City of Marshfield

Guide to

Residential Solar Energy Permitting and Inspection (7.5kW or less)

Building Services Division • P.O. Box 727 • 630 South Central Avenue • Marshfield, WI 54449-0727
Foreword

The City of Marshfield and its Sustainable Marshfield Committee have set ambitious goals to expand residential use of renewable energy in the community. The Solarize Marshfield project, a solar group-purchasing program (which included workshops and a 10-15% cost savings with bulk purchasing power for participants) offered in partnership with Grow Solar Wisconsin, concluded in 2012. The Guide to Residential Solar Energy Permitting and Inspection followed as a means of streamlining the permitting and inspection process for the City. Installers that plan to deliver the benefits of solar energy in the Marshfield homes can follow this step-by-step guide to assist them with required documentation and necessary contacts throughout the process. This guide to local permitting will enable more solar energy generation in Marshfield residences and expand the many benefits provided by this form of renewable energy.

Table of Contents

- Page 2    Foreword
- Page 3    Eligibility
- Page 4    Important Information
- Page 5-6  Application and Inspection Instructions
- Page 7    Residential Solar Electrical Permit Application < 7.5kW
- Page 8-9  One Line Diagram and Notes Form
- Page 10-11 Example Installation Plan with Framing and Attachment Detail
- Page 12    Example Site Plan
- Page 13    Certificate for Electrical Service
- Page 14    Map of Marshfield City Hall
The City of Marshfield encourages the installation of solar energy systems and has streamlined the submission, review and approval process for residential solar photovoltaic projects. All new installations require electrical and building review and interconnection approval with Marshfield Utilities. This guide has been developed primarily as an overview of city permit and inspection requirements for only residential systems under 7.5 kW/DC.

**Eligibility**

**Electrical Considerations**
- Residential system under 7.5 kw/DC.
- System does not require line side connection or service panel upgrade
- No corrective measures are required to bring the property to code
- No electrical work will be covered up

**Zoning Considerations**
- Roof-top system is below roof-line OR if system extends beyond roof-line, must meet district height limits. To identify zoning district visit http://ci.marshfield.wi.us/planning/maps/

**Historical Considerations**
- Is not recognized as a historical building

Solar electric systems that do not meet the above eligibility requirement should contact the City of Marshfield (715-486-2016) to determine permitting requirements
**Important Information**

- **Code Compliance** - All photovoltaic systems shall be installed in accordance with the current edition of the Code and all applicable laws, regulations, licensing, and permit requirements adopted by this jurisdiction, and any and all manufacturers’ installation requirements. Marshfield currently enforces the following version of code:
  - *Wisconsin Electrical Code SPS 316*
  - *Wisconsin Uniform Dwelling Code SPS 320-325*
  - *Marshfield Code*

- **License Requirements** - All photovoltaic systems shall be installed by an individual and business that has been issued a current and appropriate license in accordance with state and local requirements.
  - *Electrical license*
  - *Contractor license*
  - *State license*

- **Fee** - The application fee for a residential solar PV permit for systems under 7.5 kW is $200 and covers all applicable fees. Separate building and electrical inspection permit applications and fees are NOT required for qualifying residential solar PV installations.

- **Equipment** - All equipment, array modules, inverters, racking, combiner boxes, DC disconnects, fittings, etc., shall be installed per approved plans and manufacturer installation instructions. All material and equipment shall be listed and labeled by an approved testing agency.

- **Array Placement** - Solar array shall not be placed on the premise or dwelling above underground electrical utility service or below overhead utility service.

- **Planning Review** - Planning Review - Roof-mounted solar energy systems that are located on an existing building or structure require a Site Plan with their application. If the PV system will exceed height requirements in the projects identified zoning district, a conditional use will be needed. Free-standing solar energy systems must comply with the city’s accessory structure conditions and set-back requirements.

If a project is located on a historic building then approval by the Historic Preservation Committee is required. Contact the Zoning Administrator (715.486.2075) to discuss requirements for completing a Certificate of appropriateness application.

Under Wis. Stat. § 66.0401, local governments -- counties, towns, cities and villages -- may not place any restriction on the installation or use of solar or wind energy systems unless the restriction:

- Serves to preserve or protect public health or safety
- Does not significantly increase system cost or efficiency
- Allows for an alternative system of comparable cost and efficiency

This law effectively prohibits unreasonable public land use controls covering solar and wind energy systems by defining a fairly narrow set of “reasonable” conditions.

