Milwaukee Shines

Creating a Foundation for Solar

American Planning Association National Conference
April 15, 2013
Milwaukee Shines

Reducing Soft Costs

- Planning and Zoning
- Permitting
- Other Support
  - Solar-Ready
  - Financing
  - Education
Milwaukee Shines

US Dept of Energy
- Solar America City
- SunShot Initiative

Goals
- Increase installations
- Increase installers
- Reduce cost of solar
- Support manufacturing
- Public - Private Partnership
Milwaukee Solar Zoning

Wis. Stat. §66.0401
Solar Access Rights

No political subdivision may place any restriction on installation or use of solar energy system unless satisfies one of following conditions:

1. Serves to protect public health or safety.

2. Does not significantly increase cost of system or decrease efficiency.

3. Allows for alternative system of comparable cost and efficiency.
Milwaukee Solar Zoning

Solar Zoning Ordinance:
General Requirements

- Rooftop = no restrictions

- Ground mount = front and side set backs. Review by Zoning Board with neighbor input.

- Review will require installer to provide multiple options, costs, and site plans.
## Milwaukee Solar Zoning

### Solar Farm

<table>
<thead>
<tr>
<th>ZONING DISTRICT</th>
<th>USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>Permitted</td>
</tr>
<tr>
<td>Commercial</td>
<td>Special</td>
</tr>
<tr>
<td>Commercial Services</td>
<td>Permitted</td>
</tr>
<tr>
<td>Downtown</td>
<td>Special</td>
</tr>
<tr>
<td>Industrial</td>
<td>Permitted</td>
</tr>
<tr>
<td>Special (Schools)</td>
<td>Permitted</td>
</tr>
<tr>
<td>Lakefront Overlay</td>
<td>Special</td>
</tr>
</tbody>
</table>
Milwaukee Permitting 101

First Things First

- What does current structure look like?
- Get everyone in same room
- Stay on-task
- Record off-track comments
- Clarify. Clarify.
- SHW & PV
Milwaukee Permitting

Easy First Steps

- Needed installer credentials
- Required permits
- Supporting documents (w/ examples)
- Permit Costs
- CONTACT INFO
Milwaukee Permitting

Installer Checklist

- Eliminate back and forth
- Put responsibility on installer
- Available online

CONTACT INFO

Solar Photovoltaic (PV) System Submittal Checklist

Instructions:
1. Type or print a separate form for each location.
2. Return all copies with permits and fee to:
   Milwaukee Development Center
   803 N. Broadway Street, Milwaukee, WI 53202-3617
   PH: (414) 286-8207, FAX: (414) 286-0251

Installer Credentials:
- I have the State of Wisconsin Master Electrician License.
- I have the City of Milwaukee Electrical License.
- My business/I have the State of Wisconsin Dwelling Contractor Certification,
- My business/I have or employ someone who has the State of Wisconsin Dwelling Contractor Qualifier Certification.
- My business/I have the City of Milwaukee Home Improvement Contractor License.

Documents:
- Completed City of Milwaukee Electrical Permit Application (can be submitted via e-Permits system)
- Completed City of Milwaukee Building Permit Application
  - Completed Plan Review Application
  - Roof documentation showing attachment and existing structure (such as rafter size, spacing, span, grade, and species of lumber, etc.)
  - Documentation showing a catalog cut out of sheet of the solar device by weight
  - Provide structural calculations that show the structure is capable of supporting the additional weight of the new solar equipment
  - Site plan and placement plan showing the location of the solar energy system on the lot and the design of the system (include any improvements, landscaping, features on adjoining lots that impact the proposed system, etc.)

