

Policy Guidance for Regulating Solar Energy Systems¹
Department of Energy Resources
Massachusetts Executive Office of Energy and Environmental Affairs
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*This Guidance, along with the companion **Model Zoning for the Regulation of Solar Energy System**, was prepared by a consultant hired by the Massachusetts Department of Energy Resources (DOER) to assist cities and towns throughout Massachusetts in establishing reasonable standards to facilitate development of small-, medium- and large-scale ground-mounted and roof-mounted solar energy systems.² **DOER acknowledges that this Guidance represents our own understanding of state law and has made every effort to carefully research this issue. While DOER believes our interpretation is reasonable, we anticipate that local municipal counsel may offer a different interpretation and that communities will need to consider these alternatives moving forward. It is highly recommended that any local regulatory language developed from this Guidance be reviewed by municipal counsel prior to adoption.***

The Problem

Today, people are searching more than ever for ways to cut their personal energy consumption costs. More broadly, as awareness of problems associated with greenhouse gas (GHG) emissions continues to increase, there is more demand for locally-based renewable energy sources as alternatives to burning imported fossil fuels. Small-, medium- and large-scale ground-mounted and roof-mounted solar energy systems, both photovoltaic and solar thermal, are increasing in popularity across the state and are proving to be a viable source of renewable energy.³ As the installation of these systems has become more widespread, local officials are asking how or whether these systems should be regulated. Can we regulate height, aesthetics, or

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² This material was prepared by the Horsley Witten Group.

³ For the purposes of this guidance, large-scale ground-mounted solar energy systems are those that are at least 40,000 square feet in area or over 250 kW of energy production. DOER chose this threshold because solar energy systems larger than this size would often be a primary use (i.e., power generation), rather than accessory to a home or other use. The model zoning associated with this guidance further defines small-scale systems as those that occupy 1,750 square feet of surface area or less (equivalent to a rated nameplate capacity of about 10kW) and medium-scale systems as those that occupy more than 1,750 but less than 40,000 square feet of surface area (equivalent to a rated nameplate capacity of 10-250 kW). For the purposes of local regulation, communities may want to change the dividing line between what they call “small”, “medium”, or “large” systems depending on local conditions and opportunities.

other design elements? Is this a matter for zoning or a general bylaw? Is there any relevant case law? What do state statutes say on the matter?

With any discussion of local regulation, this last question is paramount. The following sections provide an overview of the statutes in Massachusetts relative to this issue and how these affect the ability of local governments to regulate small-, medium- and large-scale ground-mounted and roof-mounted solar energy systems.

The Statutes

Massachusetts General Laws (M.G.L.) are unique in their treatment of solar energy systems and provide specific reference to this issue in four places:

[Chapter 40A Section 3](#)

This section of M.G.L. addresses “[s]ubjects which zoning may not regulate...” As this language suggests, this section of the statute describes several uses that cannot be regulated in the same manner as typical residential, commercial, or other uses. For example, limits on the ability to regulate religious uses, agricultural uses, and day-care operations are included in this section of the statute. Paragraph 9 of this section addresses solar energy systems as follows:

No zoning ordinance or by-law shall prohibit or unreasonably regulate the installation of solar energy systems or the building of structures that facilitate the collection of solar energy, except where necessary to protect the public health, safety or welfare.

[Chapter 40A Section 9B](#)

This section of Chapter 40A is entitled “Solar access” and addresses two separate issues. The first paragraph allows communities to use their Zoning Bylaw/Ordinance to establish districts that would protect solar access through a variety of standards including limitations on building height, requirements for planting and pruning, orientation of buildings and streets, and several other similar items. These standards would either optimize exposure to the sun through design techniques, or limit shading in a way that also protects solar access through various design and maintenance strategies.

The second paragraph of Section 9B provides for the ability to use a Special Permit process to impose restrictions on neighboring properties for the purposes of protecting access to sunlight. In accordance with this statutory provision, a Special Permit may be granted to establish an involuntary easement over neighboring properties restricting the growing of vegetation or other activities that would qualify as an “impermissible interference” with solar access.