A separate law, Wis. Stat. § 236.292, voids all restrictions on platted land that prevent or unduly restrict the construction or operation of solar energy systems. This law effectively prohibits private land use controls (e.g., deed restrictions, homeowner association regulations, easements, etc.) from preventing the installation & operation of solar energy systems.
### Solar Permitting Application & Inspection Instructions

<table>
<thead>
<tr>
<th>Project Milestone</th>
<th>Instructions</th>
<th>Documentation Required</th>
<th>Contact Information</th>
</tr>
</thead>
</table>
| **Step 1.**  
Apply for interconnection agreement | Gain interconnection pre-approval from Marshfield Utilities. | • Include site plan showing location of external disconnection switch  
• Include cut sheet  
• Include 1 line schematic diagram of the system (Link to form) | **Marshfield Utilities**  
Attn: Nicolas Kumm  
kumm@marshfieldutilities.org  
Mail: 2000 South Central Ave.  
PO Box 670  
Marshfield, WI 54449  
Phone: (715) 387-1195 |
| **Step 2.**  
Schedule a preliminary inspection | Contact the City of Marshfield Inspector to receive a preliminary inspection to review compliance with all applicable codes.  
- National Electrical Code  
- Wisconsin State Electrical Code  
- National Electrical Safety Code  
- City of Marshfield Electrical Code  
- Wisconsin Urban Dwelling Code  
- City of Marshfield Building Code | • Structural information worksheet (Link to form) – Roof type and system weight calculations  
• Framing plan - Specify the size, grade and maximum spans of all existing and new roofing framing members that will carry the weight of the PV arrays.  
• Attachment plan - Attachment details for PV modules. Provide enough information to clearly verify the size, type and spacing of all fasteners. | **City of Marshfield Electrical Inspector**  
Phone: 715-486-2016  
Email-Pat.Kilty@ci.marthfield.wi.us |
| **Step 3.**  
Complete permit & additional documentation  
(Continued on page 5...) | Complete and submit residential solar permit application form, fee and other additional supporting documentation to the City of Marshfield. | **Permit** : Link to City of Marshfield Residential Solar PV Permit Application Form (Link to form)  
**Structural** : Applications for installations on truss roof system need to be accompanied by engineering data, based upon accepted engineering practices, that indicates that the roof system will properly support all applied solar PV loads, including dead weight and wind uplift. Solar PV systems installed on rafter framed roof systems need to meet the structural load requirements of SPS 321.02 and the associated appendix span tables.  
**Electrical** : Complete and submit a 1 line schematic diagram of the system (Link to form)  
• Load calculations for arrays.  
• Wire types and sizes.  
• All associated equipment & disconnects.  
• Location, wire sizes, and details for all grounding methods. | Acceptable submission contacts:  
Email: Pat.Kilty@ci.marthfield.wi.us  
Over-the-counter  
630 South Central Ave, 6th Floor  
Fax - 715-384-7631  
Mail - P.O. Box 727, 630 South Central Avenue Marshfield, WI 54449-0727 |
### Solar Permitting Application & Inspection Instructions

<table>
<thead>
<tr>
<th>Project Milestone</th>
<th>Instructions</th>
<th>Documentation Required</th>
<th>Contact Information</th>
</tr>
</thead>
</table>
| **Step 3.** Complete permit & additional documentation (continued) | Complete and submit residential solar permit application form, fee and other additional supporting documentation to the City of Marshfield. | **Site Plans**: Complete and submit a site plan (Link to sample). Include:  
- Lot dimensions  
- Location of the solar PV array as well as any other existing structures located on the lot.  
- Any existing easements on the site plan | Acceptable submission contacts: Pat.Kilty@ci.marthield.wi.us  
Over-the-counter  
630 South Central Ave, 6th Floor  
Fax - 715-384-7631  
Mail - P.O. Box 727, 630 South Central Avenue Marshfield, WI 54449-0727 |
| **Step 4.** Schedule final inspection | After the project is complete, contact the City of Marshfield to schedule a final inspection. | Inspection checklist:  
- Size of service  
- Available breaker space  
- Line side tap needed  
- Service panel clearances  
- Proper grounding of Inverter and PV  
- How the conduit is ran from the inverter to the roof  
- Utility disconnect location  
- Proper wire size | City of Marshfield Electrical Inspector:  
Phone - 715-486-2016  
Pat.Kilty@ci.marthield.wi.us  
Mail - P.O. Box 727, 630 South Central Avenue Marshfield, WI 54449-0727 |
| **Step 5.** Schedule interconnection inspection | Contact Marshfield Utilities to schedule interconnection inspection. | It is recommended that the installer and customer attend the interconnection inspection. Customer/installer must have or provide (2) signed copies of PSC-6029, Distributed Generation Interconnection Agreement. Marshfield Utilities:  
Email: Kumm@marshfieldutilities.org | Marshfield Utilities  
Nick Kumm  
Kumm@marshfieldutilities.org  
Phone: (715) 387-1195 |