Fees:
- I have included Solar Electrical Permit Fee: $__________ $0.60 per KW (not to exceed $200.00 per unit)
  - Residential (One and Two Family): $65 minimum + $3.00 processing fee
  - Commercial: $75 minimum + $3.00 processing fee
- I have included Building Permit Fee: $__________
  - Residential (One and Two Family): $60 minimum + assessor fee
  - Commercial: $75 minimum + $3.00 processing fee

City of Milwaukee
Milwaukee Permitting

Improve Process

- Reduce # days to approve
  - Create policy for goal
  - Create expedited permit
    - Solar ABCs
- Consistent Permit $$
- Improve Inspection
  - Require training (online)
- All permits submitted online
EVOLUTION OF PROGRAM

- First considered options:
  - Residential PACE,
  - On-bill financing
  - Revolving loan program

- Partnered with private lender: Summit Credit Union

- Loan Loss Reserve
  - Energy Efficiency: $1 million LLR = $20 million
  - Solar: $100,000 LLR = $2 million
Milwaukee Financing

RESIDENTIAL BENEFITS

- Loan size: up to $15,000
  - $20,000 for solar
- Low interest rate (~5%)
- Term: up to 15 years
- Loosened underwriting criteria
- No money down
- No home equity
Milwaukee Shines

www.MilwaukeeShines.com

Amy Heart
aheart@milwaukee.gov
414-286-5593

www.growsolar.org

SunShot
U.S. Department of Energy
Beyond the Solar City: Building on Pittsburgh’s Successes to put Southwestern Pennsylvania on the Solar Map
SunShot Team Members

Partner Organizations

- PennFuture
- City of Pittsburgh
- Allegheny County
- Southwestern Pennsylvania Commission
- CONNECT (Congress of Neighboring Communities)
- SUNWPA (Solar Unified Network of Western Pennsylvania)

Consultants and Experts

- Environmental Planning & Design, LLC (EP&D)
- Attorneys from Goehring, Rutter & Boehm (Pittsburgh) and Cozen O’Conner (Philadelphia)
- Bill Brooks, national solar inspection expert
- Clean Energy Finance Center
Municipal Participants

Allegheny County

Aspinwall
Baldwin Borough
Brentwood
Carnegie
Collier
Dormont
Etna
Forest Hills
Green Tree
McKees Rocks
Monroeville

Beaver County

Mount Oliver
O’Hara
Pittsburgh
Richland
Scott
Sharpsburg
Shaler
Stowe
Upper St. Clair
West Mifflin
Wilkinsburg

Midland
Monaca
Solar in Pennsylvania

- 160 MW of solar installed
- Enough to power about 17,000 homes
- Currently ranking 8th nationally in total solar capacity
- 6,730 solar systems
- Most systems installed in past 4 years
- 4th fastest growth rate in the U.S.
- 4,700 solar jobs
Solar in Southwestern Pennsylvania

• 4MW of installed solar capacity; mostly installed since 2008
• More than 270 solar systems
• Solar energy systems in every county of western PA
• 15 companies installing or developing solar

Solar Installations in Southwestern Pennsylvania
Map created by Southwestern Pennsylvania Commission; source - PA Department of Environmental Protection
Project Motivations

- Pennsylvania adopted an aggressive energy policy in 2004 and established benchmark targets (.5%) for renewable energy market share; subsequently, the Commonwealth implemented a rebate program to stimulate private-sector activity.

- While Pennsylvania was the 3rd leading solar state in the nation in 2010 (100 MW), Western Pennsylvania produced approximately 4% of the Commonwealth’s total MW.

- The Pittsburgh region has limited history with regional regulations; there are over 120 municipal zoning ordinances within Allegheny County alone.

- PennFuture and the Heinz Endowments performed an analysis of solar development barriers in Western Pennsylvania in 2011.

- Solar United Network of Western Pennsylvania (SUNWPA) was formed in 2011 as an outgrowth of the PennFuture/Heinz Endowments analysis. Before SUNWPA’s formation, no industry-related advocacy group existed.
Primary Work Scope Components

#1 Model Zoning Ordinance

#2 Uniform Permitting and Inspection Process

#3 Sunshine Community Certification Designation

#4 Region-wide Code Enforcement and Building Inspection Training (based on the Solar ABC’s)

#5 Educational Campaign

#6 Regional Finance Strategy

#7 Municipal Guidebook – printed and online versions
Key Legal Underpinnings

#1 The Pennsylvania Municipalities Planning Code (state enabling law) authorizes municipalities to enact zoning, subdivision, land development and comprehensive plans to regulate solar installations.

