Solar Ready II

Stakeholder Meeting

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U.S. Department of Energy

Solar Ready II

DVRPC

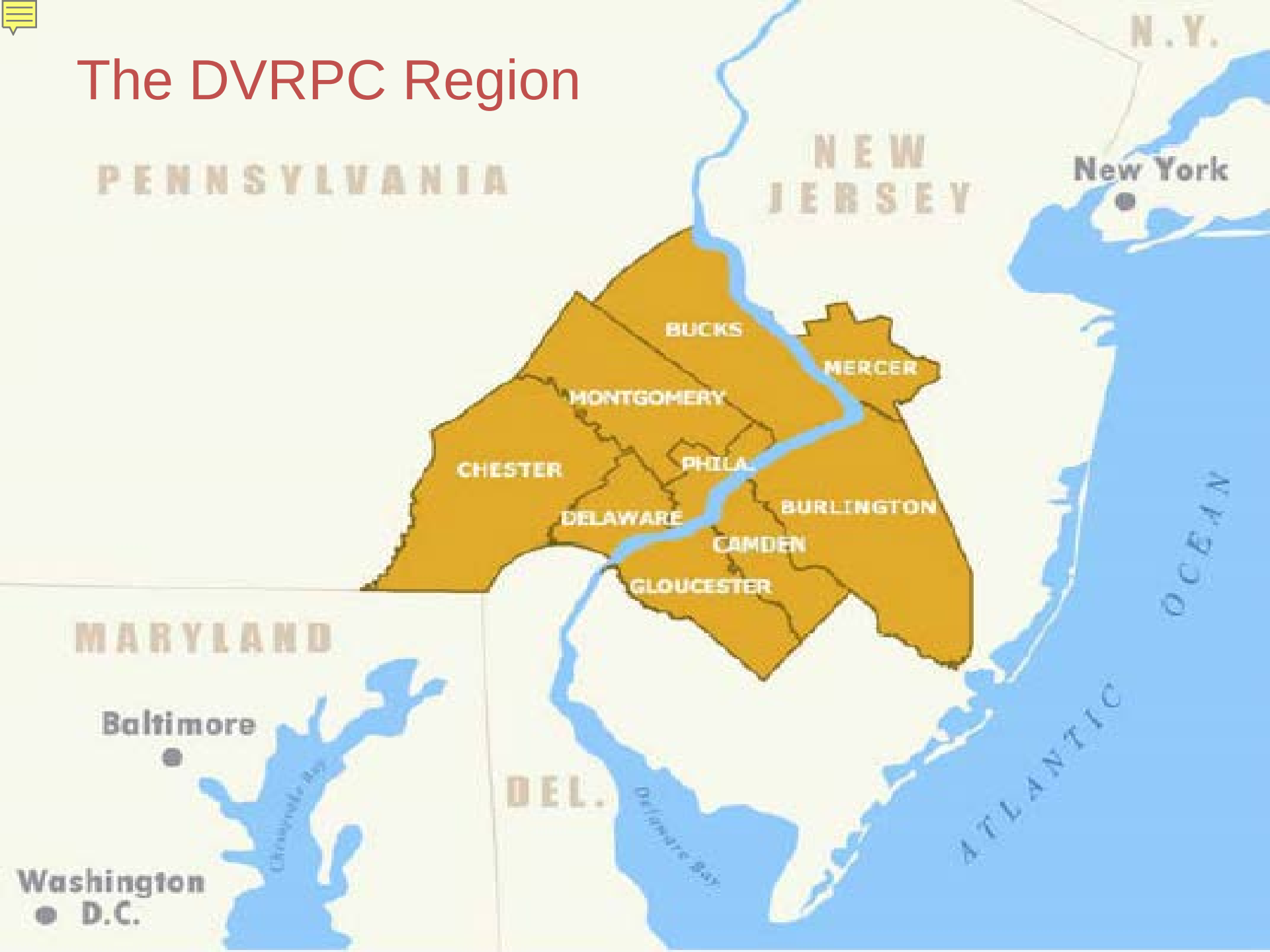
&

Delaware County Planning Department

Goals of Today's Meeting

1. Recap: Solar Ready II
2. Progress to date
3. Review: existing solar PV **barriers** and **best management practices** for solar adoption in our region (surveys)
4. "Draft" Solar PV Best Management Practices
5. Clearly lay out next steps.

The DVRPC Region



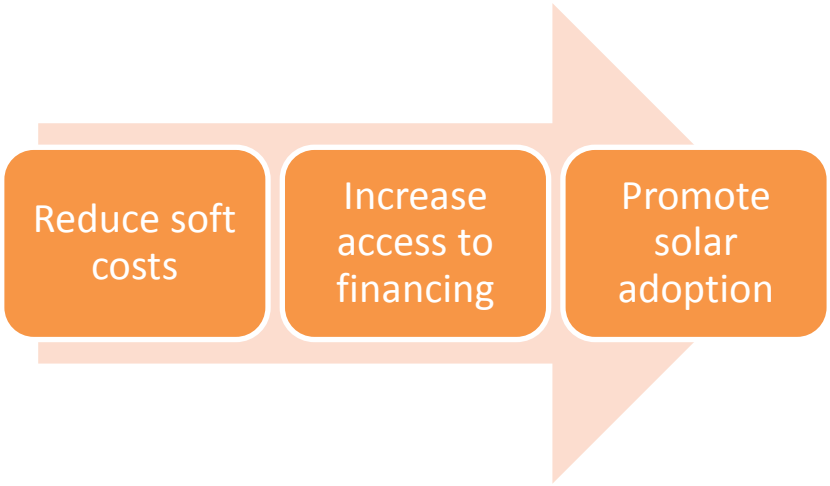
Delaware Valley Regional Planning Commission