### Response Time

Marshfield strives to respond to solar permit applications, questions and inspections in a prompt manner. In general, contractors can anticipate the following response times:

- **Over the counter permit application processing by Marshfield staff**: Next Business Day
- **Mailed permit application processing by Marshfield staff**: Two Business Days (from when received)
- **Response to solar related inquiry or inspection scheduling request by Marshfield staff**: One Business Day
- **Scheduling notice required for preliminary or final inspections by Marshfield staff**: One Business Day
# Building Services Division

**SOLAR ELECTRICAL PERMIT APPLICATION**

**(RESIDENTIAL <7.5 KW)**

<table>
<thead>
<tr>
<th>Date: ___________________________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Property Owner Information</strong></th>
<th><strong>Site Location</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name__________________________</td>
<td>Address__________</td>
</tr>
<tr>
<td>Address_______________________</td>
<td>Is this a rental unit? _____ Yes _____ No</td>
</tr>
<tr>
<td>City_____________ State______ Zip_________</td>
<td>Phone____________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>General Contractor</strong></th>
<th><strong>Type of Service</strong> (Check all that apply):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name__________________</td>
<td>Single Phase _____ Three Phase _____</td>
</tr>
<tr>
<td>Address________________</td>
<td>Voltage _____ Amperage ________</td>
</tr>
<tr>
<td>City_____________ State______ Zip_________</td>
<td>Overhead _____ Underground _____</td>
</tr>
<tr>
<td>Phone________________</td>
<td>Existing service size__________ Line side tap____</td>
</tr>
<tr>
<td>Contractor No. #_________________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Electrical Contractor Information</strong></th>
<th><strong>Roofing:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(Indicate if same as general contractor)</td>
<td>Material _______ # of overlays______</td>
</tr>
<tr>
<td>Electrical __________________________</td>
<td>Manufactured truss/rafter/other________________</td>
</tr>
<tr>
<td>Address____________________________</td>
<td></td>
</tr>
<tr>
<td>City_____________ State______ Zip_________</td>
<td></td>
</tr>
<tr>
<td>Phone________________</td>
<td></td>
</tr>
<tr>
<td>Master License No. __________________</td>
<td></td>
</tr>
<tr>
<td>Electrical Contractor No._____________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>FEES</strong></th>
<th><strong>Valuation of Work:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Solar Electric Fee = <strong>$200</strong></td>
<td>$________________</td>
</tr>
<tr>
<td><strong>FAILURE TO OBTAIN AN PERMIT PRIOR TO COMMENCING WORK IS DOUBLE PERMIT FEE</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Description of Work:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Application Attachments</strong> (check if included):</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-line Electrical Diagram____</td>
</tr>
<tr>
<td>Structural Calculations____</td>
</tr>
<tr>
<td>Existing Structure Plan____</td>
</tr>
<tr>
<td>Framing Plan____</td>
</tr>
<tr>
<td>Cut Sheet (racking only)____</td>
</tr>
<tr>
<td>Attachment Plan____</td>
</tr>
<tr>
<td>Equipment Installation Specs____</td>
</tr>
<tr>
<td>Site Plan____</td>
</tr>
</tbody>
</table>

I hereby apply for an electrical permit and I acknowledge that the information above is complete and accurate: that the work will be in accordance with the all applicable State and Local Building Code, the National Electrical Code, the Wisconsin State Electrical Code, the NESCC and the City of Marshfield Electrical Code; that I understand this is not a permit but only an application for a permit and work is not to start without a permit; that the work will be in accordance with the approved plan in the case of work which requires a review and approval of plans.

____________________________
Applicant’s Signature

---

Building Services Division • P.O. Box 727 • 630 South Central Avenue • Marshfield, WI 54449-0727
PANEL INSTALLATION PLAN

SCALE 1/8" = 1'-0" (8) 39 1/2" x 120" PANELS

14 S. 39TH ST.
Structural Information Worksheet
(Show at preliminary site inspection and submit with permit application)

Roof Information
Approx. Age of Roof: _____ years  Roofing Type (Comp-Shingle Tile Shake Metal T&G): __________ Sheathing __________ Layers of Material __________

Roof Structure:  Rafters _______ Trusses _______ Other _______________________

Rafter Size: _____ x _____ inches   Rafter Spacing: _____ inches on center   Rafter Span: _____ ft. _____ in.