#2 Pennsylvania adopted the Uniform Construction Code (UCC), the International Residential Code (IRC), the International Building Code (IBC) and the International Mechanical Code (IMC - by reference only). The State Legislature, however, only adopted solar-related provisions that address equipment and systems that utilize solar energy for heating and cooling; not PV systems.

#3 The Political Subdivision Tort Claims Act grants municipalities and their employees immunity from liability except in 8 areas such the maintenance of real property and the operation of a motor vehicle. Subsequently, municipalities are not liable when a zoning or land development permit is issued and the system later fails and/or compromises public health, safety and welfare.
Tenets of the Model Ordinance

#1 The ordinance was designed as an **add-on to an existing ordinance**

#2 PV installations were treated as **accessory uses/structures**

#3 Maintain **existing** accessory use/structure standards for height and setbacks

#4 While uniformity was desired, there was no attempt to create a “one size fits all” type ordinance; **optional provisions were created**

#5 For most people, it wasn’t about the use; **it was about the type and orientation of the roof**

#6 Roofs facing **streets are more aesthetically important than alleys**
Examples of Model Provisions

Location Within a Lot

1. Building-mounted systems are permitted to face any rear, side and front yard or any unregulated yard area as defined in [Section/Article] of this Ordinance. Building-mounted systems may only be mounted on lawfully permitted principal or accessory structures.

2. Ground-mounted systems are permitted based on the requirements for accessory uses or structures in the property’s zoning district.
1. Ground-mounted systems. Ground-mounted systems are subject to the accessory use or structure setback requirements in the zoning district in which the system is to be constructed. The required setbacks are measured from the [lot/parcel/property] line to the nearest part of the system. No part of the ground-mounted system shall extend into the required setbacks due to a tracking system or other adjustment of solar PV related equipment or parts.
Examples of Model Provisions

Rooftop Screening

1. [Optional add-on] Building-mounted systems installed on a flat roof shall not be visible from the public right-of-way within a [# (number) foot] radius of the property, exclusive of an alley as defined by this Ordinance, at a level of 5 (five) feet from the ground in a similar manner as to any other rooftop HVAC or mechanical equipment. This can be accomplished with architectural screening such as a building parapet or by setting the system back from the roof edge in such a manner that the solar PV system is not visible from the public right-of-way within a [# (number) foot] radius at a level of 5 (five) feet from the ground.

Without Parapet
Typical Solar Permitting Process
PV systems may be subject to rules of the Uniform Construction Code (UCC), although there are discrepancies between law and regulations.

UCC requires permits but exempts non-structural repairs to residential buildings. A PV installation should be defined as a non-structural change, unless:

- The “repair requires the removal or cutting of a structural beam or load-bearing support.” The UCC does not define “cutting.” But the IRC notes that “wood-framed structural members shall not be drilled, notched or altered except for as provided in the [IRC] code.”

PA Labor & Industry Regulations are more narrow than the statute. Utility and miscellaneous use structure regulations apply only to structures as a building of less than 1,000 sq ft and is accessory to a detached one-family dwelling except for carports, detached private garages, greenhouses, and sheds.
Key Legal Findings/Considerations

• UCC gives municipalities authority over the administration and enforcement of building codes, including what documentation is required to be submitted. Also, “building code officials can waive documentation requirements if the nature of the construction does not require the review of the construction documents to determine compliance with the UCC.”