- MPO for Greater Philadelphia Region
- Region is bi-state, nine counties surrounding and including Philadelphia
- Planning areas
  - Transportation Planning, Air Quality, Smart Growth Planning, Environmental Planning, Housing and Economic Development, Population and Employment forecasts, Long Range Planning
  - Office of Energy and Climate Change:
    - Regional greenhouse gas inventory
    - Climate Change Adaptation Planning
    - Preparing the region for alternative energy
    - Electric Vehicle Readiness Plan
    - Municipal energy management assistance
    - Pennsylvania Partnership to Promote Natural Gas Vehicles

U.S. Department of Energy SunShot Initiative Rooftop Solar Challenge

Rooftop Solar Challenge

- Incentivizes regional teams to make it easier and more affordable for Americans to go solar.
- Focus on: Streamlining permit processes, updating planning and zoning codes, improving standards for connecting solar power to the electric grid, and increasing access to financing.



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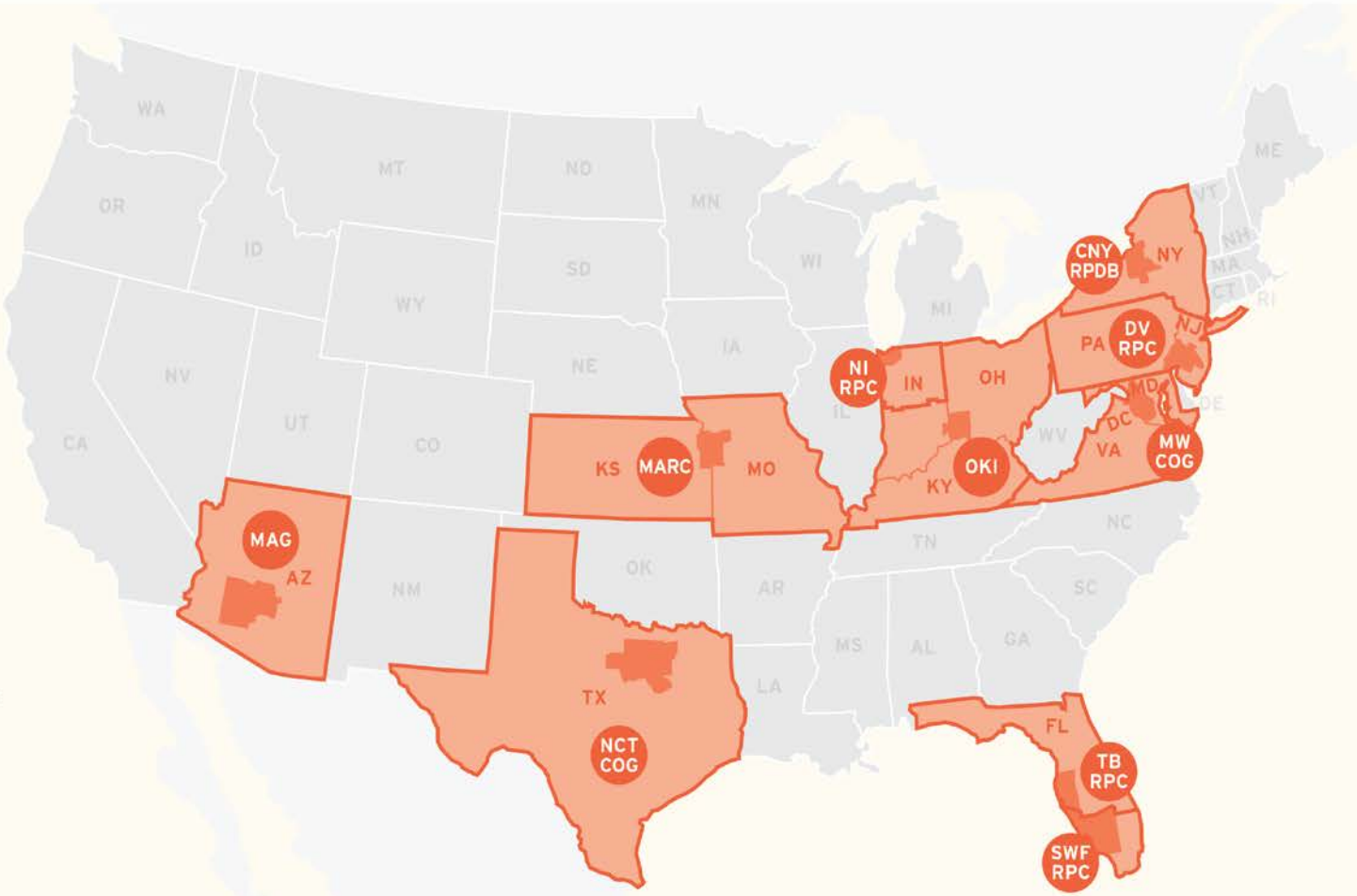
SOLAR READY II REGIONAL PARTNERS

