Renewable Energy Ordinance Framework – Solar

Download Solar REOF as a Word document or pdf

DVRPC's Renewable Energy Ordinance Frameworks were developed by DVRPC's Alternative Energy Ordinance Working Group (AEOWG). The AEOWG brings together leadership from counties and municipalities in the Greater Philadelphia region to support the safe and sound development of small-scale renewable energy systems, including solar photovoltaic, small wind (<100kW), and geothermal. This working group is convened by DVRPC's Office of Energy and Climate Change Initiatives as a component of its effort to reduce energy consumption and greenhouse gas emissions in the region. This work is in line with DVRPC's Long-Range Plan, *Connections: The Regional Plan for a Sustainable Future*, which identifies "Build an Energy Efficient Economy" as one of the four key strategies critical to realizing a sustainable future for our region.

These Renewable Energy Ordinance Frameworks are intended to serve as a resource for municipalities as they develop and update ordinances to govern the siting of small-scale renewable energy systems in their community. Municipalities in the DVRPC region are increasingly faced with the task of regulating the installation of small-scale renewable energy systems. As energy costs rise, and state and federal incentives reduce the initial cost of these systems, residents and businesses–some driven by environmental awareness–are becoming increasingly enabled to install renewable energy systems. However, many municipalities in the region do not have in place ordinances to approve, modify, or reject these renewable energy systems. As a result, residents and businesses often face the use-variance process, which must be performed on a case-by-case basis, resulting in considerable time delays, increased project costs, and increased strain on limited municipal resources. Inconsistent and unpredictable land use regulations can create a significant barrier to the installation of renewable energy systems by both residents and businesses, and deter the renewable energy industry from doing business in the region. Further, use variances, if granted, can be construed as spot zoning, creating costly legal challenges and delay.

A handful of municipalities in the region have begun adopting ordinances to proactively regulate the installation of renewable energy systems in an attempt to balance the benefits of renewable energy with the goals expressed in their municipal planning documents. Zoning and other land use regulations play an important role in enabling renewable energy projects that are cost effective and compatible with existing land use.

The purpose of these frameworks is to provide clear, consistent guidance on how to construct renewable energy ordinances that are consistent with state laws; are not overly restrictive or contradictory to the nature of renewable energy systems; and promote safe and sound community development. These frameworks provide a menu of sample ordinance language options, both permissive and restrictive, to allow municipalities to build a customized ordinance that addresses their local issues.

The document is formatted for easy navigation. Text boxes include corresponding guidance that explains the breadth of barriers, benefits, and cautions for municipalities when regulating these types of renewable energy systems.

These frameworks will be updated regularly as municipalities in our region develop ordinances and more information about renewable energy systems becomes available. The language provided in these frameworks is not intended to be adopted wholly. Municipalities should consult their solicitor to understand the implications associated with ordinance adoption and the specific language to be provided in the ordinance.