• Absent gross negligence or intentional misconduct, a building inspector or code official cannot be held personally liable for an inappropriately granted building permit [based on case of law for government immunity].
Permitting Approach

Therefore, Western Pennsylvania’s approach assumed:

• a PV installation is part electrical permit and part building permit
Solar Installer Certifications

**Installers must be** registered contractors with the Pennsylvania Attorney General’s office;

*and* the Solar PV installations must be designed by a certified or licensed professional (one of the following):

- NABCEP Certification (North American Board of Certified Energy Practitioners)
- UL Photovoltaic System Installation Certification
- Listed on the PA Sunshine Program Approved Solar Electric (PV) Installers list under the Dept. of Environmental Protection
- Licensed Electrician
Required Contents for Solar PV Permit

For Systems Less Than 13.44 kW

#1 Site plan showing location of major components on the property. This drawing need not be exactly to scale, but it should represent relative location of components at site (see supplied example site plan)

#2 Electrical diagrams showing PV array configuration, wiring system, over-current protection, inverter, disconnects, required signs, and AC connection to building

#3 Specification sheets and installation manuals (if available) for all manufactured components including, but not limited to, PV modules, inverter(s), combiner box, disconnects, and mounting system

#4 Application fee

#5 Completed information for a two (2) step application form (3-pages total)
Sample of the Solar PV Permit

Structural Review of PV Array Mounting System

**Roof Information:**

YES □ NO □ Is the roofing type lightweight (Yes = composition, lightweight masonry, metal, etc...)? Provide Roofing Material Description _______________

YES □ NO □ Does the roof have a single roof covering? Provide method and type of weatherproofing roof penetrations (e.g. flashing, caulk)_____________________

YES □ NO □ Is weatherproofing sealant compatible with the roofing material. Describe method and type of weatherproofing roof penetrations (e.g. flashing, caulk) ______________________________

YES □ NO □ Has the installer conducted a visual inspection of the roof and confirmed that there is no pre-existing damage? (If damage is noted, provide details for any work necessary to repair the existing roof structure.)
Mounting System Information

YES [ ] NO [ ] Is the mounting structure an engineered product designed to mount PV modules with no more than an 18” gap beneath the module frames? If YES, complete information on the mounting system below:

a. Mounting System Manufacturer ____________; Product Name and Model# ______________
b. Total Weight of PV Modules and Rails ___________ lbs
c. Total Number of Attachment Points ______________
d. Weight per Attachment Point (Total Weight of Modules and Rails (from line b.) ÷ Total Number of Attachment Points (from line c.) = ___________________ lbs.

YES [ ] NO [ ] Is this less than or equal to 45 lbs?

e. Maximum Spacing Between Attachments Points on a Rail = ______________ inches

(see product manual for maximum spacing allowed based on maximum design wind speed)
f. Total Surface Area of PV Modules (square feet) _____________________________ ft²
g. Distributed Weight of PV Module on Roof (Total Weight of PV Modules and Rails (from line b.) ÷ Total Surface Area of PV Modules (from line f.) = ______________ lbs/ft².
Recommended Permitting Fees

- Flat fee rather than value-based fee
- A fee that includes the zoning, permitting and electrical inspection, if possible

<table>
<thead>
<tr>
<th>Criteria</th>
<th>National Average for Solar Permit</th>
<th>Pennsylvania Average for Solar Permit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permit Fee</td>
<td>$250</td>
<td>$456</td>
</tr>
<tr>
<td>Basis of Fees</td>
<td>Fixed, flat</td>
<td>Mostly value-based</td>
</tr>
<tr>
<td>Time to Issue Permit</td>
<td>1 Business day (electronic or over counter)</td>
<td>8.66 Business days</td>
</tr>
</tbody>
</table>

*Fee should include zoning, permitting and inspection
**Based on Vote Solar Permitting Report for Pennsylvania
Lessons Learned

• The permitting process can take as long if not longer to gain consensus than the zoning aspects. Aesthetics was a secondary or tertiary issue; structural and electrical safety were the main concerns.

• Utilize graphic representations (either photographs or three-dimensional sketches) to explain concepts and specific provisions to elected officials, planning commissioners and laypersons; most importantly - they help keep everyone on the same page.

• The use of the "Technical Committee" as a microcosm of a typical community and as a “sounding board” was overwhelmingly successful.

• Involve the high level building code officials and trainers early in the development of a permitting process.