- CNY RPDB — Central New York Regional Planning and Development Board
- DV RPC — Delaware Valley Regional Planning Commission
- MAG — Maricopa Association of Governments
- MW COG — Metropolitan Washington Council of Governments
- MARC — Mid-America Regional Council
- NCT COG — North Central Texas Council of Governments
- NI RPC — Northwestern Indiana Regional Planning Commission
- OKI — Ohio-Kentucky-Indiana Regional Council of Governments
- SWF RPC — Southwest Florida Regional Planning Council
- TB RPC — Tampa Bay Regional Planning Council



NARC — Building Regional Communities — National Association of Regional Councils

Solar Ready II

Powered by SunShot — U.S. Department of Energy

SRII Grant Details

Major Goals

Reduce Soft Costs to Solar PV Adoption

Funding Amount

$90,000 ($75,000 plus $15,000 if goals are met)

Timeframe

18 to 30 months (depending on accomplishments met)

DVRPC's Solar Ready II Objectives

The goal of Solar Ready II is to create more streamlined and standardized solar practices in the region, and to achieve measureable improvements in the region's solar market conditions.

Solar Ready II will:

- Identify existing conditions and barriers to solar adoption in Greater Philadelphia
- Develop and implement a plan to reduce soft costs of solar PV adoption (best management practices)
- Provide free "light" technical assistance to interested municipalities
- Provide training on solar PV best management practices to municipalities, and related market stakeholders

What is SunShot targeting?

Soft Costs

=

~~Up to 50%~~ **over 64%** of the cost of a solar installation

SunShot
U.S. Department of Energy

Major Deliverables and Milestones

Subtask	Target Date
Engage stakeholders	Dec. 2013 and ongoing
Evaluate existing processes/policies and update with Best Management Practices (BMPs)	February 2014 and ongoing
Jurisdiction Questionnaires and data gathering	March 2014 and ongoing
Engage 10-30 local governments as committed participants	March 2014 and ongoing
Finalize BMPs, develop BMP materials	July 2014 and ongoing
Conduct trainings, technical assistance on determined BMPs	September 2014 and ongoing

Activity to date

- Recruited 13 municipalities
- Program outreach (Launched Web page) www.dvrpc.org/EnergyClimate/solarready.htm
- Surveyed municipalities (13) and installers (9) on best practices and barriers
- Selected three (give or take a few) draft Best Management Practices

Delaware Valley Regional Planning Commission's
SOLAR READY II Stakeholder Meeting

PLEASE JOIN US!

Municipal participants

13 and counting…

- Jurisdiction questionnaires
- Attend trainings on BMPs
- One-on-one technical assistance

Best Management Practices

Process	Improve Permitting Process	Prequalify Installers	Utility Coordination
Planning	Zoning Code Improvements	Improve Solar Access	Educate Developers + Homeowners
Financing & Adoption	Distribute Cost Survey to Installers	Enact Solarize Program	Engage Local Lenders

