Grow Solar

Local Government Solar Toolkit

PLANNING, ZONING, AND PERMITTING

Illinois

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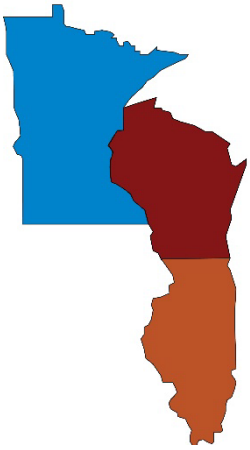
Rooftop Solar Toolkit Summary

Planning, Zoning, and Permitting

As part of the Grow Solar Partnership, toolkits have been assembled to equip local governments in Minnesota, Wisconsin, and Illinois with information regarding solar development as it relates to planning, zoning, and permitting. The purpose of these toolkits is to provide resources that will assist communities in addressing barriers to solar energy installations in a manner tailored to each community's needs. The following is a summary of materials that can be found in each of the toolkits.



Solar Overview

State Solar Policy Summary

Solar policy plays an important role in the development of solar energy. This document includes highlights from each state in both the regulatory arena as well as financial incentives that are available to support solar. Additionally, the State Solar Policy Summary includes statutes that enable local governments to regulate solar in planning, zoning, and permitting. This document can be used as reference guide specific to each state.

Three State Regional Analysis

The Three State Regional Analysis looks at the 3-state region of Minnesota, Wisconsin, and Illinois to identify similarities and differences in state law and typical practices in permitting, planning, and zoning for solar energy development. This document serves as the foundation for the toolkits that were developed for each state. Using this analysis, national best practices were modified so that they could be integrated into each state's regulatory framework insofar as it relates to solar development.

Planning

Comprehensive Plan Guide

The Comprehensive Plan Guide is a tool communities can use when they update their land use plans. This document outlines considerations that communities should make and identifies elements that allow for clear priorities around solar energy objectives. Model language is included to help local governments see the types of goals and policies they could include in their plans.

Zoning

Model Ordinances

All local governments with the authority to regulate zoning should include solar development in their zoning code to recognize the value of solar and alleviate any local concerns. These model ordinances offer language to address a variety of solar land uses, tailored to local conditions and priorities.

Permitting

Local Government Permitting Checklist

Providing a clear and predictable permitting process saves time and money for both contractors and municipalities. Using national best practices, a template has been created that can be adapted locally, with notes on where municipalities might choose to modify standards based on varying circumstances.

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State Solar Policy Summary

Illinois

Illinois currently has the most installed solar capacity in the three state region. The demand for solar is expected to increase in response to policy and market forces. The following provides a brief summary of solar policy and current market conditions in the state that impact new solar development.

Solar Policy

There are a number of policies in the State of Illinois that support the expansion of the solar market. These Public Acts are provided here:

- Renewable Energy Portfolio Standard: Illinois Public Acts 095-1027 & 096-0159 mandate that 25% of Illinois' energy needs be met by renewable energy sources by 2025, including 6% of its RPS (1.5% of total electricity) comes from solar power. The Future Energy Jobs Bill (see below) re-establishes the 25% by 2025 standard, with carve outs for specific types of renewable energy development.
- Homeowners' Solar Rights Act: Illinois state law prohibits homeowners' associations and similar organizations from preventing homeowners from using or installing solar energy systems (see below).
- Special Assessment for Solar Energy Systems: Illinois offers a special assessment of solar energy systems for property tax purposes.
- Illinois' Future Energy Jobs Bill was passed December 1st, 2016. It rolled several energy measures into one and addresses a wide range of issues, including keeping nuclear plants open. The bill also establishes the state's solar energy goals, solar development budget, and methods of attaining those goals. These measures will result in an estimated 1,320 MW of solar energy development in the State by 2020.

Solar Market

Illinois has a number of incentives to help spur and finance solar development to reach state goals and mandates. Available incentives are listed here:

- Solar Energy Rebate Program: Illinois had a rebate program in place through 2015, but it has largely been replaced with solar incentives that are part of the Future energy Jobs legislation. The Illinois Power Authority (IPA) will purchase solar renewable energy credits (SRECs). Carve outs for this funding mechanism have been set for small-scale (distributed) solar installations, community shared solar installations, utility-scale solar farms, and solar development on brownfield sites.
- PACE: Illinois Public Act 096-0481 enables local governments to enter into voluntary agreements with property owners for financing solar and energy efficiency (Property Assessed Clean Energy Agreements).

Through 2015 Illinois has 57 MW of installed solar energy capacity and ranks 25th in the nation. 2016 and 2017 will see a big year for solar in the state as the results of previous solar incentives and the newly passed solar policy incentives begin to transform the market.

Statutory Context – Local Authority

Enabling Statutes for addressing solar resources

1. **Comprehensive Planning**
   - Illinois State Law 65 ILCS 5/11-12-5) Sec. 11-12-5 gives every plan commission and planning department authority to:

     Prepare and recommend to the corporate authorities a comprehensive plan for the present and future development or redevelopment of the municipality.

2. **Planning Commission Authority**
   - Division 12 Plan Commissions 65 ILCS 5/11-12-4 grants authorities to municipalities to establish planning commissions and departments. The power given to these planning bodies includes:

     (5) To prepare and recommend to the corporate authorities schemes for regulating or forbidding structures or activities which may hinder access to solar energy necessary for the proper functioning of solar energy systems, as defined in Section 1.2 of The Comprehensive Solar Energy Act of 1977, or to recommend changes in such schemes.

3. **Zoning**
   - As part of Division 13 Zoning (65 ILCS 5/11-13-1) – granting authority to municipalities to regulate through zoning – the following is stated regarding solar energy:

     (10) […] to regulate or forbid any structure or activity which may hinder access to solar energy necessary for the proper functioning of a solar energy system, as defined in Section 1.2 of the Comprehensive Solar Energy Act of 1977.

4. **Homeowners' Associations**
   - Illinois state law (765 ILCS 165/) prohibits homeowners' associations and similar entities from preventing homeowners from using or installing solar energy systems. For instance, 765 ILCS 165/20 states:

     No deed restrictions, covenants, or similar binding agreements running with the land shall prohibit or have the effect of prohibiting a solar energy system from being installed on a building erected on a lot or parcel covered by the deed restrictions [...]

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Solar in Comprehensive Planning

Purpose

Comprehensive plans are the foundational policy documents that reflect a community's priorities and values regarding development and local resources. Solar energy resources are an increasingly valuable local resource. Solar development can bring environmental and economic benefits to a community through clean energy production, creation of local jobs and revenue, and improved property values. Communities are acknowledging this valuable resource and incorporating support and guidance for solar energy development into comprehensive plans, sending a strong message of commitment to sustained growth in the solar energy sector.

Communities are not, however, always familiar with the characteristics of solar resources and solar land uses. This document outlines considerations that communities should make and identifies elements that allow for clear priorities around solar energy objectives. Identifying how solar development can benefit the community will help decision-makers determine how solar resources and investments are integrated into the community in a way that balances and protects competing development or resources.

Downtown Solar Resource Map. Rochester, MN

Considerations

When addressing solar development in a comprehensive plan, it is important to acknowledge what makes solar work for a community as well as the inherent conflicts that may arise. Any comprehensive plan that includes a solar component should:

1. Address the solar resource and the different land use forms that solar development can take
2. Acknowledge the multiple benefits of solar development
3. Guide decision-makers on optimizing opportunities when solar development might conflict with other resources or land use forms

Each of these components can help a community identify how they wish to include solar as a resource and to be able to reasonably justify why and where solar development is supported.

In Illinois, the Chicago Metropolitan Agency for Planning (CMAP) has the most robust regional planning in the state. The current CMAP regional plan is GO TO 2040, which plans for a more sustainable future. As a regional example, the plan specifically addresses solar in the following ways:

1. Fosters sustainable practices and renewable energy generation
2. As an economic development tool
3. Utilizes renewable energy generation in water utilities

Solar Resource

The local landscape (e.g., topography, on-site obstructions, obstructions on adjacent land, potential future obstructions) defines whether or not a given site has a good solar resource. An adequate solar resource is a site that is unshaded for at least 6 hours a day, both now and into the future. Communities can map their solar resource using LiDAR data that is frequently available in urban areas, and in some states even in rural areas. Such a map can allow the community to measure the size of their "solar reserves," identify areas with good and poor resources for prioritizing development in a manner consistent with other land uses. Communities can even distinguish between opportunities for rooftop and ground-mount solar development opportunities.