[Chapter 187 Section 1A](#)

Chapter 187 of M.G.L is entitled “Easements” and provides the statutory framework for any easement used to protect solar access. Specifically, this section states the following:

Any instrument creating a solar easement may include, but the contents are not limited to, all of the following:

(1) A description of the dimensions of the easement expressed in measurable terms, such as vertical or horizontal angles measured in degrees, or the hours of the day on specified dates during which direct sunlight to a specified surface of a solar collector, device, or structural design feature may not be obstructed, or a combination of these descriptions.

(2) The restrictions placed upon vegetation, structures, and other objects which would impair or obstruct the passage of sunlight through the easement.

(3) The amount, if any, of permissible obstruction of the passage of sunlight through the easement, expressed in measurable terms, such as a specific percentage of sunlight that may be obstructed.

(4) The provisions for trimming vegetation that would impermissibly obstruct the passage of sunlight through the easement including any compensation for trimming expenses.

(5) Any provisions for compensation of the owner of property benefiting from the easement in the event of impermissible obstruction of the easement.

(6) The terms or conditions, if any, under which the easement may be revised or terminated.

[Chapter 40C](#)

This section of M.G.L. is called “*Historic Districts*” and covers all of the provisions related to establishing these special protective areas. Solar energy systems are mentioned specifically under Section 7 where it reads:

When ruling on applications for certificates of appropriateness for solar energy systems, as defined in section one A of chapter forty A, the commission shall also consider the policy of the commonwealth to encourage the use of solar energy systems and to protect solar access.

Understanding the Statutes

Chapter 40A Section 3

In Chapter 40A Section 3 special protections are provided for solar energy systems similar to those provided for child-care facilities, religious uses, etc.⁴ However, this paragraph is more concise than those for other protected uses, and the limitation to not “prohibit or unreasonably regulate” is qualified by the simple statement that such regulation can only occur “to protect the public health, safety, or welfare.” These terms are not further defined in the statute in a manner that provides more detailed guidance to municipalities. Furthermore, to date, no court has had occasion to review the portion of Section 3 relevant to solar energy systems and case law pertaining to other portions of Section 3 is of limited applicability. This makes it even more challenging to find any legal frame of reference for how these protections limit local zoning authority.

Nevertheless, it is possible to identify several important points that will help to frame local regulation of small-, medium- and large-scale ground-mounted and roof-mounted solar energy systems.

- 1) *Zoning Bylaw/Ordinance versus General Bylaw/Ordinance.* First, solar energy systems are type of land use. Also, because the statutory language that addresses solar energy systems is found primarily under Chapter 40A, and this section addresses zoning, the Zoning Bylaw/Ordinance is the appropriate place to regulate these systems.
- 2) *Zoning Bylaws/Ordinances and the State Building Code.* Chapter 40A Section 3 also includes the following exemption language “No zoning ordinance or bylaw shall regulate or restrict the use of materials, or methods of construction of structures regulated by the state building code...” The model zoning that accompanies this Guidance has been carefully drafted to abide by this provision of state statute. Communities adapting this model zoning should be similarly cautious to avoid adopting requirements that are precluded by statute as they are already addressed in the Building Code.
- 3) *Allowable Use.* In DOER’s interpretation, roof-mounted and small- and medium-scale ground-mounted solar energy systems cannot be prohibited as a use within a Zoning Bylaw/Ordinance. Because Special Permits explicitly provide the option to deny an application, the Special Permit process is not a viable choice for regulating these systems. It is DOER’s further interpretation that roof-mounted and small- and medium-scale ground-mounted solar energy systems must be allowed by-right in order to comply with Chapter 40A Section 3. A municipality may review these systems as part of Site Plan Review (see “Unreasonable Regulation” below).

⁴ These protections are provided in the 9th paragraph of Section 3 of Chapter 40A. For ease, this document refers generally to Section 3 throughout.

Regarding large-scale ground-mounted solar energy systems, DOER is unable to provide a definitive interpretation of unreasonable regulation under Chapter 40A Section 3. As drafted, the model zoning accompanying this Guidance allows large-scale ground-mounted solar energy systems in most zoning districts via Site Plan Review. It prohibits such systems in one residential district and allows them upon issuance of a special permit in another residential district. This approach recognizes that some communities presently require a Special Permit to install a large-scale ground-mounted solar energy system, and/or restrict such facilities to certain districts. Given the plain language of the statute, DOER believes that it is prudent for communities to allow large-scale ground-mounted solar energy systems somewhere in the community. At the same time, these systems are by definition large, even if they have relatively benign impacts compared to other land uses. Thus, a higher degree of municipal control over the location and permitting of such systems may not be inconsistent with the Chapter 40A Section 3 mandate that regulations be reasonable and necessary to protect public health, safety, or welfare.