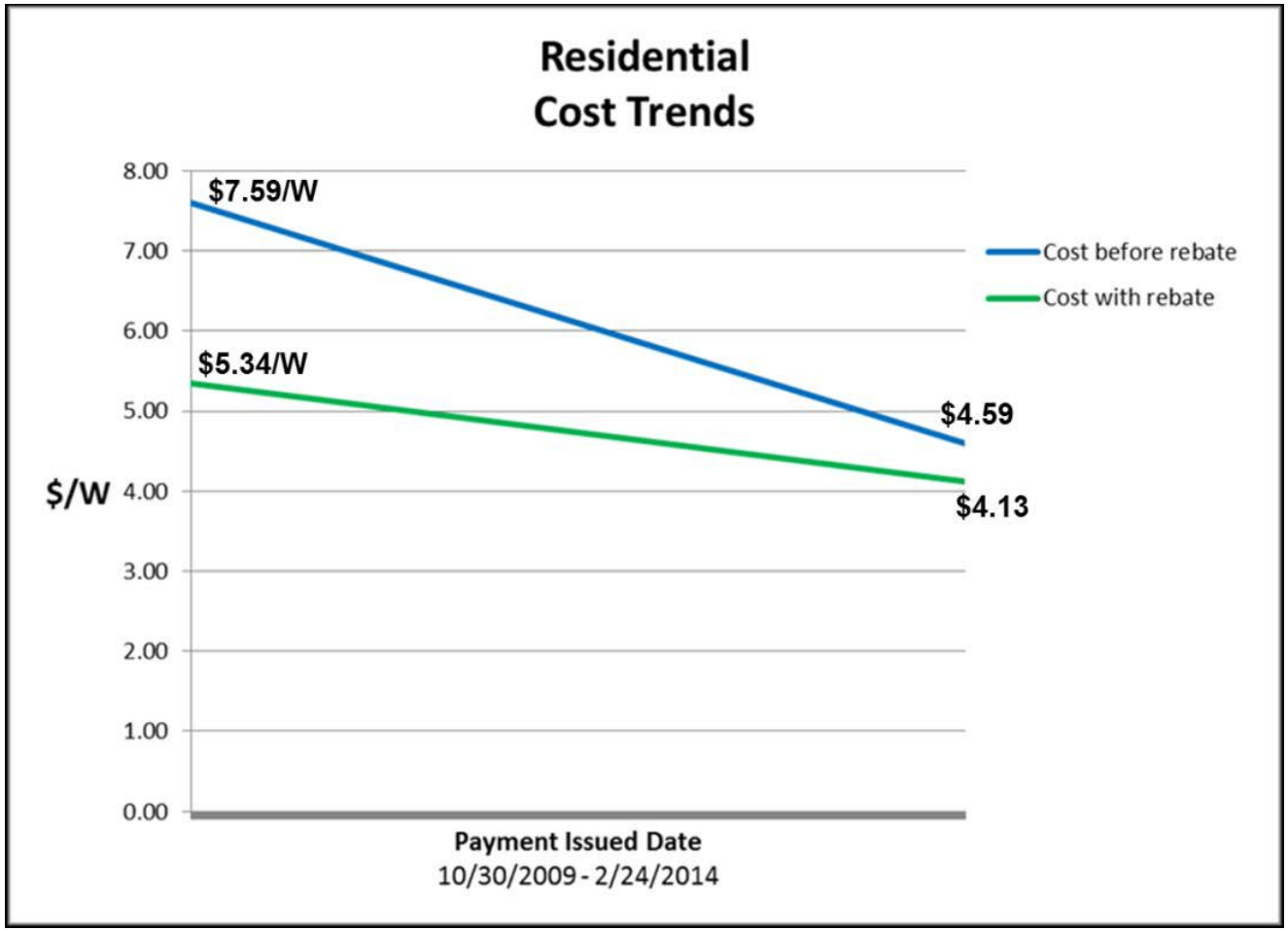
BMP Survey Results

Best Management Practice (Select top three)	Munis	Installers
standardize and streamline solar permitting process	30%	78%
develop solar-ready design criteria/checklist for new construc.	70%	0%
educate real estate developers and builders	40%	33%
solar system ownership, economics and financing	40%	33%
first responder safety provisions and training	30%	33%
prepare zoning ordinance for use throughout the region	30%	33%
develop solar installer qualifications	30%	22%
standardize solar permit fees at reasonable levels	0%	44%
educate homeowners about solar energy systems	20%	22%
develop guidelines for solar on historic buildings	10%	0%

Installer Survey

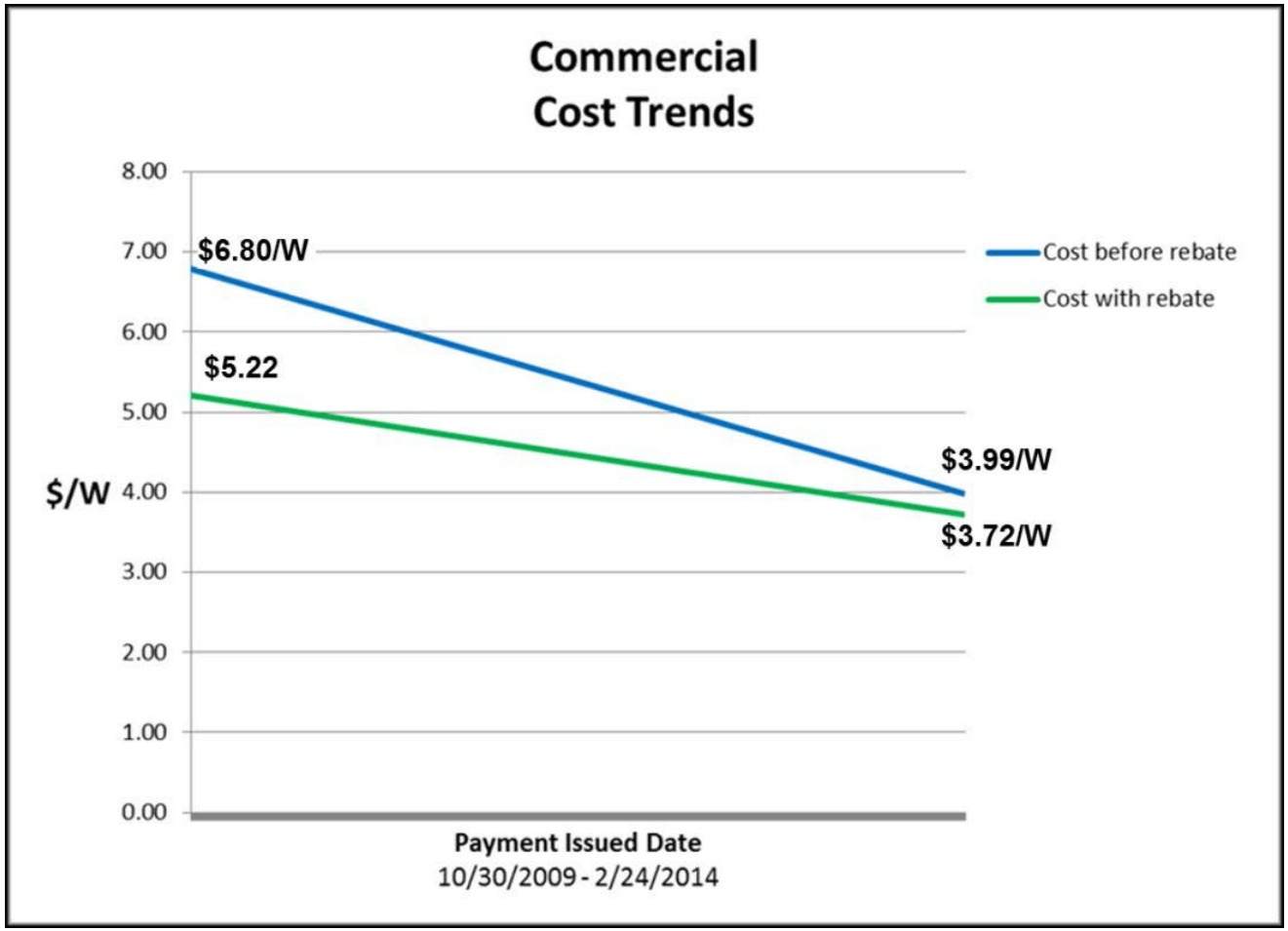
Category	Average Rank	$/Watt
Installation labor	1.33	$ 0.67
Marketing and overhead	2.22	$ 0.24
Obtaining all necessary permits (building, electrical, zoning, etc)	2.67	$ 0.10
Project design	3.89	$ 0.07