In addition to measuring and recognizing the solar resource, communities should recognize that a variety of methods exist to capture the energy and provide economic value. There are several different types of solar installations a community will want to consider: rooftop, accessory ground-mount, and principal ground-mount. A community can use the comprehensive plan to determine which of these technologies to support and/or promote.

Rooftop Solar, Parkland Community College, IGEN

Solar Benefits

Communities can realize a number of benefits through solar development, including environmental, energy production, and economic development. Environmental benefits include helping meet local air quality or climate protection goals. Communities with renewable energy or energy independence goals can better achieve these through explicit support of solar energy development. Economically, solar development creates construction jobs for a variety of trades, financially benefits those who install systems on their properties with lower energy bills, and increases the property value of buildings within the local housing market.

Ground Mount System

Land Use Conflicts

Like any development, solar may come into conflict with other land uses, and solar resources are often co-located with other important local resources. Recognizing these issues in the comprehensive plan can help to mitigate future problems.

Solar Farm

Some conflicts to consider include:

- Agricultural practices
- Urban forests
- Historic resources
- Airport control towers
- Natural areas
- Future housing or commercial development

Each community is different and may see conflicts arise that are not listed here. Identifying and addressing those conflicts in comprehensive planning will need to happen at the community level.

Elements

Common features of a comprehensive plan include a discussion of existing conditions, a presentation of desired outcomes in the form of a vision and goals, and an inventory of policies and actions that support those goals. The following model language are examples of what could be incorporated into a comprehensive plan.

Existing Conditions

Understanding the potential importance of a community's solar resource requires some knowledge of both the availability of the local solar resource and the community's existing energy use. Using a solar map, like the one described above, is a useful way to demonstrate the solar potential across the area. Identifying the areas with the greatest potential can help the community plan and prepare for the best sites to locate investment and to achieve the goals outlined in the plan. Understanding the nature of the community's energy use – data that can be obtained from the community's utility providers – can put the solar resource within the appropriate economic and use intensity context. For instance, most communities have sufficient solar resources to theoretically meet a substantial portion of their electric energy consumption, even if only the best resources are used.

Southwestern Illinois College, 125kW, IGEN

Goals

Among communities that have added renewable energy goals and objectives to their plans, common themes include encouraging solar site design for new subdivisions, improving the energy performance of municipal facilities, removing barriers and creating incentives for small-scale or "distributed" installations, and capturing economic development opportunities associated with renewable energy investment.

Examples of goals may be:

> **Goal 1:** Encourage local production of solar energy on new residential and commercial construction.
>
> **Goal 2:** Maximize the production of solar photovoltaic energy to the extent feasible, while minimizing potential biological, agricultural, visual, and other environmental impacts.

Policies and Actions

In Comprehensive Plans, policies are statements of intent with enough clarity to guide decision-making. Policy statements should be tied to the desired goals and set a clear path to action. Examples of policies are:

> **Policy 1:** Establish clear guidelines for solar ready development in all zoning districts where solar is a permitted use.
>
> **Policy 2:** The City supports the State's effort to achieve the Renewable Portfolio Standard (RPS), which requires utilities to generate 25% of electricity from renewable energy sources, and the State's solar energy goal of having sufficient solar generation to meet 10% of electric use by 2030.

Actions are more specific statements that direct programs, regulations, operational procedures, or public investments. Action statements are intended to guide the implementation of the stated policies. Examples of action statements follow:

> **Action 1:** Provide incentives for developers who build solar-ready residential and commercial structures.
>
> **Action 2:** The City should complete a study to identify opportunities for investment in solar energy resources on public buildings and lands.

References:

Google's Project Sunroof solar mapping tool https://www.google.com/get/sunroof/data-explorer/

Planning for Solar Energy, American Planning Association https://www.planning.org/store/product/?ProductCode=BOOK_P575

Planning Advisory Service Essential Info Packets, Planning and Zoning for Solar Energy https://www.planning.org/pas/infopackets/open/eip30.htm

Iowa Smart Planning Principles, Statute, Guidance document on-line. https://rio.urban.uiowa.edu/sites/rio/files/Iowa_Smart_Planning_Overview_0.pdf

Minnesota Solar Planning Requirement – Metropolitan Land Planning Act 473.859. Subd.2b

Metropolitan Council Local Planning Handbook

Illinois Planning Authority for Protection Solar Resources ((65 ILCS 5/11-12-5) (from Ch. 24, par. 11-12-5) http://www.ilga.gov/legislation/ilcs/fulltext.asp?DocName=006500050K11-12-5

Grow Solar

Model Solar Zoning for Illinois Municipalities

Every Illinois community should have zoning language that addresses solar energy systems. Solar installations are a form of development, and development regulations, including zoning and subdivision ordinances, need to incorporate the variety of development forms that solar installations can take. Moreover, incorporating solar land uses and development in the ordinances recognizes that the community's solar resources are a valuable asset with economic and environmental value that property owners will want to capture. Solar development regulation can help educate staff and community members, as well as alleviate potential conflicts or confusion.

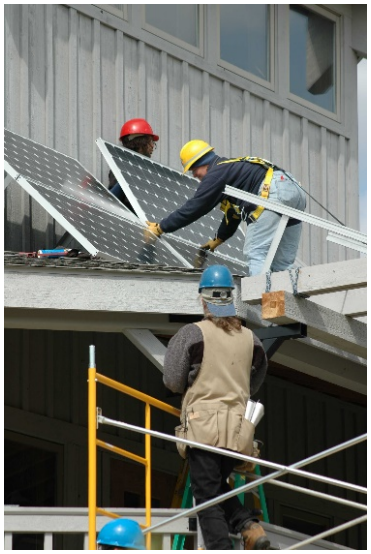


Photo Credit: Midwest Renewable Energy Association

Illinois state statutes leave most solar development regulation to local governments; the State does not pre-empt or guide solar development except for enabling local governments to take certain actions. Most importantly, Illinois law mostly leaves to local governments the challenge of defining solar "rights," including when property owners have an as-of-right solar development opportunity, when solar rights trump or are trumped by other property rights, and how or whether to protect solar installations from trees or buildings on adjacent properties. State law only protects solar development "rights" in the context of limiting Home Owners Associations (HOAs) from restricting solar development.

Local development regulations that are solar ready will have the following characteristics:

- Address all the types of solar land uses that the community is likely to see
- Result in an as-of-right solar installation opportunity for at least accessory use solar and where possible for principal use solar development
- Balance between solar resources and other valuable local resources (trees, soils, historic resources) in the development process

All zoning ordinances include certain basic elements that can, if not considered in the context of solar resources and technologies, create inadvertent barriers to solar development. Basic zoning elements include:

1. **Use:** Which land uses are permitted, which are conditional, which are prohibited in each zoning district? Should the community allow solar farms in industrial districts, or ground-mount accessory solar in the backyards of residential districts?
2. **Dimensional Standards:** Where on the lot can solar land uses be placed? If the solar resource is only viable in the front yard, or only available above the peak of the roof because of the neighbor's trees, should the community allow solar development in those locations? Most communities allow some exceptions to height and setback requirements—does solar meet the same standard to qualify for an exception?

3. **Coverage and Bulk:** How much of the property can be developed consistent with the preferred development pattern for that zoning district? Should solar panels in the backyard count as an accessory structure if the community limits the number of accessory buildings in residential neighborhoods? Does the surface of a solar collector count as impervious surface for storm water standards?

Photo credit: Great Plains Institute

Some communities' zoning ordinances have more advanced elements that should also be addressed to remove barriers and to take advantage of incentives. Examples include:

- **Design standards:** Are community aesthetic or character standards part of local regulations? How can solar development fit into areas where the community has set design goals?
- **Solar Easements or Cross-Property Protection:** Does local regulation protect the long-term solar resource when someone makes a long-term investment in solar infrastructure? Is there a public purpose in protecting solar access across property lines?
- **Home Owners Associations:** Illinois law limits HOAs from preventing individual home owners' investment in on-site solar, but leaves to the HOA discretion on solar design standards. Should the community guide HOA choices on solar installation design?
- **Integrating with Other Processes:** How does solar development conflict or support agricultural protection, historic preservation, urban forests, urban expansion areas, municipal utility goals?
- **Capturing Co-Benefits:** Solar farms or other principal uses are subject to stormwater management regulations. Can ground cover requirements for solar farms actually create a stormwater or "pollinator" habitat?