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- 4) *Unreasonable Regulation.* A Zoning Bylaw/Ordinance may provide performance standards for the installation of small-, medium- and large-scale ground-mounted and roof-mounted solar energy systems, which can be reviewed by the Zoning Enforcement Officer or through Site Plan Review. However, if the application of these standards would effectively preclude the installation from happening, this could violate state law unless the protection of “public health, safety or welfare” is being advanced.

Chapter 40A Section 9B and Chapter 187 Section 1A

With regard to the first paragraph of Section 9B, communities across the country have already incorporated standards or incentives for orientation of buildings and streets in a manner that optimizes solar exposure. Much of the language developed at the local level has used standards within the [Leadership in Energy and Environmental Design](#) (LEED) system as a starting point.

Commentary: It should also be noted that orientation of streets is generally regulated through local subdivision rules and regulations as enabled by M.G.L. Chapter 41 Sections [81M](#) and [81Q](#). Among other things, the purpose of the subdivision control law is to protect the safety, convenience and welfare of the inhabitants of cities and towns by regulating the laying out and construction of ways in subdivisions. Chapter 41 Section 81Q also states that the rules and regulations may encourage the use of solar energy systems and protect to the extent feasible the access to direct sunlight of solar energy systems.

Communities generally have two options with regard to street layout in subdivisions: they can either provide the required layout of the streets ahead of time; or they can require that the

applicant for a subdivision approval submit a proposed street layout design that optimizes exposure of future buildings to solar pathways. For example, when considering solar exposure, street layouts should maximize the distance of streets that stretch east-west (horizontally) and north-south (vertically), and minimize streets that run diagonally. This facilitates the placement of buildings with the longer axis stretching east-west while maintaining their orientation to the street. Streets oriented diagonally discourage actual south facing orientation to maximize solar energy harvesting.

With regard to the second paragraph of Section 9B, extensive research has yet to identify an instance in Massachusetts where a Special Permit was used specifically to establish a solar easement on a neighboring property. Nor has any district or overlay district been identified where this type of Special Permit is specifically offered. The challenge with trying to establish any such district or permit provision is the implication that one property owner could impose a restriction on another. Further, these restrictions would likely reduce the development potential of that neighboring property. Even with an extensive outreach process for the purposes of a zoning change, it is extremely difficult for property owners or the community as a whole to agree to a “down zoning” proposal. The prospect of town meeting or city council agreeing to establish zoning allowing this outside of a formal zoning change - through a permit application - while not impossible, seems unlikely.

While the mechanics of this statutory language may seem too controversial to overcome, it is important to understand the intent. The viability of solar energy systems depends on access to sunlight. If future development of neighboring buildings will preclude such access, then that viability will disappear. Furthermore, in discussions about other important design standards—stormwater management, sustainable landscaping, and passive techniques for energy savings—the use of tree plantings and preservation has become more of a prominent goal in site development. The goal, in many instances, is to create shade. While these techniques can be effective, they can certainly create conflicts where sunlight may be required on a neighboring property for solar energy systems.

Communities looking to foster opportunities for rooftop or ground-mounted facilities must consider the potential for these competing goals moving forward. While Chapter 40A Section 9B may be limited in its ability to resolve these conflicts, there are other techniques a community may consider to protect solar access.

Transfer of Development Rights (TDR). This technique might be applied in densely developed urban areas where the proximity and height of tall buildings could preclude the ability to install an effective solar energy system. Through incentives, a TDR program could be used to limit the height of a building to ensure sunlight exposure to another. These development rights could then be sold to another property where increasing the height will not cause any problems for adjacent property owners. Urban TDR programs that potentially transfer building height from one site to another can be found in Seattle, WA and Providence, RI.