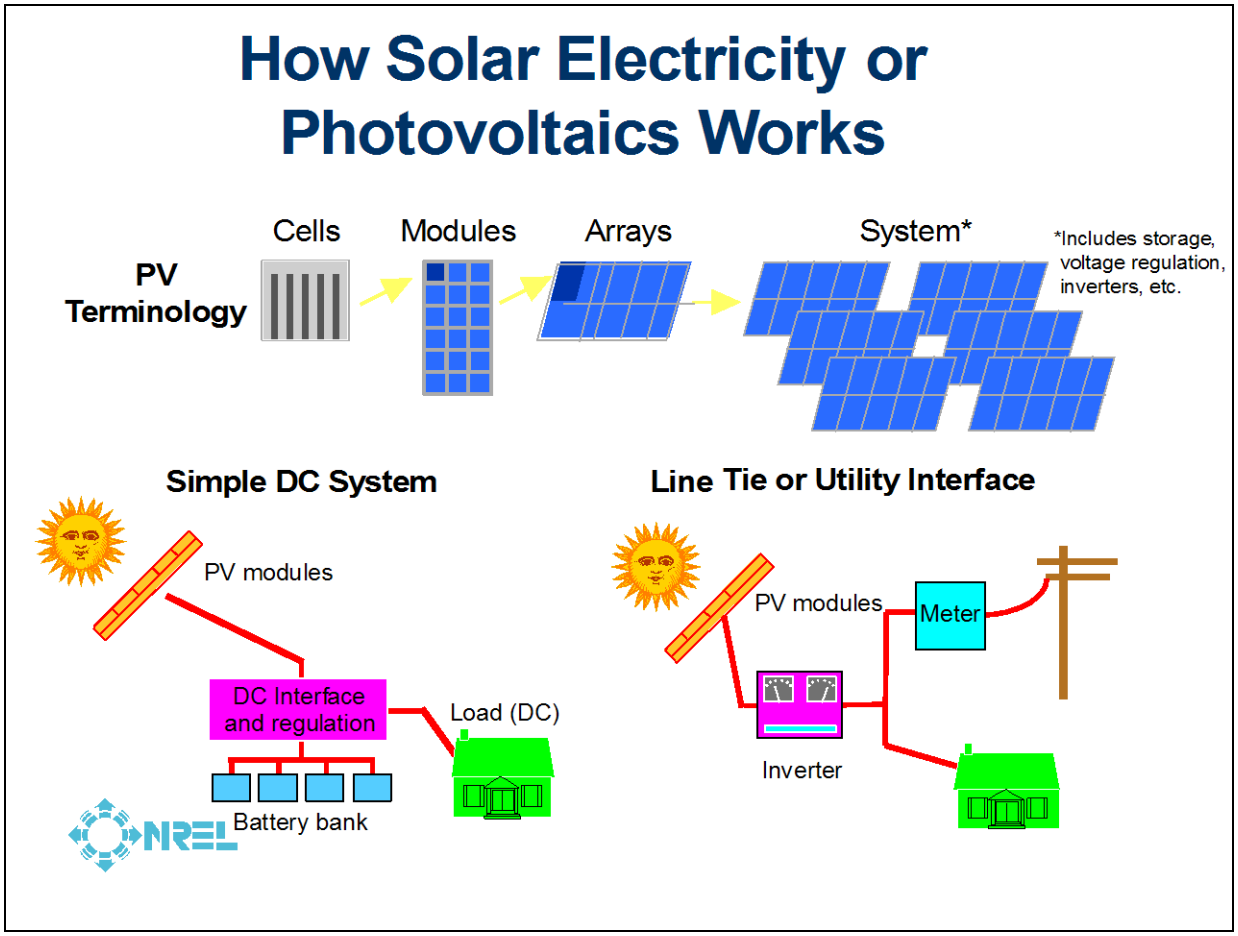
Introduction: Renewable Energy Ordinance Framework – Solar

Legend:
Blue -- Ordinance framework
Black – Possible ordinance language

Introductory Text

The most common solar technologies used on buildings in the United States are solar photovoltaic (PV) panels, which generate electricity, and solar hot water, which heat water or air. A PV solar energy system is made up of several PV solar cells. An individual PV cell is usually small, typically producing about one or two watts of power. To boost the power output of PV cells, they are connected together to form larger units, called modules. Modules, in turn, can be connected to form even larger units, called arrays, which can be interconnected to produce more power, and so on. Because of this modularity, Solar PV can be designed to meet any electrical requirement, no matter how large or how small. By themselves, modules or arrays do not represent an entire system. Systems also include structures that point them toward the sun and components that take the direct-current electricity produced by modules and "condition" that electricity, usually by converting it to alternate-current electricity. These items are referred to as the balance of system (BOS) components. Combining modules with BOS components creates an entire system.

Solar hot water systems, on the other hand, start by using a solar thermal collector. These are usually thin, flat boxes that are mounted on the roof facing the sun. A transparent cover lets sunlight into the box; tiny tubes inside carry water or another fluid (like antifreeze) into the box to be heated. An absorber plate, painted black, absorbs more sun and heat to increase water temperatures. The collector sends the hot water into an insulated storage tank. If the system uses a liquid other than water in the solar collector, that hot liquid heats the water through a coil of tubing inside the tank. Solar Hot Water systems and Solar PV utilize the sun, and therefore need to be mounted similarly for sun exposure.