PV Costs: Before vs After PA Sunshine (residential)



Courtesy: MidAtlantic Renewable Energy Association (www.themarea.org), *PA Solar Counts: Our Common Solar Wealth* (June 2014)

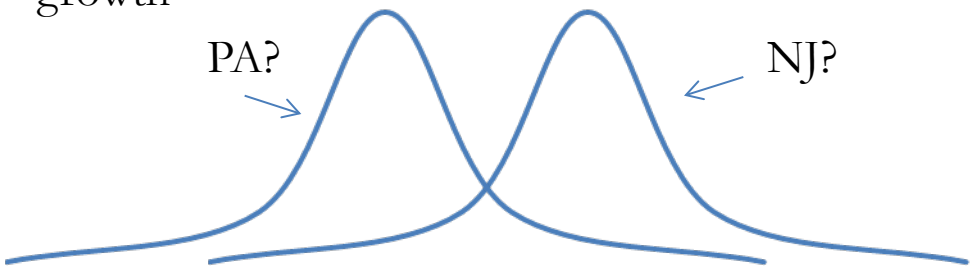
PV Costs: Before vs After PA Sunshine (commercial)



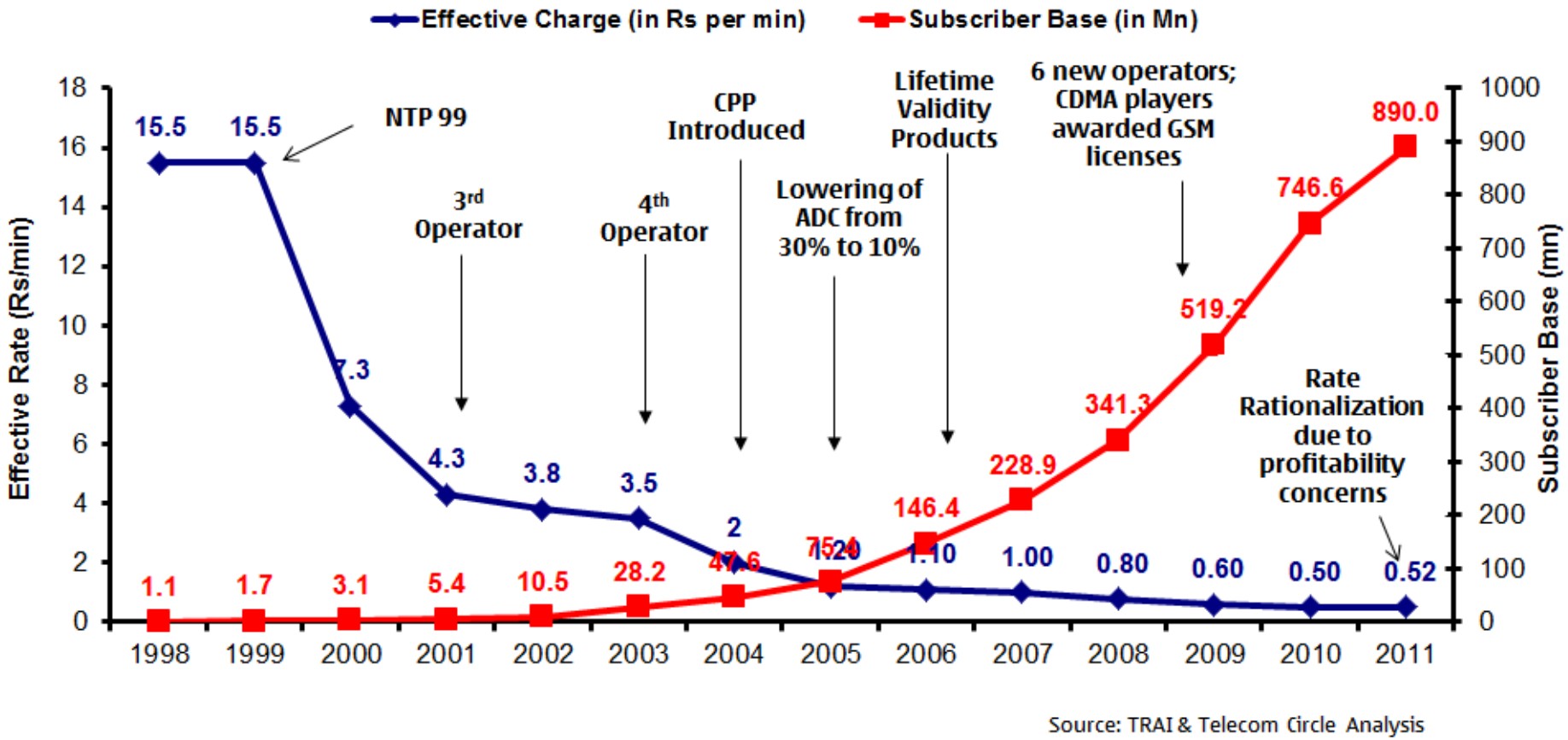
Courtesy: MidAtlantic Renewable Energy Association (www.themarea.org), *PA Solar Counts: Our Common Solar Wealth* (June 2014)

Solar PV Life Cycle Model

Embryonic	Early Adoption	Rapid Growth	Consolida-tion	Mainstream
Very low volume of highly customized, one-off projects	The emergence of standards, and development of the ingredients necessary for future market growth	Explosive growth based on compelling economics and early scale	Dramatic restructuring, becomes attractive to mainstream	A mature market, modest growth, few development needs



Compare to the Cellphone Industry



Source: TRAI & Telecom Circle Analysis

Yesterday a door-to-door sales guy from a company called Vivint came by. The offer is that they put solar panels on our roof. They would own the panels, and they would sell the energy that the panels produce to us at a rate that's about 30% lower than what we pay PSE&G.