Photo Credit: Great Plains Institute

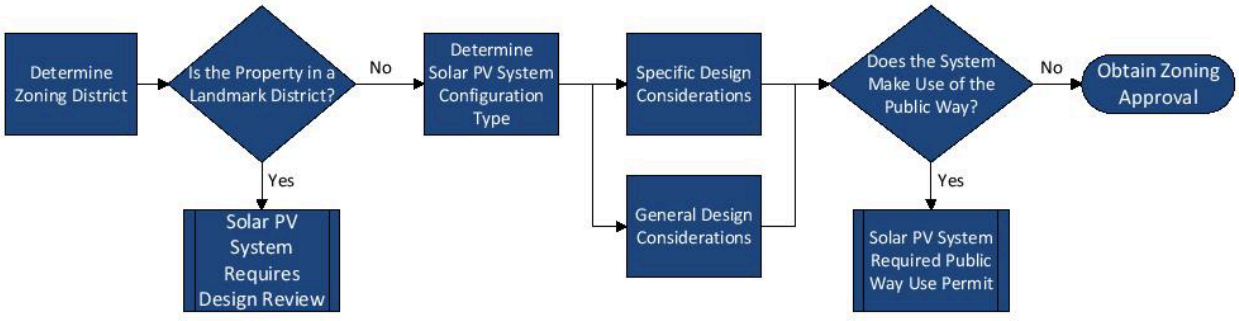


Figure 1: Flow Diagram illustrating zoning review process

Source: City of Chicago Zoning Policy, February, 2013

Illinois has several regional organizations providing technical assistance on best practices for sustainable development regulation and addressing climate mitigation and resiliency in local government policies and standards. The City of Chicago developed a solar development web portal and a zoning guide to help contractors and homeowners by clearly identifying decision points and standards for small solar development projects. Chicago Metropolitan Area Planning has developed a Climate Adaptation Toolkit that provides benchmark information, policy guidance, and regulatory examples for a variety of community types.

The Grow Solar Illinois' model solar ordinance, provided below, offers sample ordinance language that addresses a variety of solar land uses and local circumstances. The model also provides explanatory text and suggestions for altering the language to tailor the ordinances to local conditions and priorities.

The Resources and Reference Material section at the end of this document provides additional national and state examples and materials to guide local decision-making on making development regulation "solar ready."

Resources and Reference Material:

- City of Chicago Solar Zoning Policy, http://www.cityofchicago.org/city/en/depts/dcd/supp_info/solar_zoning_policy.html
- City of Minneapolis Solar Zoning Ordinance, http://www.minneapolismn.gov/www/groups/public/@cped/documents/webcontent/convert_285502.pdf
- National American Planning Association, *Planning for Solar Energy,* https://www.planning.org/store/product/?ProductCode=BOOK_P575
- National American Planning Association, Planners Advisory Service Essential information packet, https://www.planning.org/pas/infopackets/open/eip30.htm
- Chicago Metropolitan Area Planning Climate Adaptation Toolkit, June 2013 http://www.cmap.illinois.gov/documents/10180/14193/FY13-0119+Climate+Adaptation+toolkit+lowres.pdf/98b5e57c-453f-4111-bc02-6e2cdea0dabc
- University of North Carolina, *Planning and Zoning for Solar Energy*, http://sogpubs.unc.edu/electronicversions/pdfs/pandzsolar2014.pdf
- Solar ABCS, *A Comprehensive Review of Solar Access Law in the United States,* http://www.solarabcs.org/about/publications/reports/solar-access/pdfs/Solaraccess-full.pdf
- The Solar Foundation, *A Beautiful Day in the Neighborhood: Encouraging Solar Development through Community Association Policies and Procedures,* http://www.thesolarfoundation.org/a-beautiful-day-in-the-neighborhood-encouraging-solar-development-through-community-association-policies-and-processes/
- National Alliance of Preservation Commissions, *Sample Guidelines for Solar Systems in Historic Districts*, http://www.preservationnation.org/information-center/sustainable-communities/buildings/solar-panels/additional-resources/NAPC-Solar-Panel-Guidelines.pdf
- National Trust for Historic Preservation, Solar Panels and Historic Preservation, http://www.preservationnation.org/information-center/sustainable-communities/buildings/solar-panels/#.VUJ32JNi91A

Grow Solar

Model Solar Ordinance – Illinois

Introduction

Illinois has good solar energy potential—as good as Houston, Texas, and many parts of Florida. As solar energy system components have become more efficient and less costly an increasing number of solar energy systems have been installed in Illinois. Market opportunities for solar development have dramatically increased in Illinois over the last five years, such that most communities now must address solar installations as land use and development issues. Solar energy components continue to improve in efficiency and decline in price; solar energy has reached retail cost parity for many customers, and is now approaching cost competitive status at the wholesale level.

Model Solar Energy Standards

This ordinance was developed based on work completed under the Department of Energy's Phase I Rooftop Solar Challenge program in Minnesota, and updated for the three-state Grow Solar initiative, funded by Rooftop Solar Challenge Phase 2. This version was last updated June, 2017.

But solar energy is much more than a supplement (or alternative) to utility power. Solar energy has become a symbol of energy self-sufficiency and environmental sustainability. The growth in solar installations is attributable as much to the non-economic benefits as to solar being an economic substitute for electric utility power. Households and businesses wanting to reduce their carbon footprint see solar energy as a strong complement to energy efficiency. Volatility in natural gas prices and retail electric rate increases make free solar fuel an attractive price hedge.

Solar Energy Issues

Local governments in Illinois are seeing growing interest by property owners in solar energy installations, and are having to address solar land uses in their development regulation. Given the continuing cost reductions, and growing value of clean energy, solar development will increasingly be a local development opportunity, from the rooftop to the large scale solar farm. Three primary issues tie solar energy to development regulations:

1. *Land use conflicts and nuisance considerations.* Solar energy systems have few nuisances, but some types of solar development can compete for land with other development options, while visual impacts and safety concerns by neighbors sometimes create opposition to solar installations. Good design and attention to aesthetics can answer most nuisance or visual concerns. But large scale development (solar farms or gardens) are becoming more common and raise the issue about whether and where such land uses are appropriate, just like other types of development.
2. *Protecting access to solar resources.* Development regulations can inadvertently limit a property owner's ability to access their solar resource. Solar access can also be limited by buildings or vegetation on adjacent lots. Communities should consider how to protect and develop solar resources in zoning and subdivision processes.
3. *Encouraging appropriate solar development.* Local governments that have set climate protection or sustainability goals can meet some of their commitment by removing regulatory barriers to solar energy and incorporating low or no-cost incentives in development regulations to spur solar investment.

Components of a Solar Development Ordinance

Solar energy standards should:

1. *Create an as-of-right solar installation path for property-owners*. Create a clear regulatory path (an as-of-right installation) to solar development for both accessory and (if appropriate) principal uses such as solar farms and ground-mount community shared solar installations.
2. *Limit regulatory barriers to developing solar resources*. Ensure that access to solar resources is not unduly limited by height, setback, or coverage standards, recognizing the distinct design and function of solar technologies and land uses.
3. *Define appropriate aesthetic standards.* Retain an as-of-right installation while balancing design concerns in urban neighborhoods, historic districts, and new subdivisions.
4. *Address cross-property solar access* issues. Consider options for protecting access across property lines in the subdivision process and in zoning districts that allow taller buildings on smaller (urban density) lots.
5. *Address principal solar uses*. Define where in the community solar energy land uses are appropriate as a principal or primary use, and set development standards and procedures to guide such development.
6. *Consider "solar-ready" design*. Encourage developers and builders to use solar-ready subdivision and building design.
7. *Consider regulatory incentives*. Incorporate regulatory incentives such as density bonuses that can spur private-sector solar investment.

Different Settings and Community Types

The model ordinance language addresses land use concerns for both urban and rural areas, and thus not all of the provisions may be appropriate for every community. Issues of solar access and nuisances associated with solar energy systems are of less consequence outside urban density areas, where lot sizes are almost always greater than one acre. Solar farms and gardens (principal solar land uses) are much more likely to be proposed in rural areas rather than developed cities. However, urban areas should consider where solar farms or gardens can add value to the community and enable economic development of a valuable local resource. Rural communities should address rooftop and accessory ground-mount development, although the standards used in this model are designed more for the urban circumstances.

This ordinance includes language addressing solar energy as an accessory use to the primary residential or commercial use in an urban area, and language for principal solar uses as typically seen in rural communities. The accessory and principal land uses have different issues and need to be addressed in a substantially different manner from each other. Communities should address both types of solar development.