Source: IREC Neighborhood Power: Building Communities with Solar Energy

This framework provides guidance and example language for creating a zoning process that ensures proper siting, installation, and maintenance of a solar PV system. The language provided can be modified to become a stand-alone ordinance, or incorporated into a municipality's existing zoning ordinance. **Note: The language provided in this framework is not intended to be wholly adopted. Please consult with your municipal solicitor.**

This framework addresses smaller-scale accessory-use applications that are intended to serve as an accessary structure to the primary use and reduce on-site consumption of utility power. The regulatory language provided here will be useful for most residential and commercial uses. It is **not** meant to give guidance on large-scale, primary-use solar projects, such as solar farms or utility-scale solar projects. A utility-scale solar energy project is not based on the number of panels or energy generated, but on the purpose of the energy. If the power from a solar application's primary purpose is to be sold for commercial gain, then it can be considered a utility-scale solar application. Energy generated by a utility-scale solar application is typically sold to energy companies, rather than end users. The owners of the utility-scale solar application obtain a permit from the Commonwealth of Pennsylvania and are listed by the U.S. Department of Energy as a power generation source. However, the issues concerning the regulation of solar energy systems as an accessory use and those associated with solar farms are too great to be covered in one document. The regulatory language provided will help you create ordinances that will handle most solar energy system applications in your municipality. If you would like more guidance on utility-scale solar ordinance language, please refer to the resources listed at the end of your framework, or contact DVRPC or your county planning department.

Section 1. Intent/Background

This section offers examples of how to phrase the intent and purpose of the ordinance. The inclusion of intent and purpose language is strongly encouraged in an renewable energy ordinance, as it explains the intent of creating provisions for solar energy development and clarifies a municipality's rationale for establishing a solar energy ordinance. It should also address why the regulations are being adopted, outline the goals of the ordinance, and perhaps refer to the enabling or related act to make the relevance of the ordinance apparent. If the ordinance is a "stand-alone" ordinance, the municipality may wish to tie the regulations back to its state's Planning Code by referencing applicable language (e.g., health, safety, welfare) from the Act. An intent or purpose section highlights the benefits of solar energy systems and why they should be protected through the development of the ordinance. This section also serves to establish the rationale for the ordinance in case of a legal challenge. This intent and purpose language may also use the "whereas" clause from the ordinance adoption.

Benefits of solar energy that could be mentioned in this section include the following:

- Solar energy is a renewable energy source;
- Solar energy is a clean energy source;
- Solar energy enhances the reliability and quality of the power grid;
- Solar energy reduces peak power demands;
- Solar energy helps diversify the State's/Municipality's energy supply portfolio;
- Solar energy promotes customers' choice for electric supply;
- Solar energy helps promote local, green jobs; and
- Solar energy helps reduce dependence on foreign oil.

- The purpose of this ordinance is to provide a regulatory framework for the construction and operation of Solar Energy Systems in (Municipality), subject to reasonable restrictions, which will preserve the public health, safety, and welfare, while also maintaining the character of _____(Municipality).
- The purpose of this ordinance is to define solar energy systems as an inherently beneficial use of all residential and commercial properties. Solar energy systems preserve the municipality's public health, safety, and welfare by reducing the carbon

If municipalities are developing this solar ordinance as a stand-alone ordinance, they can reference back to the state planning code for additional general purpose statements that may also apply to the purpose of developing solar.

footprint of each property by creating a clean, renewable energy source. Solar energy systems provide the property owner with the choice for electric supply, reduce the peak power demand of the utility grid, and enhance the municipality's electric power reliability and quality.

Calling a solar energy system "inherently beneficial" may be confusing if local governments are planning to restrict where solar energy systems can be placed. If a local government plans to restrict use, this section might specify that despite its inherent qualities, this ordinance will restrict the use of panels so as to promote their compatibility with existing land uses as specified in (name section) of this ordinance.

Section 2. Definitions

Any term used in the text of the ordinance must be defined. This section provides a selection of important terms and their definitions for both large and small-scale solar installations. Several variations have been provided for some terms to allow flexibility for the individual municipality. Definitions may be included in the body of the alternative energy ordinance, if it is a stand-alone ordinance, or may be incorporated into the Definitions section of the zoning ordinance.

Solar Easements: Legal agreements that protect access to sunlight on a property.

Solar Access: The access of a solar energy system to direct sunlight.

Solar Rights Laws: Laws that limit the restrictions localities and neighborhoods can make on solar installations.

If such laws are put into place, it is important that the language be specific so as to avoid future legal conflicts.