• Adopt the mantra “raise the bar” and “tow the line”; take time to assemble facts and to dispel mis-/dis-information.
Managing Principal, Environmental Planning & Design, LLC
Principal-In-Charge, Western Pennsylvania SunShot Project

andrewschwartz@epd-pgh.com
(412) 261-6000
Other Contacts and References

Evan Endres
Project Manager, PennFuture
endres@pennfuture.org
(412) 456-2372
www.PennFuture.org/SunShot
Innovations From Rooftop Solar Challenge Communities
SunShot Solar Outreach Partnership

The SunShot Solar Outreach Partnership (SolarOPs) is a U.S. Department of Energy (DOE) program designed to increase the use and integration of solar energy in communities across the United States. The International City-County Management Association (ICMA) and ICLEI-Local Governments for Sustainability and their partners were competitively selected by DOE to conduct outreach to local governments across the United States, enabling them to replicate successful solar practices and quickly expand local adoption of solar energy.
Part of the SunShot Solar Initiative

22 teams are taking actions in four areas to bring down soft costs and make it faster, easier, and cheaper to go solar:

- Permitting and interconnection processes
- Financing
- Net metering and interconnection standards
- Planning and zoning
Team Panelists

- Midwest Renewable Energy Association
  - Amy Heart, City of Milwaukee Solar Program Manager

- Mid-America Regional Council (MARC)
  - Beth Dawson, MARC Solar Energy Coordinator

- Citizens for Pennsylvania’s Future (PennFuture)
  - Andrew Schwartz, Environmental Planning & Design
For More Information

- Visit APA’s Solar Outreach Partnership website at [www.planning.org/research/solar](http://www.planning.org/research/solar)
- Visit the Partnership’s website at [www.solaroutreach.org](http://www.solaroutreach.org).
- Learn more about the Rooftop Solar Challenge at [www.eere.energy.gov/solarchallenge/](http://www.eere.energy.gov/solarchallenge/)

This session has been approved for 1.5 GBCI CE. Please complete the sign-in sheet at the back of the room.
Solar Ready KC

Powered by SunShot
U.S. Department of Energy
Solar Ready KC

- Mid-America Regional Council (MARC), grantee
- Five Jurisdiction Partners:
  - City of Kansas City, MO
  - Clay County, MO
  - City of Lee’s Summit, MO
  - Johnson County, KS
  - City of Olathe, KS
- Utility Partner: Kansas City Power & Light
# Regional Reality

- **Two States, Two Realities**

### Kansas

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Renewable</th>
<th>Solar Portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 - 2015</td>
<td>10%</td>
<td>na</td>
</tr>
<tr>
<td>2016 – 2019</td>
<td>15%</td>
<td>na</td>
</tr>
<tr>
<td>2020+</td>
<td>20%</td>
<td>na</td>
</tr>
</tbody>
</table>

Applies to Investor Owned Utilities and Rural Cooperatives

### Missouri

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Renewable</th>
<th>Solar Portion</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 - 2013</td>
<td>2%</td>
<td>.04%</td>
</tr>
<tr>
<td>2014 - 2017</td>
<td>5%</td>
<td>.1%</td>
</tr>
<tr>
<td>2018 - 2020</td>
<td>10%</td>
<td>.2%</td>
</tr>
<tr>
<td>2021+</td>
<td>15%</td>
<td>.3%</td>
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</tbody>
</table>

Applies to Investor Owned Utilities Only
### Regional Reality

- **Two States, Two Realities**

<table>
<thead>
<tr>
<th>Net Metering</th>
<th>Kansas</th>
<th>Missouri</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Who?</strong></td>
<td>Investor Owned Only</td>
<td>All Utilities</td>
</tr>
<tr>
<td><strong>Intent</strong></td>
<td>Sized not to exceed anticipated load</td>
<td>To offset all or part of use</td>
</tr>
<tr>
<td><strong>Maximum Capacity</strong></td>
<td>25 kW – Residential</td>
<td>100 kW Systems &gt; 10 kW + insurance</td>
</tr>
<tr>
<td><strong>Excess Generation</strong></td>
<td>200 kW – Commercial</td>
<td>Credited to next bill at utility’s avoided cost. Any excess at end of year donated to utility.</td>
</tr>
<tr>
<td><strong>Available Until</strong></td>
<td>Carried forward each month at full retail rate. Any excess at end of year donated to utility.</td>
<td>Capacity = 5% of Previous Year’s Single Hour Peak Load</td>
</tr>
<tr>
<td><strong>Rebate</strong></td>
<td>No</td>
<td>$2/w up to 25 kW</td>
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</tbody>
</table>
### Regional Reality

