

## 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's 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.

## Illinois Standardized Permitting Template

JOB SITE ADDRESS \_\_\_\_\_

NAME OF BUILDING OWNER \_\_\_\_\_

JOB VALUATION \_\_\_\_\_

<b>Installation Contractor</b>	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.

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.
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).

### 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 \_\_\_\_\_ 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÷f) \_\_\_\_\_ 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 distributed weight of the PV system is greater than 5 lbs/ft2, a study or statement demonstrating the structural integrity of the installation, or a statement stamped by an Illinois 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](http://www.solarabcs.org/permitting).

Fill out the standard electrical diagram completely. A guide to the electrical diagram is provided at [www.solarabcs.org/permitting](http://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](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](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/>