Solar Energy: Radiant energy (direct, diffused, or reflected) received from the sun at wavelengths suitable for conversion into thermal, chemical, or electrical energy.

Solar Energy System: Means any solar collector or other solar energy device, or any structural design feature, mounted on a building or on the ground, and whose primary purpose is to provide for the collection, storage, and distribution of solar energy for space heating or cooling, for water heating, or for electricity.

This definition addresses what a solar energy system physically is (can be solar hot water and PV), but does not address the purpose of the power. This may lead to the restriction of solar installations based on creative financial models. Or it could lead to utility-scale installations because it does not define the purpose of the energy.

Solar Energy System: An energy system which converts solar energy to usable thermal, mechanical, chemical, or electrical energy to meet all or a significant part of a structure's energy requirements.

This definition is recommended as particularly effective. It addresses physically what a solar energy system is (can be solar hot water and PV) and the last half of the sentence allows various forms of financing to be implemented (such as a Solar Power Purchase Agreement).

Conventional Energy Source: Includes all fossil fuel forms of energy and electrical energy generated off site.

Building-Integrated Photovoltaic (BIPV) Systems: A solar energy system that consists of integrating Solar PV modules into the

building envelope, where the solar panels themselves act as a building material (roof shingles) or structural element (i.e., façade).

Ground-Mounted: Systems which are not mounted on existing structures.

Photovoltaic (PV) Systems: A solar energy system that produces electricity by the use of semiconductor devices, called photovoltaic cells, which generate electricity whenever light strikes them.

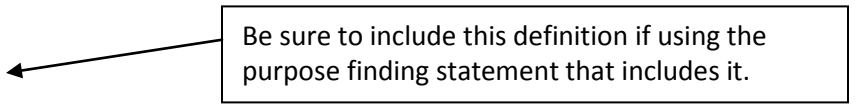
Solar Collector: A solar photovoltaic cell, panel, or array, or solar hot air or water collector device, which relies upon solar radiation as an energy source for the generation of electricity or transfer of stored heat.

Solar Storage Battery: A device that stores energy from the sun and makes it available in an electrical form.

On-Grid/Grid Connected: An energy system connected to the Public Electric Utility.

Off-Grid: An energy system not connected to the Public Electric Utility.

Inherently beneficial use: A use which is considered of value to the community because it fundamentally serves the public good and promotes the general welfare. Such a use includes, but is not limited to, a hospital, school, child care center, or a wind, solar, or photovoltaic energy facility or structure.



Section 3. Applicability

The ordinance review process can be a major barrier to the development of solar energy projects. An ordinance that fails to identify solar energy systems as an allowed use (such as an accessory, permitted, conditional use, or special exception) can result in solar energy only being permitted through a variance process. While a conditional use, or special exception, is suitable for some areas of development where additional scrutiny is warranted (such as historically significant areas), it should only be required in certain limited circumstances, if the overarching desire in your community is to encourage renewable energy. In general, municipal requirements that add to the cost of solar energy projects and time to install them will tend to discourage them.

Each municipality will have to make a decision about how they want to apply solar energy systems in their community (such as an accessory use in all districts, overlay district, a conditional use, not applicable (or only applicable) in certain zoning districts, etc.), and this document can provide different examples of language to support their decision.

A municipality should also decide where it is appropriate for solar energy systems to be placed. This is accomplished by deciding which locations and uses for the solar energy systems are appropriate. The following section will provide language that gives a municipality the options to regulate the use for the solar energy (principal or accessory), the location (which zoning districts), and the level of review required (by-right, conditional use, etc.). By combining these factors into appropriate language, a municipality can ensure that solar energy systems are sited appropriately.

- This ordinance applies to Solar Energy Systems to be installed and constructed after the effective date of the ordinance, and all applications for Solar Energy Systems on existing structures or property.

- Solar Energy Systems constructed prior to the effective date of this ordinance shall not be required to meet the requirements of this ordinance.

- Any upgrades, modifications, or changes that materially alter the size or placement of an existing Solar Energy System shall comply with the provisions of this ordinance.

The ordinance language provided applies to solar energy systems that are installed and constructed after the effective date of the ordinance, and all applications for Solar Energy Systems on existing structures or property. Projects that predate the ordinance aren't usually regulated by the ordinance, but language to specify that could be included. However, it is recommended that existing solar energy systems be exempted because it would likely be impractical and costly for such systems to meet new regulations.