Solar Development is not one thing

Communities would not apply the same development and land use standards to an industrial facility and a single family home, merely because both are buildings. Solar farm/garden development is a completely different land use than rooftop or backyard solar. Standards that are appropriate for solar farms may well be wholly inappropriate for rooftop solar, and may unnecessarily restrict or stymie solar development opportunities of homes and business owners.

Model Ordinance

I. **Scope -** This article applies to all solar energy installations in Model Community.

II. **Purpose** - Model Community has adopted this regulation for the following purposes:

A. **Comprehensive Plan Goals** - To meet the goals of the Comprehensive Plan and preserve the health, safety, and welfare of the Community's citizens by promoting the safe, effective, and efficient use of solar energy systems installed to reduce the on-site consumption of fossil fuels or utility-supplied electric energy. The following solar energy standards specifically implement the following goals from the Comprehensive Plan:

1. **Goal**: Encourage the use of local renewable energy resources, including appropriate applications for wind, solar, and biomass energy.
2. **Goal**: Promote sustainable building design and management practices in residential, commercial, and industrial buildings to serve the needs of current and future generations.
3. **Goal:** Assist local businesses to lower financial and regulatory risks and improve their economic, community, and environmental sustainability.
4. **Goal**: Efficiently invest in and manage public infrastructure systems to support development and growth.

Comprehensive Plan Goals

Tying the solar energy ordinance to Comprehensive Plan goals is particularly important for helping users (both Planning Commission and community members) understand why the community is developing and administering regulation.

The language here provides examples of different types of Comprehensive Plan goals, and other policy goals that the community may have that are served by enabling and encouraging solar development. The community should substitute its policy goals for these examples.

If the Comprehensive Plan does not include goals that supporting local solar development), the community should consider creating a local energy plan or similar policy document to provide a policy foundation for solar development regulation.

B. **Climate Change Goals**: As a signatory of the Cool Cities program, Model Community has committed to reducing carbon and other greenhouse gas emissions. Solar energy is an abundant, renewable, and nonpolluting energy resource, and its conversion to electricity or heat will reduce our dependence on nonrenewable energy resources and decrease the air and water pollution that results from the use of conventional energy sources.

Climate Protection Strategies

Local governments that are participating in the Cities for Climate Protection program, Mayor's Climate Protection signatories, the Cool Cities/Cool Counties program, or have adopted climate protection or energy independence policies or plans can use private solar investment to meet those goals.

C. **Consistency with Regional Plans:** Model Community is part of a regional planning process that has developed recommendations for greenhouse gas reductions, a purpose served by encouraging local solar development.

D. **Infrastructure:** Distributed solar photovoltaic systems will enhance the reliability and power quality of the power grid and make more efficient use of Model Community's electric distribution infrastructure.

E. **Local Resource** - Solar energy is an under-utilized local energy resource and encouraging the use of solar energy will encourage local economic development, diversify the community's energy supply portfolio, and limit exposure to fiscal risks associated with imported fossil fuels.

F. **Improve Competitive Markets** - Solar energy systems offer additional energy choice to consumers and will improve competition in the electricity and natural gas supply market.

III. Definitions

Solar Definitions

Not all these terms are used in this model ordinance, nor is this a complete list of solar definitions. As a community develops its own design standards for solar technology, many of the concepts defined here may be helpful in meeting local goals. For instance, solar daylighting devices may change the exterior appearance of the building, and the community may choose to distinguish between these devices and other architectural changes.

Solar Energy System: A solar energy system whose primary purpose is to harvest energy by transforming solar energy into another form of energy or transferring heat from a collector to another medium using mechanical, electrical, or chemical means.

Building-integrated Solar Energy Systems: A solar energy system that is an integral part of a principal or accessory building, rather than a separate mechanical device, replacing or substituting for an architectural or structural component of the building. Building-integrated systems include but are not limited to photovoltaic or hot water solar energy systems that are contained within roofing materials, windows, skylights, and awnings.

Grid-intertie Solar Energy System: A photovoltaic solar energy system that is connected to an electric circuit served by an electric utility company.

Ground-Mount: A solar energy system mounted on a rack or pole that rests or is attached to the ground. Ground-mount systems can be either accessory or principal uses.

Off-grid Solar Energy System: A photovoltaic solar energy system in which the circuits energized by the solar energy system are not electrically connected in any way to electric circuits that are served by an electric utility company.

Passive Solar Energy System: A solar energy system that captures solar light or heat without transforming it to another form of energy or transferring the energy via a heat exchanger.

Photovoltaic System: A solar energy system that converts solar energy directly into electricity.

Renewable Energy Easement, Solar Energy Easement: An easement that limits the height or location, or both, of permissible development on the burdened land in terms of a structure or vegetation, or both, for the purpose of providing access for the benefited land to wind or sunlight passing over the burdened land.

Renewable Energy System: A solar energy or wind energy system. Renewable energy systems do not include passive systems that serve a dual function, such as a greenhouse or window.

Roof-Mount: A solar energy system mounted on a rack that is fastened to or ballasted on a building roof. Roof-mount systems are accessory to the principal use.

Roof Pitch: The final exterior slope of a building roof calculated by the rise over the run, typically but not exclusively expressed in twelfths such as 3/12, 9/12, 12/12.

Solar Access: Unobstructed access to direct sunlight on a lot or building through the entire year, including access across adjacent parcel air rights, for the purpose of capturing direct sunlight to operate a solar energy system.

Solar Farm: A commercial facility that converts sunlight into electricity, whether by photovoltaics (PV), concentrating solar thermal devices (CST), or other conversion technology, for the primary purpose of wholesale sales of generated electricity. A solar farm is the principal land use for the parcel on which it is located.

Solar Garden: A commercial solar-electric (photovoltaic) array that provides retail electric power (or a financial proxy for retail power) to multiple households or businesses residing or located off-site from the location of the solar energy system. A community solar system may be either an accessory or a principal use.

Solar Resource: A view of the sun from a specific point on a lot or building that is not obscured by any vegetation, building, or object for a minimum of four hours between the hours of 9:00 AM and 3:00 PM Standard time on all days of the year.

Solar Collector: A device, structure or a part of a device or structure for which the primary purpose is to transform solar radiant energy into thermal, mechanical, chemical, or electrical energy.

Solar Collector Surface: Any part of a solar collector that absorbs solar energy for use in the collector's energy transformation process. Collector surface does not include frames, supports and mounting hardware.

Solar Resource

Understanding what defines a "solar resource" is foundational to how land use regulation affects solar development. Solar energy resources are not simply where sunlight falls. A solar resource has minimum spatial and temporal characteristics, and needs to be considered not only today but also into the future. Solar energy equipment cannot function as designed if installed in partial shade, with too few hours of daily or annual direct sunlight, or without southern or near-southern exposure. Many provisions of the model ordinance are predicated on the concept that a solar resource has definable characteristics that are affected by local land use decisions and regulation.

Solar Daylighting: A device specifically designed to capture and redirect the visible portion of the solar spectrum, while controlling the infrared portion, for use in illuminating interior building spaces in lieu of artificial lighting.

Solar Energy: Radiant energy received from the sun that can be collected in the form of heat or light by a solar collector.

Solar Energy System: A device, array of devices, or structural design feature, the purpose of which is to provide for generation of electricity, the collection, storage and distribution of solar energy for space heating or cooling, daylight for interior lighting, or water heating.

Solar Heat Exchanger: A component of a solar energy device that is used to transfer heat from one substance to another, either liquid or gas.

Solar Hot Air System: A solar energy system (also referred to as Solar Air Heat or Solar Furnace) that includes a solar collector to provide direct supplemental space heating by heating and re-circulating conditioned building air. The most efficient performance typically uses a vertically mounted collector on a south-facing wall.

Solar Hot Water System: A system (also referred to as Solar Thermal) that includes a solar collector and a heat exchanger that heats or preheats water for building heating systems or other hot water needs, including residential domestic hot water and hot water for commercial processes.

Solar Mounting Devices: Racking, frames, or other devices that allow the mounting of a solar collector onto a roof surface or the ground.

Solar Storage Unit: A component of a solar energy device that is used to store solar generated electricity or heat for later use.

IV. Permitted Accessory Use. Solar energy systems shall be allowed as an accessory use in all zoning classifications where structures of any sort are allowed, subject to certain requirements as set forth below. Solar energy systems that do not meet the visibility standards in C. below will require a conditional use permit, except as provided in Section V. Conditional Accessory Uses.

Height - Rooftop System

This ordinance notes exceptions to the height standard when other exceptions are granted in the ordinance. Communities should directly reference the exception language, rather than use the placeholder language here.

