013 <http://www.irecusa.org/2013/04/solar-permitting-process-checklists-and-best-practices-two-new-helpful-resources-for-local-governments-from-irec-and-vote-solar/>

National Renewable Energy Laboratory. "NREL Reports Soft Costs Now Largest Piece of Solar Installation Cost." Press Release. December, 2013. <http://www.nrel.gov/news/press/2013/5306.html>

National Renewable Energy Laboratory. "Permitting Best Practices Make Installing Solar Easier." <http://www.nrel.gov/docs/fy13osti/57104.pdf>

City of San Jose. Regulation on the Permitting, Fees and Inspection of Solar in San Jose, October, 2013. <http://sanjoseca.gov/DocumentCenter/View/21882>

Seel, Joachim, Galen Barbose and Ryan Wiser. "Why are Residential PV Prices in Germany so Much Lower Than in the United States?" Lawrence Berkley National Laboratory and the U.S. Department of Energy. February 2013. <http://emp.lbl.gov/sites/all/files/german-us-pv-price-ppt.pdf> Solar Energy Industries Association. "U.S. Solar Market Insight." Q1 2013 <http://www.seia.org/research-resources/us-solar-market-insight>

U.S. Energy Information Administration. "Short Term Energy Outlook." July, 2014. <http://www.eia.gov/forecasts/steo/report/electricity.cfm>

The Vote Solar Initiative. "Project Permit." June 2014: <http://projectpermit.org/#muni=694>