This language is somewhat restrictive because it requires systems that predate the ordinance to come into complete compliance if additional panels are installed or the system is moved.

By-right (permitted use): Permitted uses in a zoning ordinance are those that the municipality feels should be allowed in a particular zone under all circumstances, though they may be made subject to specific standards that would be reviewed by the municipal zoning officer and planning commission. Your local government, for example, may choose to make Solar Energy Systems permitted uses in certain zoning districts, subject to certain criteria.

• Solar Energy Systems are a permitted use in all zoning districts.

The most permissive language allowing all types of solar in all districts.

• Solar Energy Systems shall be permitted in the _____ and _____ districts by right.

This language will only allow solar in the certain districts. Additional language can be added that makes solar a conditional use in other zoning districts.

• A Solar Energy System shall be considered a permitted use in all zoning districts when attached to an existing structure.

• All Solar Energy Systems shall be an accessory to the primary use of the lot and shall be located on same lot as the primary use.

• Solar Energy Systems shall be considered an accessory use and permitted by right if mounted to an existing structure and if any percentage of the energy is used for one or more of the principal uses on the same lot.

• Any solar energy equipment shall be considered to be an accessory structure to the principal building.

• Solar Energy Systems shall be permitted in commercial districts by right when ground mounted on an existing impervious surface, such as a parking lot.

These language examples provide various restraints that a municipality can place on solar, while still keeping it a by-right use. Some are more restrictive than others. A municipality should determine what is appropriate for its community.

• Solar Energy Systems shall be permitted by right in [all] or [the following] residential districts when the gross area of the Solar Energy System does not exceed X percent of the lot's developable area.

Special Exception/Conditional Use: A special exception or conditional use is a permitted use, but requires that the applicant meet objective requirements specified in the ordinance and that a public hearing is held on the application before the zoning board or governing body. This may add to the cost and amount of time needed to complete an installation and may discourage solar installations to some extent. However, it allows the municipality a greater level of control over approving proposed solar energy systems. Requiring special exception/conditional use approval may be appropriate for ground-mounted installations or in certain zoning districts.

- Solar Energy Systems shall be permitted in the commercial district by special exception when the following conditions are met:
    - Solar Energy System is not located in a setback area OR [is X feet from any property line].
    - Solar Energy System is located on property not adjacent to any residential district.
    - Solar Energy Systems occupies less than X percent of the lot's developable area.

Section 4. General Regulations

Municipalities may use this section just for guidance and ideas on what they should incorporate into their current regulations.
This section will present a variety of regulations that the municipality may include in the ordinance: Permitting, Setbacks/height, Aesthetics/screening, Solar Access, Decommissioning and Abandonment, Glare, Relative Production/generation, Compliance with Other Regulations.

The general regulations are guidelines or added requirements that must be integrated into the local review process used by your municipality. The standards that follow may be used in addition to existing special use permits and site plan review standards, or they may be used to create a stand-alone set of review standards that substitute for any existing review standards. Approval standards may be imposed upon specific types of solar energy systems (i.e., ground mounted/freestanding versus roof-mounted), imposed upon specific districts, or be generally applied to all solar energy systems. (For example, *"Solar is considered a permitted accessory use in all districts, provided the following requirements are met"*)

HEIGHT and SETBACKS

Often, a municipality will wish to require specifications for the placement of solar panels that are roof mounted or building mounted. Keep in mind that it is beneficial to allow an air space between solar PV panels and the building or structure that they are mounted on because the cooler the module, the more electricity it produces. Height and set back requirements can also improve first-responder safety in the event of a fire or emergency (see section "First Responder Safety" on p.21 of this framework for more information).

For roof-mounted systems or wall-mounted installations, it is important to consider two factors:

1. Vertical height above the roof; and
2. Setbacks from the roof edges.

• A roof- or wall-mounted Solar Energy System shall comply with the following:

-A Solar Energy System shall not project vertically above the peak of the roof to which it is attached, as viewed from the property line.

-A Solar Energy System shall not project vertically more than ten (10) feet above a flat roof.