#### Two States, Two Realities

<table>
<thead>
<tr>
<th>Interconnection</th>
<th>Kansas</th>
<th>Missouri</th>
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</thead>
<tbody>
<tr>
<td>Who?</td>
<td>Investor Owned Only</td>
<td>All Utilities</td>
</tr>
<tr>
<td>Codes</td>
<td>Must meet all local codes</td>
<td>Must meet all local codes</td>
</tr>
<tr>
<td>Fees/Insurance</td>
<td>Utility can’t require additional insurance</td>
<td>Systems over 10 kW must carry $100,000 insurance</td>
</tr>
<tr>
<td>Manual Disconnect</td>
<td>Utility can require manual disconnect for system</td>
<td>Utility can require manual disconnect for system</td>
</tr>
</tbody>
</table>
**Regional Reality**

- **Two States, Two Realities**

<table>
<thead>
<tr>
<th></th>
<th>Kansas</th>
<th>Missouri</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Capacity – 2011</td>
<td>0.13 MW</td>
<td>2.64 MW</td>
</tr>
<tr>
<td>Installed Capacity – 2012</td>
<td>0.26 MW</td>
<td>6.27 MW</td>
</tr>
<tr>
<td>Installed Cost – 2011</td>
<td>$4.50/watt residential, $3.50/watt commercial</td>
<td></td>
</tr>
<tr>
<td>Installed Cost – 2012</td>
<td>$4.00/watt residential, $3.00/watt commercial</td>
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Issues Tackled

- Changing Market Reality
- Solar Misperceptions
  - Solar Incidence Reality
  - Cost of Solar
- Proactive vs Reactive Solar Engagement
- Lack of Solar Installation Tracking
- Continuing Dichotomy of Kansas vs Missouri
Process

- Collaborative Approach to Grant
- Build on Prior Successes
  - REECS project: 2009/2012 IEEC adoption
- Build on Allied Projects
  - Cross-promotion within agency initiatives
  - Energy Works KC
  - Air Forum
- Series of Presentations & Forums
- Solar Rooftop Resolution
Results

Best Management Practices

- Process Improvements
- Planning Improvements
- Financing Options
Process Improvements

Step 1
- Streamline Permits

Step 2
- Standardize Permit Fees
- Notify Utility

Step 3
- Pre-Qualify Plans and Installers

Solar Ready KC Best Management Practice
Planning Improvements

Step 1
• Improve Solar Access

Step 2
• Improve Solar Readiness

Step 3
• Engage Homeowners Associations
Results

Solar Ready KC Best Management Practice

Lessons Learned

- Stakeholder Process Facilitates Regional Adoption
- Permitting Process Didn’t Need Speed but Clarity
- Helpful to Tie Solar to National Businesses
- Local Jurisdictions Not Aware of Solar Installations
- Solar Markets Can Ramp Up Fast
- Coordinate BMPs with Planning Process and Permit Process Reviews and Updates
Need Clarity on Legality of Leases
Missouri Rebate will most likely go away
Threats to Renewable Portfolio Standards
Uncertainty is Keeping National Companies Out of Both States
Rising Utility Bottleneck for Net Metering and Interconnection in Missouri
Lack of Addressing Solar Opens Jurisdiction to Possible Issues
Future Goals/Plans

- Continuing Outreach and Education
- Applied for Rooftop Solar Challenge II
- Implementing Commercial PACE Program
- Looking at Qualified Energy Conservation Bonds
- Assembling GIS to Support Solar
For further information contact:

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Mid-America Regional Council
bdawson@marc.org
816.701.8325 d