PV System Information:
Solar panel consists of ___________ solar modules  PV Array Weight: __________ psf

Mounting system has ___________ points of connection with the roof

Panel Weight Calculation:
Solar Module Weight = __________ lbs.  Mounting System Weight = lbs.

Total Panel Weight = ((# of modules) x (module wt.)) + (mounting system wt. = ( __________ x __________ ) + __________ = __________ lbs.

Point Load Calculation:
Point Load = (total panel wt.)/(# of points of connection) = __________ lbs

Distributed Load Calculation:
Solar Module Area = (length” x width”) / 144 = __________ x __________ = __________ ft²
City of Marshfield Guide to Residential Solar Energy Permitting and Inspection

Diagram for Example 1 - Standard String Inverter System

This form is available to download and complete in fill-in format at:

- AC Module Electrical Diagram
- Standard String Electrical Diagram
- Micro Inverter Electrical Diagram
- Supply Side Connection Electrical Diagram
Notes for Electrical Diagram for Example 1
Standard String Inverter System

This form is available to download and complete in fill-in format at:

- **AC Module Electrical Diagram**
- **Standard String Electrical Diagram**
- **Micro Inverter Electrical Diagram**
- **Supply Side Connection Electrical Diagram**
Indicate Distance

Sketch existing structures (i.e. building, garage)

Property Line

Property

Address

Proposed Structure Height

Principle Structure Height

Property Line

Property Line

Property Line

Property Line

N

S

E

W

N

S

E

W
MARSHFIELD UTILITIES
CERTIFICATE FOR ELECTRIC SERVICE
State of Wisconsin

Customer Name: ___________________________ Date: ___________________________
Service Address: ___________________________
City/Town/Village: ___________________________
County of: WOOD MARATHON CLARK
Mailing Address/other info: ___________________________
Electrical Contractor or wireman: ___________________________
Daytime Phone No.: ___________________________

TYPE OF SERVICE

[ ] Temporary [ ] Permanent Voltage: ___________________________
[ ] Underground [ ] Overhead Entrance Size (amps): ___________________________
[ ] Single Phase [ ] Three Phase Conductor Size: ___________________________
[ ] Pole [ ] Pedestal Permit No: ___________________________

Requested disconnect date __________________________ Requested disconnect time __________________________

Utility contact: __________________________ (WILL NOT PROCESS IF LEFT BLANK)

*UNDERGROUND INSTALLATIONS

Contractors MUST inform property owners of their responsibility to locate private facilities. These facilities include but are not limited to: sprinkler systems, downspout drains, outbuilding feeds, power to supplemental lighting, propane lines, private gas lines, sump pump drains, sewage line, well pump wires, pet fences and electronic security.

Contractor must also inform owner that final landscaping will be the responsibility of the owner. Marshfield Utilities will try to limit the amount of damage done but all flora and landscaping that is to be saved shall be removed from the area prior to work.

I certify that the property owner has been informed of their responsibilities.

This Certificate is given to absolve Marshfield Utilities from any liability resulting from the non-compliance of any such electrical work with the requirements of Wisconsin State Electrical Code.

Signature below shall indicate he or she is the electrical contractor or wireman who completed the wiring at the above listed address and that all of the electrical work done or performed fully conforms with the requirements of Marshfield Utilities – Electric Service Manual, the Wisconsin State Electrical Code, and all local government requirements. Energizing the described wiring will in no way create a hazard.

This written statement is made according to and in compliance with the provisions of Sec. 101.865 of Wisconsin Statutes and Marshfield Utilities rules. Any person who violates the provisions of Section 101.865 is guilty of a misdemeanor and shall be fined not less than $25 nor more than $100 or imprisoned in the county jail for not less than 30 days nor more than 6 months.

SIGNED (ELECTRICAL CONTRACTOR OR WIREMAN)
The City of Marshfield City Hall is located at 630 South Central Ave, Marshfield. Both the Department of Planning and the Division of Building Services are located on the 6th Floor.

Marshfield City Hall
630 South Central Ave.
Marshfield, WI 54449
Phone: 715-486-2016
Fax: 715-384-7631