• The solar panels shall not exceed a height of eight inches from the rooftop. In no event shall the placement of the solar panels result in a total height including building and panels than what is permitted in the zoning district in which they are located.

This language ties the height limit to the zoning district, but would be restrictive for those wishing to install panels on buildings that are already at the maximum height

•Roof structures for the housing of solar equipment may be allowed to exceed the district's height requirement, if for every foot exceeded it is set back the same amount from the roof's perimeter. In no case shall the height exceed five feet above the district's height requirement.

This language allows installations to exceed a district's height requirement within certain standards and to a limit. This could allow better solar access, while still respecting prevailing height limits.

4.3 kW system, Philadelphia, PA

3 kW system, Philadelphia, PA

GROUND-MOUNTED SYSTEMS

Permitted As An Accessory Structure

Solar panels shall be permitted as Ground-Mounted Systems in accordance with the following:

- All Ground-Mounted Systems shall be set back a distance of X feet from any property line in a residential zoning district or in conformance with the area and bulk standards for accessory structures in commercial districts as provided herein.
- The location of the Ground-Mounted System shall meet all applicable setback requirements of the District in which it is located.
- Ground-Mounted Systems shall not be permitted in a front yard.
- Ground-Mounted Systems shall not exceed a height of 12 (or 15) feet.
- The total surface area of all Ground-Mounted Systems on the lot shall not exceed X percent of lot area.

Ten to 20 feet from property lines has been common, but the ordinance can specify a range or a number.

Twelve to 15 feet was used in this particular ordinance, but a municipality may want to increase or decrease that.

This can create a double restriction if used in conjunction with other setback limitations. The larger this percentage, the less restrictive the ordinance.

Not Permitted As an Accessory Structure

Ground-Mounted Systems shall not be categorized as accessory buildings, and should be treated with different provisions.

Many ordinances treat ground-mounted installations as accessory buildings and treat them as such for height and setbacks, or the language can make a clear distinction, as in this case.

Ground-Mounted Systems and Solar Energy Systems mounted on accessory buildings shall not exceed 12 feet in height if ground mounted or the maximum permitted height of an accessory building in the zoning district.

This may prohibit the ability to install solar on detached garages.

No more than XX percent of a lot may be covered with a Solar Energy System.

By setting a coverage limit, this language can help prevent utility-size installation

Ground-Mounted Systems shall be located on lots of one acre or more.

Ground-Mounted Systems shall be categorized as an accessory structure which must meet all setback and height requirements, along with the following conditions: (to be determined by the municipality)

Placing a minimum lot size requirement can be quite restrictive; the use of setbacks can be a more effective means of regulating ground-mounted installations.

A municipality can consider ground-mounted systems as an accessory structure, especially for height and setbacks, and then create additional criteria.

AESTHETICS and SCREENING

Aesthetic concerns may be raised by residents and businesses, especially in locations with historic areas of significance. It should be noted that measures to alleviate aesthetic concerns can compromise the ability of solar energy systems to operate properly, especially in cases where screening or setback requirements would block areas with the most access to sunlight. Your ordinance can explicitly acknowledge that, while aesthetic concerns exist with solar energy systems, your municipality has placed priority on the environmental and economic impacts associated with solar energy systems. Note that any screening or aesthetic-related idea could take place on the north side of the project. There the screen won't shade the sun from the panels. Also note that, while important to consider aesthetics and screening, this type of regulation may need to evolve with the technology itself–consider satellite dishes, which once were commonly regulated for when their diameter often achieved 10 feet, though the regulation no longer became necessary once the industry reduced the sizes of the dishes. If similar advancements were to be made for solar energy systems, then aesthetics and screening regulations may become obsolete or need updating.

The design of Solar Energy Systems shall, to the extent reasonably possible, use materials, colors, textures, screening, and landscaping that will blend the facility into the natural setting and existing environment.

Common and acceptable language, although more prescriptive landscaping requirements.

Solar energy equipment shall not be conspicuous from adjacent streets. For example, solar panels directly facing adjacent streets will be considered to be conspicuous.

This is especially restrictive. This could limit panels on any pitched roofs that face a street.

Any trees to be removed shall be accompanied by a plan demonstrating the need to remove trees and replacement of the trees. An applicant shall locate a Solar Energy System so that tree removal is not required to the extent practical.