Height - Ground or Pole Mounted

This ordinance sets a 20-foot height limit, assuming a standard that is higher than typical height limits for accessory structures, but lower than the principal structure. Communities may want to consider balancing height with setback, allowing taller systems if set back farther, for instance, an extra foot of height for every additional two feet of setback. In rural (or large lot) areas height standards are unlikely to constrain solar development. Solar resources are unlikely to be constrained by trees or buildings on adjacent lots, and the lot is likely to have adequate solar resource for a ground-mount application even if the roof is shaded.

A. Height: Solar energy systems must meet the following height requirements:

1. Building or roof-mounted solar energy systems shall not exceed the maximum allowed height in any zoning district. For purposes of height measurement, solar energy systems other than building-integrated systems shall be given an equivalent exception to height standards as building-mounted mechanical devices or equipment.
2. Ground or pole-mounted solar energy systems shall not exceed 20 feet in height when oriented at maximum tilt.

B. Set-back: Solar energy systems must meet the accessory structure setback for the zoning district and primary land use associated with the lot on which the system is located.

1. **Roof or Building-mounted Solar Energy Systems.** In addition to the building setback, the collector surface and mounting devices for roof-mounted solar energy systems shall not extend beyond the exterior perimeter of the building on which the system is mounted or built, unless the collector and mounting system has been explicitly engineered to safely extend beyond the edge, and setback standards are not violated. Exterior piping for solar hot water systems shall be allowed to extend beyond the perimeter of the building on a side yard exposure. Solar collectors mounted on the sides of buildings and serving as awnings are considered to be building-integrated systems and are regulated as awnings.
2. **Ground-mounted Solar Energy Systems**. Ground-mounted solar energy systems may not extend into the side-yard or rear setback when oriented at minimum design tilt, except as otherwise allowed for building mechanical systems.

C. Visibility: Solar energy systems shall be designed to blend into the architecture of the building as described in C.2., or otherwise be screened from routine view from public right-of-ways other than alleys. The color of the solar collector is not required to be consistent with other roofing materials.

Building Integrated PV

Building integrated solar energy systems can include solar energy systems built into roofing (existing technology includes both solar shingles and solar roofing tiles), into awnings, skylights, and walls. This ordinance only addresses building integrated PV, but examples of building integrated solar thermal applications may also be available.

1. **Building Integrated Photovoltaic Systems.** Building integrated photovoltaic solar energy systems shall be allowed regardless of whether the system is visible from the public right-of-way, provided the building component in which the system is integrated meets all required setback, land use or performance standards for the district in which the building is located.
2. **Solar Energy Systems with Mounting Devices.** Solar energy systems using roof mounting devices or ground-mount solar energy systems shall not be restricted for aesthetic reasons if the system is not visible from the closest edge of any public right-of-way other than an alley. Roof-mount systems on pitched roofs that are visible from the nearest edge of the street frontage right-of-way shall not have a highest finished pitch steeper than the roof pitch on which the system is mounted, and shall be no higher than ten (10) inches above the roof.
3. **Reflectors.** All solar energy systems using a reflector to enhance solar production shall minimize glare from the reflector affecting adjacent or nearby properties. Measures to minimize glare include selective placement of the system, screening on the north side of the solar array, modifying the orientation of the system, reducing use of the reflector system, or other remedies that limit glare.

D. Coverage: Roof or building mounted solar energy systems, excluding building-integrated systems, shall allow for adequate roof access for fire-fighting purposes to the south-facing or flat roof upon which the panels are mounted. Ground-mount systems shall not exceed half the building footprint of the principal structure, and shall be exempt from impervious surface calculations if the soil under the collector is not compacted and maintained in vegetation. Foundations, gravel, or compacted soils are considered impervious.

E. Historic Buildings: Solar energy systems on buildings within designated historic districts or on locally designated historic buildings (exclusive of State or Federal historic designation) must receive approval of the community Heritage Preservation Commission, consistent with the standards for solar energy systems on historically designated buildings published by the U.S. Department of Interior.

Roof-Mounted Solar Energy Systems

This ordinance sets a threshold for solar panels that they not be steeper than the finished roof pitch. Mounted systems steeper than the finished roof pitch change the appearance of the roof, and sometimes create additional considerations in regard to the wind and drift load on structural roof components. Safety risks can be mitigated through structural review or roof structure modification if the aesthetic impacts are not a concern to the community.

Reflectors

Unlike the solar collector, systems that use a reflector do create a potential glare situation that may be greater than building windows. Reflectors are designed to reflect, not absorb, light. However, the glare risk is intermittent and seasonal (usually only in the summer, early morning or late evening, and only for a limited amount of time). Counties may want to include provisions regarding reflector glare in the event that a glare nuisance situation arises in order to provide guidance for addressing the nuisance.

Accessory Use Impervious Surface

The community should consider an important distinction between a ground-mount solar array and the roof of an accessory building; the un-compacted and vegetated ground under the array can be used to infiltrate stormwater. Having the infiltration area does not eliminate all the impacts of the collector surface, but should be considered as a significant mitigating factor.

Coverage

Roof coverage limitations are generally not necessary, as some of the roof is likely to be shaded or otherwise not suitable for solar energy. Coverage is an issue of concern to ensure ready roof access in the event of a fire. Coverage limits can be a percentage limitation, such as 80% of the total south-facing roof, or a required setback from one or more edges.

F. Plan Approval Required: All solar energy systems shall require administrative plan approval by the Model Community zoning official via the review of the application for a building permit.

1. **Plan Applications.** Plan applications for solar energy systems shall be accompanied by to-scale horizontal and vertical (elevation) drawings. The drawings must show the location of the system on the building or on the property for a ground-mount system, including the property lines.

   a. **Pitched Roof Mounted Solar Energy Systems.** For all roof-mounted systems other than a flat roof the elevation must show the highest finished slope of the solar collector and the slope of the finished roof surface on which it is mounted.

   b. **Flat Roof Mounted Solar Energy Systems.** For flat roof applications a drawing shall be submitted showing the distance to the roof edge and any parapets on the building and shall identify the height of the building on the street frontage side, the shortest distance of the system from the street frontage edge of the building, and the highest finished height of the solar collector above the finished surface of the roof.

2. **Plan Approvals.** Applications that meet the design requirements of this ordinance, and do not require an administrative variance, shall be granted administrative approval by the zoning official and shall not require Planning Commission review. Plan approval does not indicate compliance with Building Code or Electric Code.

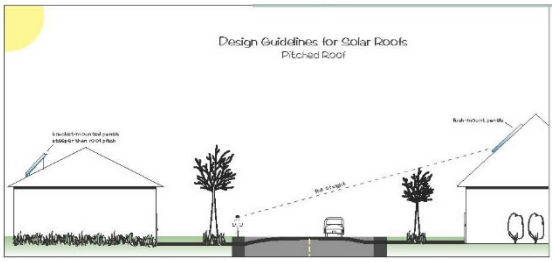
G. Approved Solar Components: Electric solar energy system components must have a UL listing or approved equivalent and solar hot water systems must have an SRCC rating.

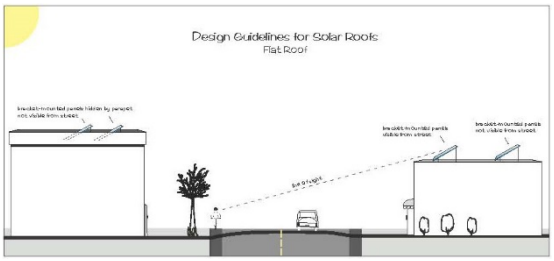
H. Compliance with Building Code: All solar energy systems shall meet approval of local building code officials, consistent with the State of Illinois Building Code, and solar thermal systems shall comply with HVAC-related requirements of the Energy Code.

I. Compliance with State Electric Code: All photovoltaic systems shall comply with the Illinois State Electric Code.

Plan Approval

This process is generally part of the process for obtaining a building permit. If the community does not issue building permits, it can be tied to a land use permit instead. For rural areas or cities without standards for rooftop systems, the plan approval section may be eliminated.





Glare (Accessory Uses)

This ordinance does not include glare standards for accessory use solar installations. Solar collectors (the panels) have glass surfaces and thus will reflect light. However, the glare risk associated with accessory use solar is generally lower and less intrusive to nearby land uses than glare from glass windows, which are ubiquitous in developed areas. The surface area of a residential solar array may actually be less than the window surface area of a typical single family home. The horizontal orientation of a window is much more likely to reflect sunlight into the neighbor's home or onto a nearby street than is a solar array (which is tilted toward the sky). In most cases, a solar panel reflects less than a window.