The term of the contract is 20 years (!) and the rate of increase is around 3%/year.

I get that we're betting on the idea that PSE&G's prices will rise faster than 3%/year and also that in the next 20 years, we wouldn't be able to afford our own panels.

If this were a 10-year or even a 15-year contract, I'd be all over it. My concern is that 15 years from now, we'll have obsolete, expensive, solar panels stuck all over the house and will be getting power from them at a rate comparable to what I'd pay the PSE&G.

Anyone else hear from these guys or have any experience with Vivint? Or have any thoughts in general? They say they're doing a lot in Collingswood, but I haven't noticed any houses with panels.

Like · Comment · Share

[redacted] What happens if you move?
June 8 at 6:33am · Like

[redacted] Contract transferred to new owner.
June 8 at 6:38am · Like

[redacted] Do you still need supplemental power from pse&g?
June 8 at 7:09am · Like

[redacted] Yes, if we use more than we produce.
June 8 at 7:21am · Like

[redacted] Not to be obvious but since you don't produce power at night, when you use the most energy, do you have a way to store the energy? And how much will you produce vs what you currently use?
June 8 at 7:44am · Like

[redacted] Something really bugs me about it. Really scientific of me, huh?
June 8 at 7:54am · Like

[redacted] What if in 5 years solar panels are way cheaper or there is a great government tax incentive that makes it within your reach... where you would be getting power for free or even selling more that you use. I don't know I think the 30 year term part would be my deal breaker.
June 8 at 7:58am · Like · 2

[redacted] Sorry I mean 20
June 8 at 7:59am · Like

[redacted] Have they asked any of your neighbors? What do they think?
June 8 at 7:59am · Like

[redacted] Solar panels are big here in Arizona. Pretty much everyone leases them just like you describe. Break even point is around six years here, then it's profitable. Until then, your bill is fixed. Not a bad deal!
June 8 at 8:21am · Like · 1

[redacted] Too many trees probably to get full use of sun. Selling back to power company is only pennies on the dollar.
June 8 at 9:04am · Like

[redacted] A friend of mine in town sells solar panels. I don't know his company but I can reach out to him, if you would like more info.
June 8 at 9:43am · Like

[redacted] Do you pay any thing up front? Seems surprisingly low-risk for you actually. The only downside is that you might pay slightly more for (some of) your power than you otherwise would at some point in the future. Am I missing something?
June 8 at 10:29am · Like

[redacted] You use power at peak times when most people do not. You use your power in reverse priority to everyone else. Word of caution, transferring to a new owner is not that simple. Otherwise, it is a pretty good deal. Works best in temps below 90 degrees. Don't worry about new technology. You are leasing, not buying. The technology is currently pretty good. Consider a shorter lease term, like 10 years.
June 8 at 11:26am · Like

Best Management Practices

Focus on Permit Process and Customer Acquisition

- **Permitting guide and technical assistance**
- **Solar Ready Map**
- **Solar 101 Training Modules**
- Update Renewable Energy Ordinance Frameworks
- Link municipalities to First Responder Safety training opportunities

Best Management Practices – Permitting Guide

Develop guidance/training materials for municipalities that includes:

- Information about how to standardize and streamline permitting process
- Template checklists and applications
- Template brochures and mailers
- Calculators, information about how to calculate permit fees

And…

- Criteria and brochure on solar-ready new construction highlighting the economic benefits of being solar ready
- First responder notification requirements

Follow up one-on-one with SRII municipalities and evaluate how their permit process can be standardized and streamlined, how to calculate a fee

Host permit-specific training for participating municipalities

MARCH 2011

GUIDEBOOK FOR

SOLAR PHOTOVOLTAIC PROJECTS

IN PHILADELPHIA

SECOND EDITION

SOLAR AMERICA CITIES

City of Philadelphia

GREENWORKS PHILADELPHIA

Project Permit: *Best Practices in Residential Solar Permitting*

1. **Post Requirements Online:** Information on permit fees, application requirements and process should be easily accessible via the city's website so applicants can review and prepare materials in advance. Municipalities should provide a submittal checklist of all requirements for rooftop solar PV and solar thermal permitting in a single online location. Click here for an example of a solar checklist.

2. **Implement an Expedited Permit Process:** The majority of small residential PV systems can be processed quickly if they meet clearly defined review requirements. We recommend adopting an expedited permitting review process for these systems that enables review over-the-counter or via electronic processing within one day. The *Solar ABC's Expedited Permit Process for PV Systems* provides a good example that can be adopted in full or used as a starting point. (Note, for larger systems, not covered by the *Expedited Permit* guidelines, municipalities should set and adhere to standard permitting requirements to make the process clear and transparent. The municipality should work to make these standards consistent with neighboring jurisdictions.) (NOT CURRENTLY GRADED IN PROJECT PERMIT)

3. **Enable Online Permit Processing**: Moving to a fully online permitting system can significantly reduce travel time for installers and workload for municipalities. We recommend adopting a system that enables submittal, review and approval of PV permits via email or a website within a short period of time.