While it is true that shade of any kind interferes with solar energy systems' ability to operate, removing trees to install solar technology is generally not recommended. If tree removal is allowed, it is strongly recommended that replanting of an equivalency of lost trees/foliage be required in a solar ordinance. If in the same area of the solar panels, the foliage should be of a type that will not be expected to shade the panels.

Placement of Solar Energy Systems on flat roofs shall be allowed as of right in nonhistoric districts, provided that the Solar Energy Systems do not extend past the roofline.

Historic Districts: Installations in _____ (name of Historic district(s)) shall be reviewed by Planning Staff prior to the issuance of building permits.

To limit the aesthetic interference of panels, your ordinance can limit the placement of roof-mounted panels to the roof footprint. See also the section on "height" for more examples of height and setback restrictions.

GLARE

- Ground arrays shall be located so that any glare is directed away from an adjoining property.
- All solar panels and solar energy collectors shall be located so as to not create any additional heat load upon neighboring properties.

This may be a little broad, as a reflection off a collector for 10 minutes a day for 2 weeks of the year could be found in violation.

This language is more commonly used in an attempt to prevent glare.

SOLAR ACCESS

Owners of existing systems face potential challenges when growing trees or new structures on neighboring property shade their solar collectors. Solar access easements are designed to protect a landowner's right to install and operate solar energy systems on a home or business, including access to sunlight. Solar easements are not enforceable through a zoning or permitting process.

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 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 specific percentage of sunlight that may be obstructed.

A solar easement is a legal agreement between affected parties that protects access to sunlight on a property. For ordinance and permitting purposes, the easement should be a written document. This document ensures that all affected parties are aware of the solar installation. The easement can be free, or the parties may agree on a price. This can be limiting though--if the parties do not agree, then an installation may become impossible.

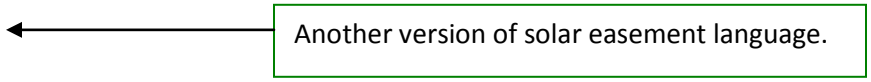
In order to obtain solar access protection, the owner of a solar energy system shall file a statement with the Zoning Officer, at the time of filing a building permit application, in which the owner will indicate the precise land and airspace which is to remain open. No one shall erect any structure or plant any vegetation which would block a solar energy system access to the sun between 9:00 am and 3:00 pm. Existing structures and landscaping on adjacent properties shall not be removed, altered, or otherwise affected by any proposed solar energy system.

This can be called the "first come, first serve" method of protecting solar access--a simple method of ensuring solar access, though pictures at the time of installation could be required to prevent future disputes.

This type of ordinance could conceivably be used to prevent building on a neighboring lot. It would be desirable to define where a system can be on the property for this ordinance to apply (e.g., not on the ground on the south property line).
There is still a question as to the enforceability of this language.

The following is the process and criteria by which property owners may evaluate and resolve issues regarding the obstruction of solar access to a property by tree or trees on a neighboring property:

- 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.
- The restrictions placed upon vegetation, structures, and other objects which would impair or obstruct the passage of sunlight through the easement.
- 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.
- The provisions for trimming vegetation that would impermissibly obstruct the passage of sunlight through the easement, including any compensation for trimming expenses.
- Any provisions for compensation of the owner of property benefiting from the easement in the event of impermissible obstruction of the easement.



FIRST RESPONDER SAFETY

Roof-mounted solar thermal and solar photovoltaic energy systems can create additional hazards for first responders during a fire, such as tripping/slipping, and structural damage as a result of additional weight on the roof from the system, among other hazards.[1] Photovoltaic energy systems present an additional hazard of electric shock, as panels cannot be simply "turned off" and will always generate electricity when enough light is shining on them. In fact, a "lock on" reaction may be possible with just the light generated by a fire or from the lamps of fire trucks at night.[2] A small-scale solar energy system with only a few modules may still generate appreciable and lethal electrical current, which would be exposed when the panel or its components were damaged. Training and education of first responders, and the incorporation of best practices into guidelines and Standard Operating Procedures, is an important step toward ensuring their safety when responding to a fire. Code and ordinance considerations, such as setbacks and roof clearance, can also help alleviate hazards by creating space for first responders to move around a roof when responding to a fire. The City of Philadelphia's fire code requires that a three-foot perimeter around residential roof edges and a six-foot perimeter around a nonresidential roof are maintained for fire department access.[3]