For the most part, concerns about glare from residential systems are misplaced: local governments do not regulate reflected light from window glass or other glass building components. That is not to say that there is not occasionally glare from a solar panel - if the angle of the sun and the panel and the viewer are positioned just right. But, like windows, the reflection is intermittent and of short duration.

J. **Compliance with State Plumbing Code:** Solar thermal systems shall comply with applicable Illinois State Plumbing Code requirements.

K. **Utility Notification:** All grid-intertie solar energy systems shall comply with the interconnection requirements of the electric utility. Off-grid systems are exempt from this requirement.

V. Principal Uses. Model Community encourages the development of commercial or utility scale solar energy systems where such systems present few land use conflicts with current and future development patterns. Ground-mounted solar energy systems that are the principal use on the development lot or lots are conditional uses in selected districts.

A. **Solar gardens:** Model Community permits the development of community solar gardens, subject to the following standards and requirements:

1. **Rooftop Gardens Permitted.** Rooftop community systems are permitted in all districts where buildings are permitted.
2. **Ground-Mount Gardens Conditional.** Ground-mount community solar energy systems must be less than five acres in total size, and are a conditional use in all districts. Ground-mount solar developments covering more than five acres shall be considered solar farms.
3. **Interconnection.** An interconnection agreement must be completed with the electric utility in whose service territory the system is located.
4. **Dimensional Standards.** All structures must comply with setback, height, and coverage limitations for the district in which the system is located.
5. **Other Standards.** Ground-mount systems must comply with all required standards for structures in the district in which the system is located.

Community Solar or Solar Gardens

Community solar systems differ from rooftop or solar farm installations primarily in regards to system ownership and disposition of the electricity generated, rather than land use considerations. There is, however, a somewhat greater community interest in community solar, and thus communities should consider creating a separate land use category.

This language limits the size of the garden to five acres, which is an installation of no more than one MW of solar capacity. Communities should tailor this size limit to community standards, which may be smaller or larger.

B. **Solar farms:** Ground-mount solar energy arrays that are the primary use on the lot, designed for providing energy to off-site uses or export to the wholesale market, are permitted under the following standards:

1. **Conditional Use Permit.** Solar farms are conditional uses in agricultural districts, industrial districts, airport safety zones subject to (7) below, and in the landfill overlay district.
2. **Stormwater and NPDES**. Solar farms are subject to Model Community's stormwater management and erosion and sediment control provisions and NPDES permit requirements.

Solar Farm Conditional Uses

The districts listed here are examples. Each community needs to consider its zoning districts and evaluate where solar farms are suitable.

Stormwater Standards

As noted with ground-mount accessory use installations, the community needs to consider the solar collector as impervious surfaces. The collector surface is impervious, but the un-compacted and vegetated ground under the array can be used to infiltrate storm water. A solar farm will almost always require an NPDES permit. However, greater attention should be given, in developing the SWPPP, to how the applicant manages the ground under the panels than to the panels themselves.

3. **Ground Cover and Buffer Areas.** The following provisions shall be met related to the clearing of existing vegetation and establishment of vegetated ground cover. Additional requirements may apply as required by Model Community.

    a. Large-scale removal of mature trees on the site is discouraged. Model Community may set additional restrictions on tree clearing, or require mitigation for cleared trees.

    b. Top soils shall not be removed during development, unless part of a remediation effort.

    c. Soils shall be planted to and maintained in perennial vegetation to prevent erosion, manage run off and build soil. Seeds should include a mix of grasses and wildflowers native to the region of the project site. Plant material must not have been treated with systemic insecticides, including neonicotinoids.

    d. Vegetated ground cover meeting the provisions of B.3.c. shall be established and maintained on the site for the duration of operation, until the site is decommissioned.

    e. The applicant shall submit a financial guarantee in the form of a letter of credit, cash deposit or bond in favor of the Community equal to one hundred twenty-five (125) percent of the costs to meet the beneficial habitat standard. The financial guarantee shall remain in effect until vegetation is sufficiently established.

Ground Cover Standards

Perennial grasses and wildflowers planted under the panels, between arrays, and in setback or buffer areas will substantially mitigate the stormwater risks associated with solar arrays, and result in less runoff than typically seen from many types of agriculture. Moreover, establishing and maintaining native ground cover can have important co-benefits to the community or the property owner. Native grasses can be harvested for forage and wildflowers and blooming plants can create pollinator and bird habitat, and maintaining the site in native vegetation will build soils that can be turned back into agriculture at the end of the solar farm's life.

Financial Surety

Communities frequently require bonds or similar financial guarantees when infrastructure improvements are required for a development project. The beneficial habitat installation can be considered in a similar light. Establishing a self-sustaining pollinator or native habitat ground cover requires maintenance over the first 2-3 years, and some maintenance over the life of the project.

4. **Foundations.** A qualified engineer shall certify that the foundation and design of the solar panels racking and support is within accepted professional standards, given local soil and climate conditions.

5. **Other Standards and Codes.** All solar farms shall be in compliance with all applicable local, state and federal regulatory codes, including the State of Illinois Uniform Building Code, as amended; and the National Electric Code, as amended.

6. **Power and Communication Lines.** Power and communication lines running between banks of solar panels and to nearby electric substations or interconnections with buildings shall be buried underground. Exemptions may be granted by Model Community in instances where shallow bedrock, water courses, or other elements of the natural landscape interfere with the ability to bury lines, or distance makes undergrounding infeasible, at the discretion of the zoning administrator.

7. **Site Plan Required.** A detailed site plan for both existing and proposed conditions must be submitted, showing location of all solar arrays, other structures, property lines, rights-of-way, service roads, floodplains, wetlands and other protected natural resources, topography, electric equipment, and all other characteristics requested by Model Community. The site plan should also show all zoning districts, and overlay districts.

8. **Aviation Protection.** For solar farms located within 500 feet of an airport or within approach zones of an airport, the applicant must complete and provide the results of the Solar Glare Hazard Analysis Tool (SGHAT) for the Airport Traffic Control Tower cab and final approach paths, consistent with the Interim Policy, FAA Review of Solar Energy Projects on Federally Obligated Airports, or most recent version adopted by the FAA.

9. **Agricultural Protection.** Solar farms must comply with site assessment or soil identification standards that are intended to protect agricultural soils.

10. **Decommissioning.** A decommissioning plan shall be required to ensure that facilities are properly removed after their useful life. Decommissioning of solar panels must occur in the event they are not in use for 12 consecutive months. The plan shall include provisions for removal of all structures and foundations, restoration of soil and vegetation and a plan ensuring financial resources will be available to fully decommission the site. Disposal of structures and/or foundations shall meet the provisions of the Model Community Solid Waste Ordinance. Model Community may require the posting of a bond, letter of credit or the establishment of an escrow account to ensure proper decommissioning.

Site Plan

Solar farm developers should provide a site plan similar to that required by the community for any other development. Refer to your existing ordinance to guide site plan submittal requirements.

Glare

Solar collectors (the panels) have glass surfaces and thus can create glare. The glare risk is generally lower and less intrusive to nearby land uses than glare from glass window. Panels are pitched toward the sun and reflections are almost always upward. Moreover, solar panels are specifically designed to be anti-glare, as reflected light lowers the panel efficacy. However, exceptions for consideration of glare include protecting air traffic control towers and approach paths.

Aviation Standards

This standard was developed for the FAA for solar installations on airport grounds. It can also be used for solar farm and garden development in areas adjacent to airports.

Agricultural Protection

If the community has ordinances that protect agricultural soils, this provision applies those same standards to solar development. Counties should understand, however, that solar farms do not pose the same level or type of risk to agricultural practices as does housing or commercial development.

VI. Conditional Accessory Uses. Model Community encourages the installation of productive solar energy systems and recognizes that a balance must be achieved between character and aesthetic considerations and the reasonable desire of building owners to harvest their renewable energy resources. Where the applicant demonstrates that the standards in Section IV. A., B., or C. cannot be met without diminishing, as defined below, the minimum reasonable performance of the solar energy system, the applicant may request a conditional use permit. A conditional use permit shall be granted if the following standards are met.

Accessory Conditional Uses

This model language uses a conditional use process to balance between aesthetic design considerations and the building owner's choice to use the property for generating renewable energy. If the community sets design standards for solar energy that are related to aesthetics or community character (rather than safety) the conditional use process allows the Planning Commission to depart from the design standards when such departures are necessary to allow for efficient harvest of solar energy. The conditional use standards spell out the conditions that staff would use to judge if the system genuinely could not be designed consistently with Section IV. (such as a lack of solar access except on the front of the building), and the metrics by which staff would judge screening or visual integration with the building. Some communities will have other means to allow this, such as an administrative variance process, to which these standards can be applied.