4. **Require a Fast Turn Around time.** Offering a same-day 'over-the-counter' permit submission is a best practice. Travel to-and-from the building department can be one of the most cost intensive parts of the permitting process for installers. Obtaining a small PV permit should require no more than one visit to the building department for properly completed applications. If an over-the-counter option is not feasible, we at least suggest a permit turn around time of less than three days.

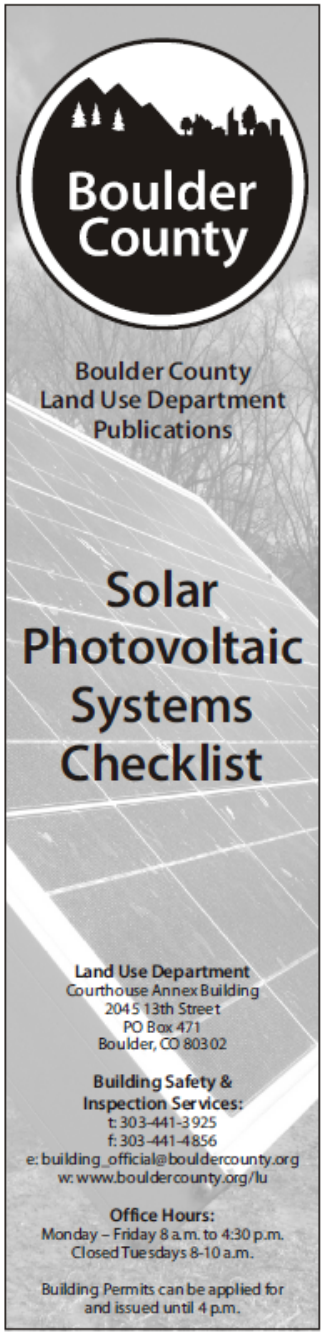
5. **Implement Reasonable Permitting Fees:** Using a flat-fee method instead of a value-based method to assess permit fees streamlines the process and ensures that larger solar energy systems are not arbitrarily penalized. Fees should fairly reflect the time needed for city staff to review and issue a permit - that's something that remains constant regardless of system size. A reasonable residential permit fee should be a flat fee of $400 or less if best practices are followed.

6. **Do Not Require Community-Specific Licenses:** We recommend accepting NABCEP PV installer and solar thermal certification, or already existing state licensing requirements, in lieu of community-specific solar business licenses.

7. **Offer a Narrow Inspection Appointment Window**: Offering an exact appointment time, or keeping the windows for inspection appointments at or below two hours greatly reduces the amount of costly worker time spent waiting for inspectors to arrive. Inspectors could also call contractors as appointment time grows close to further save time.

8. **Eliminate Excessive Inspections:** We recommend a clearly defined plan review process and only one inspection for standard rooftop systems on existing homes. Eliminating reviews that do little to validate the safe and efficient operation of a proposed PV system (i.e. plan checks with aesthetic criteria) removes unnecessary costs and expedites permit issuance. We support having both qualified installers and inspectors proficient in solar to ensure safe and compliant installations.

9. **Train Permitting Staff in Solar:** Training building department staff to review permits and perform standard fire department checks reduces time and cost. Cities should make one or half-day workshops available to relevant staff. Trainings should be available to both building department plan check and review staff as well as for inspectors. Click here for free online training for code officials, developed by IREC. (NOT CURRENTLY GRADED IN PROJECT PERMIT)



Solar Photovoltaic Systems Checklist

Per 2011 NEC (National Electrical Code)

Solar Photovoltaic applications are reviewed by the county electrical inspectors. **The following checklist shall be submitted with your plans. Each item on the list shall be marked to verify it is part of the submittal.** Incomplete information may result in plan rejection or delay in the approval of your project.

As of June 30, 2009, all ground-mounted solar arrays will require Site Plan Review Waiver (SPRW) approval. This cost is $100.00 for residential applications. Schedule a **Pre-application Conference** today.

Plan Submittal Requirements

Provide the following information:

1. A completed application form. Include the proposed PV System capacity in Watts, and whether system is a stand-alone, grid-tied, or hybrid system.
2. A deposit (the balance of fees is due at the time of permit issuance).
3. Two complete sets of plans and a CD of the electronic PDF files are to be submitted to Building Safety & Inspection Services for plan review (three complete sets of plans and a CD of the electronic PDF files are required for permits within Jamestown).

Site Plan - Equipment Outside a Building

- ❑ Show the location of all disconnects.
- ❑ Show the location of all modules.
- ❑ Show the location of all batteries.
- ❑ Show the location of inverters.
- ❑ Show the location and connection of all grounding electrode conductors.
- ❑ Show the clearances around all equipment.
- ❑ Show dimensions between equipment and structures.
- ❑ Show dimensions between equipment and property lines.

Note: See the **Pole or Ground Mounted Panels** section for additional site plan requirements.

Floor Plan - Equipment Within a Building

- ❑ Show the location of all disconnects.
- ❑ Show the location of all batteries.
- ❑ Show the location of inverters.
- ❑ Show the location and connection of all grounding electrode conductors.
- ❑ Show location of all equipment within structures.
- ❑ Label the use of the room in which the equipment is placed.
- ❑ Show clearances of the equipment.