For more information on First Responder Safety, please visit:

- **Solar Energy Systems: A Guide for Pennsylvania Municipal Officials:** http://www.pennfuture.org/UserFiles/File/Energy/Solar_MuniGuide_200912.pdf;
- **Firefighter Safety and Photovoltaic (PV) Systems, ICLEI Local Governments for Sustainability:** http://www.icleiusa.org/static/ICLEI_Firefighter_and_PV_Safety_Slides.pdf; and
- **Guidebook for Solar Photovoltaic Projects In Philadelphia:** http://www.phila.gov/green/PDFs/PhillySolarGuidebookFinal.pdf.

[1] "Building Construction: Solar Energy Systems", Coffee Break Training – Fire Protection Series, USFA National Fire Academy, No. FP-2009-39, 29 Sept 2009

[2] http://www.icleiusa.org/static/ICLEI_Firefighter_and_PV_Safety_Slides.pdf

[33] http://www.phila.gov/green/PDFs/PhillySolarGuidebookFinal.pdf

COMPLIANCE WITH OTHER REGULATIONS

An easy and highly effective way of dealing with insecurities about a solar energy system, from an electrical point of view, is to simply state that they must conform to national standards, such as the National Electric Code.

For New Jersey:

• The installation of a solar energy system shall conform to the National Electric Code as adopted by the NJ Department of Community Affairs.

For Pennsylvania:

• In the event of a conflict between this Section and the provisions of Chapter 23 of the then-current version of the International Residential Code (IRC), the IRC shall supersede this Section.

• A solar energy system shall comply with all applicable state construction and electrical codes and the National Electrical Code. Prior to the issuance of a building/zoning permit for installation of a solar energy system, the applicant must submit to the municipality all documentation required by (Municipality) to verify that the design of the device complies with the Pennsylvania Uniform Construction Code, including, but not limited to, documentation of the structural integrity of the structure(s) and electrical design.

• To the extent applicable, the solar energy system shall comply with the Pennsylvania Uniform Construction Code, Act 45 of 1999, as amended, and the regulations adopted by the Department of Labor and Industry.

• All installers must be on the official list of registered installers (DEP Solar Sunshine) OR be able to prove that they meet the standards of the registered installers--North American Board of Certified Energy Practitioners (NABCEP) Certified.

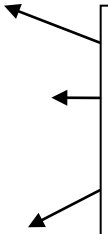
This is optional language. In order to maintain any semblance of uniform installation standards across a municipality, it is essential that solar energy system installers be registered with the state and NABCEP certified. This ensures that installers are held to the highest and most up-to-date standards available. Once again, here is an excellent way to address many engineering and safety concerns that a municipality might have. This provision simply treats a solar energy system like any other electrical installation.

Section 5. Penalties

We recommend the use of standard language, but the standards should be very specific for each municipality.

Section 6. Severability

- If any sentence, clause, section, or other part of this ordinance is, for any reason, found to be unconstitutional, illegal, or invalid, such unconstitutionality, illegality, or invalidity shall not affect or impair any remaining provisions, sentences, clauses, sections, or other parts of this ordinance. It is hereby declared as the intent of (Municipality) that this ordinance would have been adopted had such unconstitutional, illegal or, invalid provision, sentence, clause, section, or part thereof not been included herein.



These sections may be unnecessary if the municipality is including language in an existing ordinance. The municipality can, and should, use its normal standard language for this section, if possible.

Section 7. Effective Date

- This ordinance shall become effective 30 days from the date of enactment.

For More Information

- **PAS Essential Info Packets: Planning and Zoning for Solar Energy (PAS EIP-30):** http://www.planning.org/pas/infopackets/open/eip30.htm;
- **Model Solar Ordinances and Commentary:** http://www.planning.org/pas/infopackets/open/pdf/30part2a.pdf;
- **Solar Energy Systems: A Guide for Pennsylvania Municipal Officials:** http://www.pennfuture.org/UserFiles/File/Energy/Solar_MuniGuide_200912.pdf; and
- **Guidebook for Solar Photovoltaic Projects In Philadelphia:** http://www.phila.gov/green/PDFs/PhillySolarGuidebookFinal.pdf.