A. Minimum Performance, Defined: The following design thresholds are necessary for efficient operation of a solar energy system:

1. **Fixed-Mount Solar Energy Systems.** Solar energy systems must be mounted to face within 45 degrees of south (180 degrees azimuth).
2. **Solar Electric (photovoltaic) Systems.** Solar collectors must have a pitch of between 20 and 65 degrees.
3. **Solar Hot Water Systems.** Solar collectors need to be mounted at a pitch between 40 and 60 degrees.
4. **System Location.** The system must be located where the lot or building has a solar resource, as defined in this ordinance.

B. Standards for a CUP: A conditional use permit shall be granted if the applicant meets the following safety, performance and aesthetic conditions:

1. **Aesthetic Conditions.** The solar energy system must be designed to blend into the architecture of the building or be screened from routine view from public right-of-ways other than alleys to the maximum extent possible while still allowing the system to be mounted for efficient performance.
2. **Safety Conditions.** All applicable health and safety standards are met.
3. **Non-Tracking Ground-Mounted Systems.** Pole-mounted or ground-mounted solar energy systems must be set back from the property line by one foot.

VII. Restrictions on Solar Energy Systems Limited.

Consistent with 765 ILCS 165/, no homeowners' agreement, covenant, common interest community, or other contract between multiple property owners within a subdivision of Model Community shall prohibit or restrict homeowners from installing solar energy systems. No energy policy statement enacted by a common interest community shall be more restrictive than Model Community's solar energy standards.

Homeowner Installation Rights Protected

No deed restrictions, covenants, or similar binding agreements running with the land shall prohibit or have the effect of prohibiting a solar energy system from being installed on a building erected on a lot or parcel covered by the deed restrictions [. . .]

Source: Illinois Statutes, 765 ILCS 165/20

VIII. Renewable Energy Condition for Certain Permits.

A. Condition for Planned Unit Development (PUD) Approval - Model Community may require on-site renewable energy systems or zero-net-energy (ZNE) or zero-net-carbon (ZNC) building designs as a condition for approval of a PUD permit to mitigate for:

1. Risk to the performance of the local electric distribution system,
2. Increased emissions of greenhouse gases,
3. Other risks or effects inconsistent with Model Community's Comprehensive Plan.

B. Condition for Rezoning or Conditional Use Permit: Model Community may require on-site renewable energy systems or zero net energy construction as a condition for a rezoning or a conditional use permit.

1. The renewable energy condition may only be exercised for new construction or major reconstruction projects.
2. The renewable energy condition may only be exercised for sites that have sufficient on-site or district energy access to a local energy source. Local energy sources include, but are not limited to, solar energy resources, wind energy resources, biomass energy resources, and waste heat sources that can reasonably meet all performance standards and building code requirements.

Renewable Energy Conditions, Incentives

The community can use traditional development tools such as conditional use permits, PUDs, or other discretionary permits to encourage private investment in solar energy systems as part of new development or redevelopment. This model ordinance notes these opportunities for consideration by local governments. In most cases, additional ordinance language would need to be tailored to the community's ordinances.

For instance, a provision that PUDs (or other special district or flexible design standard) incorporate solar energy should be incorporated into the community's PUD ordinance rather than being a provision of the solar standards.

Conditional use permits generally include conditions, and those conditions can include renewable energy or zero net energy design, but only if the conditions are clearly given preference in policy or plan. Moreover, the community should note the desired solar conditions (solar-ready construction, incorporation of rooftop solar, zero-net-energy design) in both policy and in the CUP section of the ordinance. Explicit reference to climate or energy independence goals in the ordinance and explicit preference for such conditions will set a foundation for including such conditions in the permit.

IX. Solar Roof Incentives. Model Community has identified the following incentives to encourage development of solar energy systems.

A. Density Bonus: Any application for subdivision of land in the ___ Districts that will allow the development of at least four new lots of record shall be allowed to increase the maximum number of lots by 10% or one lot, whichever is greater, provided all building and wastewater setbacks can be met with the increased density, if the applicant enters into a development agreement guaranteeing at each three (3) kilowatts of PV.

B. Financing: Model Community provides low-rate financing or loan guarantees to development that provides specific types of preferred amenities. Development that incorporates on-site solar production or zero-net-energy buildings qualifies for such incentives.

C. Solar-Ready Buildings: Model Community encourages builders to use solar-ready design in buildings. Buildings that submit a completed U.S. EPA Renewable Energy Ready Home Solar Photovoltaic Checklist (or other approved solar-ready standard) and associated documentation will be certified as a Model Community solar ready home, and are eligible for low-cost financing through Model Community's Economic Development Authority. A designation that will be included in the permit home's permit history.

D. Solar Access Variance: When a developer requests a variance from Model Community's subdivision solar access standards, the zoning administrator may grant an administrative exception from the standards provided the applicant meets the conditions of 1. and 2. below:

1. **Solar Access Lots Identified.** At least __% of the lots, or a minimum of __ lots, are identified as solar development lots.
2. **Covenant Assigned.** Solar access lots are assigned a covenant that homes built upon these lots must include a solar energy system. Photovoltaic systems must be at least three (3) KW in capacity and solar thermal systems must have at least 64 square feet of collector area.
3. **Additional Fees Waived.** Model Community will waive any additional fees for filing of the covenant.

Solar Roof Incentives

This section of the model ordinance includes a series of incentives that can be incorporated into development regulation. Most cities and many counties use incentives to encourage public amenities or preferred design. These same tools and incentives can be used to encourage private investment in solar energy. Communities should identify incentives that are already offered, extending that incentive to appropriate solar development.

Some of the incentives noted here are not zoning incentives, but fit more readily into incentive programs offered by the community (such as financing or incentive-based design standards).

Solar Ready Buildings

New buildings can be built "solar-ready" at very low cost (in some cases the marginal cost is zero). Solar energy installation costs continue to decline in both real and absolute terms, and are already competitive with retail electric costs in many areas. If new buildings have a rooftop solar resource, it is likely that someone will want to put a solar energy system on the building in the future. A solar ready building greatly reduces the installation cost, both in terms of reducing labor costs of retrofits and by "pre-approving" the installation relative to building codes.

A community's housing and building stock is a form of infrastructure that, although built by the private sector, remains in the community when the homeowner or business leaves the community. Encouraging solar-ready construction ensures that current and future owners can take economic advantage of their solar resource when doing so makes the most sense for them.

Solar Access Subdivision Design

Some communities will require solar orientation in the subdivision ordinance, such as requiring an east-west street orientation within 20 degrees to maximize lot exposure to solar resources. However, many such requirements are difficult to meet due to site constraints or inconsistency with other requirements (such as connectivity with surrounding street networks). Rather than simply grant a variance, the community can add a condition that lots with good solar access be developed as solar homes.

Grow Solar

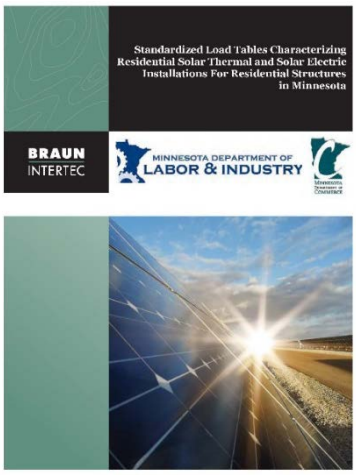
Solar Permitting for Illinois Municipalities

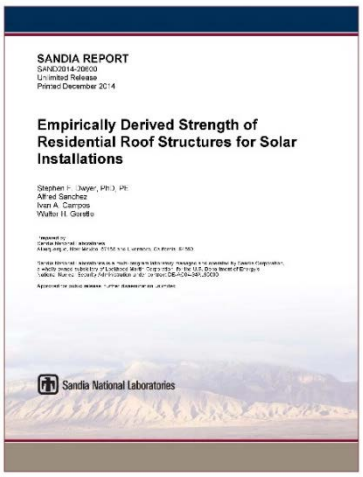
When a home or business owner makes the decision to install solar, the process begins in earnest for the solar installer. An Illinois municipality can help reduce the cost of solar development by setting clear and predictable standards for the permitting and inspection process. Making the permit and inspection process transparent and predictable to contractors saves time for both contractors and municipalities. The Solar America Board of Code and Standards (Solar ABCS) developed a set of permitting principals and standards for permitting solar installations based on thousands of installations across the nation and years of data collection and research. These standards are the national best practices that local governments across the nation adapt to their community circumstances.