Solar Mapping. One tool that can be used to help identify potential future impacts to solar access is the development of solar maps across a community. These maps are generally produced through a geographic information system (GIS) platform and could be part of a special project or a broader comprehensive planning effort. The maps often inventory existing rooftop and ground-mounted solar energy installations, but also show those sites or rooftops that have high solar energy producing potential based on their exposure to sunlight. These maps could be used to help guide permit review discussion or to identify properties that may be eligible for energy system incentives. Information on solar mapping can be found at:

- American Planning Association solar mapping site:
<http://www.planning.org/research/solar/briefingpapers/solarmapping.htm>
- Solar Boston: <http://gis.cityofboston.gov/SolarBoston/#>
- Cambridge, MA Solar Mapping Site by Mapdwell:
<http://en.mapdwell.com/cambridge>

Shadow Analyses. These analyses are becoming more common in local permit review and essentially show the path of shadows across parts of a site during different times of the year. For buildings on an applicant's property, these analyses can show whether rooftops or yards that could accommodate solar energy systems will (or will not) experience adequate sunlight exposure over time. With regard to neighboring properties, these analyses will demonstrate how proposed development could potentially impact existing roof-mounted or ground-mounted solar energy systems or those that could be installed in the future.

Special Permit Criteria. Communities could consider developing Special Permit decision criteria that will allow the permit granting authority to consider the potential impacts to solar access across property boundaries. When considering whether to grant a Special Permit for buildings that meet a certain size threshold, the following points could shape the decision:

- Whether proposed structures or landscaping will shade an existing solar energy system on an adjacent property; and/or
- Whether proposed structures or landscaping would shade an area identified on the city or town's Solar Map as having high potential for solar energy development.

Chapter 40C

In Chapter 40C Section 7, the language clearly states the need for Historic Commissions to consider the policies of the Commonwealth related to solar energy systems. When considering whether to issue a "certificate of appropriateness" for any development or renovation proposal, the Historic Commission should work to balance the goal of preserving historic buildings or neighborhoods with the Commonwealth's solar energy system protections. Reviewers can

consider the possibility of locating systems where they have limited or no visibility to the public and recommendations for certain materials can be explored. In many cases, this may not be a significant concern as most Local Historic Districts only regulate activity that is visible from a public way or water course.

Developing Local Zoning Bylaw/Ordinance Language

In order to integrate reasonable regulations into a local Zoning Bylaw/Ordinance, planners will need to consider a few important steps.

Outreach and Education

Because the statutory provisions associated with solar energy systems are unique in Massachusetts, any attempt to develop zoning for this issue should start with local outreach and education. This outreach effort should involve all zoning enforcement agents (e.g., building inspector, etc.) and permit granting authorities (e.g., Zoning Board of Appeals, Planning Board, etc.). Creating a shared understanding among local officials of the unique legal framework established by Massachusetts General Law will help to manage expectations of the community as a whole moving forward. Among the key non-government parties to involve are solar installers, as they have the most experience and a great deal at stake in the regulations.

One venue that is particularly conducive to this type of outreach and planning for alternative energy as a whole is in the development or update of a Master Plan. In developing this document, cities and towns will be able to identify opportunities for installing solar energy systems in conjunction with facilities improvements, agricultural preservation, the development of new subdivisions, and the piecemeal retrofitting of existing neighborhoods. Concurrent with planning for future opportunities, this process can also be used to educate local stakeholders in both the public and private sectors regarding the unique regulatory framework in Massachusetts. As an alternative, communities may want to do advance planning for alternative energy through other means such as the completion of a municipal energy plan or as part of a Green Communities Designation and Grant Program application. For more information on the Green Communities Designation and Grant Program, please visit: <http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/>.

Audit Your Existing Zoning Bylaw/Ordinance

Auditing the local Zoning Bylaw/Ordinance for the purposes of amending individual existing sections may be a more practical and effective approach than inserting large, stand-alone sections. Planners should closely review the full text of their Zoning Bylaw/Ordinance, including solar and other overlay districts, to see which sections will need to be altered. These sections could include, but would not be limited to the following:

- Definitions
- Allowable Uses
- Provisions for Site Plan Review (or Design Review)

- Dimensional Requirements

In addition, communities should be sure to review the design guidelines applicable to any existing Local Historic Districts.

More detailed discussion of how these sections of the Zoning Bylaw/Ordinance would be changed is provided in the accompanying model zoning document, *Model Zoning for the Regulation of Solar Energy Systems*.