However, a one-size-fits-all approach does not work for solar permitting in Illinois municipalities. Communities of different sizes have different processes. Permitting in a rural city will look different than the process in the City of Chicago. Cities of similar size have distinct characteristics in their building stock that call for different approaches to permitting. However, most Illinois municipalities use a building code standard based on the State code, and should rely on the same principals and standards to make the permitting process transparent, predictable, and based on the best evidence and research. With a new and evolving technology such as solar energy, local governments should clarify the technical and administrative processes so permit staff have a roadmap for dealing with technology and installation practices for which they might be unfamiliar.

A template for adapting national permitting best practices to Illinois cities is provided below. The template provides standardized solar permit language for Midwestern cities, but also notes where local municipalities might choose to modify the standards. The City of Chicago, Illinois' solar "beacon" city, set the example for Illinois by adapting the national permitting best practices to their unique regulatory standards and building stock. The Chicago example serves as a proof of concept for the rest of Illinois, and elements of the Chicago guidelines and standards apply to other cities. Chicago incorporated additional elements into their permitting processes, such as design standards, a solar web portal for contractors and homeowners, and integration with the electric utility's interconnection process.

Additional resources related to permitting processes, standards, and research are included at the end of the document for reference by municipal staff, elected officials and installers.





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Grow Solar

Illinois Standardized Permitting Template

JOB SITE ADDRESS _____

NAME OF BUILDING OWNER _____

JOB VALUATION _____

Installation Contractor	Name _____ Address _____ City _____ State _____ Zip _____ State License No. _____ Phone _____

Required Information for Permit:

1. Site plan showing location of major components on the property and a framing cross section that identifies type of support (rafter or truss), spacing, span dimension, and approximate roof slope. The drawings need not be exactly to scale, but it should represent relative location of components. PV arrays on dwellings with a 3' perimeter space at ridge and sides may not need separate fire service review.
2. Specification sheets and installation manuals for all manufactured components including, but not limited to, PV modules, inverter(s), combiner box, disconnects, and mounting system.
3. *If city manages electric permit process* - Electrical diagram showing PV array configuration, wiring system, overcurrent protection, inverter, disconnects, required signs, and AC connection to building (see accompanying standard electrical diagram).

If location of the solar resource on the roof requires installation within three feet of sides or ridge, check with building official to determine if fire service review is needed.

Step 1: Structural Review of PV Installation Mounting System

1. Is the roof supporting the installation a pitched roof in good condition, without visible sag or deflection, no cracking or splintering of support, or other potential structural defect? ☐ Yes ☐ No
2. Is the roof a rafter system? ☐ Yes ☐ No
3. Is the equipment to be flush-mounted to the roof such that the collector surface is parallel to the roof?

   ☐ Yes ☐ No
4. Is the roofing type lightweight? ☐ Yes (composition, lightweight masonry, metal, etc…) ☐ No
5. Does the roof have a single layer roof covering?

   ☐ Yes ☐ No

For truss systems, additional information may be needed to ascertain the truss' design loads. The SolarStruc tool (http://www.growsolar.org/wp-content/uploads/2012/06/Solarstruc-2.2.xls) allows contractors to calculate truss capacity for solar installations. Please contact the building official for standards on when structural analysis will be needed.

If "No" to any of questions 1 -4 above, additional documentation may be required. Documentation may need to demonstrate the structural integrity of the roof and all necessary structural modifications needed to maintain integrity. A statement stamped by a Illinois licensed/certified structural engineer certifying integrity may be needed. Contact the building official to determine submittal requirements.

6. Identify method and types of weatherproofing for roof penetrations (e.g. flashing, caulk).

Mounting System Information:

7. Is the mounting structure an engineered product designed to mount PV modules with no more than an 18" gap beneath the module frames? ☐ Yes ☐ No

   If No, provide details of structural attachment certified by a design professional. Manufacturer's engineering specifications are sufficient to meet this requirement.

8. For manufactured mounting systems, fill information on the mounting system below:

   a. Mounting System Manufacturer _____

   b. Product Name and Model #_____

   c. Total Weight of PV Modules and Rails _____ lbs

   d. Total Number of Attachment Points_____ (attachment points must be equally distributed across the array)

   e. Weight per Attachment Point (c÷d) _____ lbs

   f. Maximum Spacing between Attachment Points on a Rail _____inches (see product manual for maximum spacing allowed based on maximum design wind speed).

   g. Total Surface Area of PV Modules (square feet)_____ ft2

   h. Distributed Weight of PV Module on Roof (c÷g)_____ lbs/ft2

Attaching the rail to each rafter or truss that passes under the array, or to blocking installed between each support, may serve to mitigate for any structural uncertainties on older roofs or wind loading concerns. This approach is used by other Midwestern cities based upon engineering studies conducted with their building stock. Contact the building official to determine requirements.

If the outcome of e. is greater than 45 lbs or h. is greater than 5 lbs/ft2, a study or statement demonstrating the structural integrity of the installation, or a statement stamped by a Minnesota licensed/certified structural engineer, may be required. Contact the building official to determine requirements.

Step 2: Electrical Review of PV System

Please document the following information to be issued an electric permit. If the installation does not meet the following thresholds, additional information may be needed, as requested by the permit official.

1. PV modules, utility-interactive inverters, and combiner boxes are identified for use in PV systems.
2. The PV array is composed of 4 series strings or less per inverter.
3. The total inverter capacity has a continuous AC power output 13,440 watts or less
4. The AC interconnection point is on the load side of service disconnecting means (NEC 2011 705.12(D), NEC 2008 690.64(B)).
5. A standard electrical diagram should be used to accurately represent the PV system. Acceptable diagrams, in interactive PDF format, are available at www.solarabcs.org/permitting.

Fill out the standard electrical diagram completely. A guide to the electrical diagram is provided at www.solarabcs.org/permitting to help the applicant understand each blank to fill in. If the electrical system is more complex than the standard electrical diagram can effectively communicate, provide an alternative diagram with appropriate detail.

Step 3: Permit fee for residential installations

____ Fees $100
____ Additional inspection . . . . . $ 50.00

(Per inspection, when needed)

TOTAL FEE = $_____

RECEIPT NO. _____

DATE _____

Recommended fee for residential or small commercial solar installations is a fixed fee between $50 – 200, consistent with cost for services (permit processing, inspection) incurred by the government unit. Alternatively, the fee can be valuation based, but for a building permit should exclude the value of the solar collectors and electronics.

I HEREBY CERTIFY that I have completed and examined this application and certify that the information contained therein is correct. If a permit is issued, I agree all work will be done in conformance with all applicable ordinances and codes of this City and laws of the State of Illinois.

_____
CONTRACTOR OR AUTHORIZED AGENT/HOMEOWNER

Resources and Reference Material:

- Chicago Solar Express, http://www.cityofchicago.org/city/en/progs/env/solar_in_chicago.html
- Milwaukee Solar Permit, http://city.milwaukee.gov/MilwaukeeShines/Solar-Professionals/Permitting.htm#.VUD8_JNi9ps
- Saint Paul Solar Permit Checklist, http://www.stpaul.gov/DocumentCenter/View/76171
- National Renewable Energy Lab: *Permitting Best Practices* http://www.nrel.gov/docs/fy13osti/57104.pdf
- Interstate Renewable Energy Council: *Solar Permitting Best Practices*: http://www.irecusa.org/solar-permitting-best-practices/
- Solar America Board for Code and Standards (Solar ABCs): *Expedited Permit Process*, with sample line drawings for all installation types: http://www.solarabcs.org/
- Sandia National Laboratories, *Empirically Derived Strength of Residential Roof Structures for Solar Installations*, http://prod.sandia.gov/techlib/access-control.cgi/2014/1420600.pdf
- SolarStruc Tool, http://www.growsolar.org/wp-content/uploads/2012/06/Solarstruc-2.2.xls
- Minneapolis Saint Paul Solar Cities Program, *Standards for Rooftop Solar Thermal Retrofits*,
- Minnesota Division of Energy Resources/Department of Labor and Industry, *Standardized Load Tables Characterizing Residential Solar Thermal and Solar Electric Installations for Residential Structures*, http://mn.gov/commerce/energy/images/FINAL-Standardized-Load-Table-Report.pdf
- Grow Solar Inspection trainings, http://www.growsolar.org/technical-assistance/training-program-development/