Wiring Requirements

Provide a one-line diagram that includes the following information:

- ❑ Label whether the system is stand-alone, grid-tied, or hybrid.
- ❑ Conductor sizes.
- ❑ Conductor insulation types (i.e., THHN, THWN, direct burial cable, etc.).
- ❑ Conductor material (i.e., copper/aluminum).
- ❑ Conduit sizes.
- ❑ Conduit material (i.e., non-metallic, EMT, etc.).
- ❑ Over current device ratings.
- ❑ Existing and new panel amperage ratings (buss ratings).

PennFuture Model PA Permit Application

Solar Photovoltaic (PV) Permit Application

Page 1 of 3

Applicability: This Solar Photovoltaic Permit Application may be used for systems with the following qualifications:

- A total inverter capacity with a continuous AC power output of 13,440 watts (13.44kW) or less;
- A distributed weight load of less than or equal to five (5) lbs. per sq. ft.;
- A point load of less than or equal to 45 lbs. per sq. ft.;
- Installation on a roof with a single layer of lightweight roofing material;
- A mounting structure with an engineered product designed to mount PV modules with no more than an 18" gap beneath the module frames;
- The installation is overseen by a trained solar professional and a licensed Pennsylvania contractor;
- The installer assumes liability for the installation and the roof structure as it pertains to the installation.

If the System does not meet any of the above qualifications or the answer is "NO" to any of the questions in Steps 1 and 2 below, the municipality may require further information or review as it deems appropriate.

Questions regarding this Application should be directed to: _____. Definitions of terms used in this Application and sample application documents can be found in the *Solar Guide for Municipalities*.

Materials needed upon permit application submission

1. A completed copy of this Solar Photovoltaic Permit Application.
2. A site plan showing location of major components on the property. This drawing need not be to scale, but it should represent relative location of components at site (A sample site plan is included in the *Guide*.)
3. A single-line electrical diagrams showing the configuration of the photovoltaic ("PV") array, the wiring system, the overcurrent protection, the inverter, the disconnects, any required signs, and the AC connection to the building.
4. 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.
5. An application fee of $ _____.

Basic Information

Brief System Description _____
(eg, number and power rating of panels; total power rating of system; panel and inverter manufacturer; inverter/microinverter output, location of system on property)

Address of Project: _____

Applicant Name: _____
Address: _____
_____
Telephone Number: _____
E-mail address: _____

Property Owner (if different from the Applicant):
Name: _____
Address: _____
_____
Telephone Number: _____
E-mail address: _____

Installation Company (The System must be installed by a contractor licensed by the Commonwealth of Pennsylvania):
Address: _____
_____
Telephone Number: _____
E-mail address: _____
HIC#: _____

Owner of Solar System (if diffent from Applicant or Property Owner):
Name: _____
Address: _____
_____
Telephone Number: _____
E-mail address: _____

tovoltaic (PV) Permit Application

Page 2 of 3

of the System will be overseen by (check one below):
ified solar equipment installer
olar equipment installer
ntractor with a license accepted by the municipality
r on the approved list for the Pennsylvania Sunshine grant program

with above qualification: _____

ay Mounting System

covering?

composition, lightweight masonry, metal, etc.)?
_____
avier roofing materials (e.g. slate, heavy masonry, tile) may not have the assumed dead hat are found with lighter weight roofing materials and may justify a further review to either in compliance or needs enhancement.

patible with the roofing material. Describe method *and* type of ons (e.g. flashing, caulk) _____

l inspection of the roof and confirmed that there is no pre-existing damage? (*If or any work necessary to repair the existing roof structure.)*

ngineered product designed to mount PV modules with no more than an ames? If YES, complete information on the mounting system below:
urer _____
_____

and Rails _____ lbs
t Points _____
t (Total Weight of Modules and Rails (from line b.) ÷ Total Number of e c.) = _____ lbs.

above , less than or equal to 45 lbs? If YES, complete the following:
Attachments Points on a Rail = _____ inches
ximum spacing allowed based on maximum design wind speed)
dules (square feet) _____ ft^2.
dule on Roof (Total Weight of PV Modules and Rails (from line b.) ÷ Total (from line f.) = _____ lbs/ft^2.

e (g) above, less than or equal to 5 lbs/ft^2?

ermit Application

cal Diagram)

er output of 13,440 Watts or less?

ner boxes are identified for use in PV systems.

per inverter.

service disconnecting means.

andard string system, micro-inverter, AC Module or tely represent the PV system? (refer to *Guide*)

ust conduct an on-site inspection of the System.
ided in Steps 1 and 2 above.
ction of the System and submit approval to

---

e Solar Installation Company

the "Company") hereby represent and warrant that:
curate and complete to the best of my knowledge;
porting the System; and
with the applicable requirements of the
tric Code and other applicable construction codes.

ation of this System, including any liability arising out
nify, defend and hold harmless
st any claims referring or relating to (1) the accuracy
ation; or (2) the representations and warranties

ation on its behalf.

_____
_____
te: _____

e verified to the
s accurate.
_____
_____
_____
_____

Guidance on calculating fees

Criteria	Best Practices	Pennsylvania Average
Permit Fee	$250	$456
Basis of Fees	Fixed, flat	Mostly value-based
Time to Issue Permit	1 business day (electronic or over-the-counter)	8.66 business days

Solar Permitting in Pennsylvania Municipalities

Guidance on calculating fees

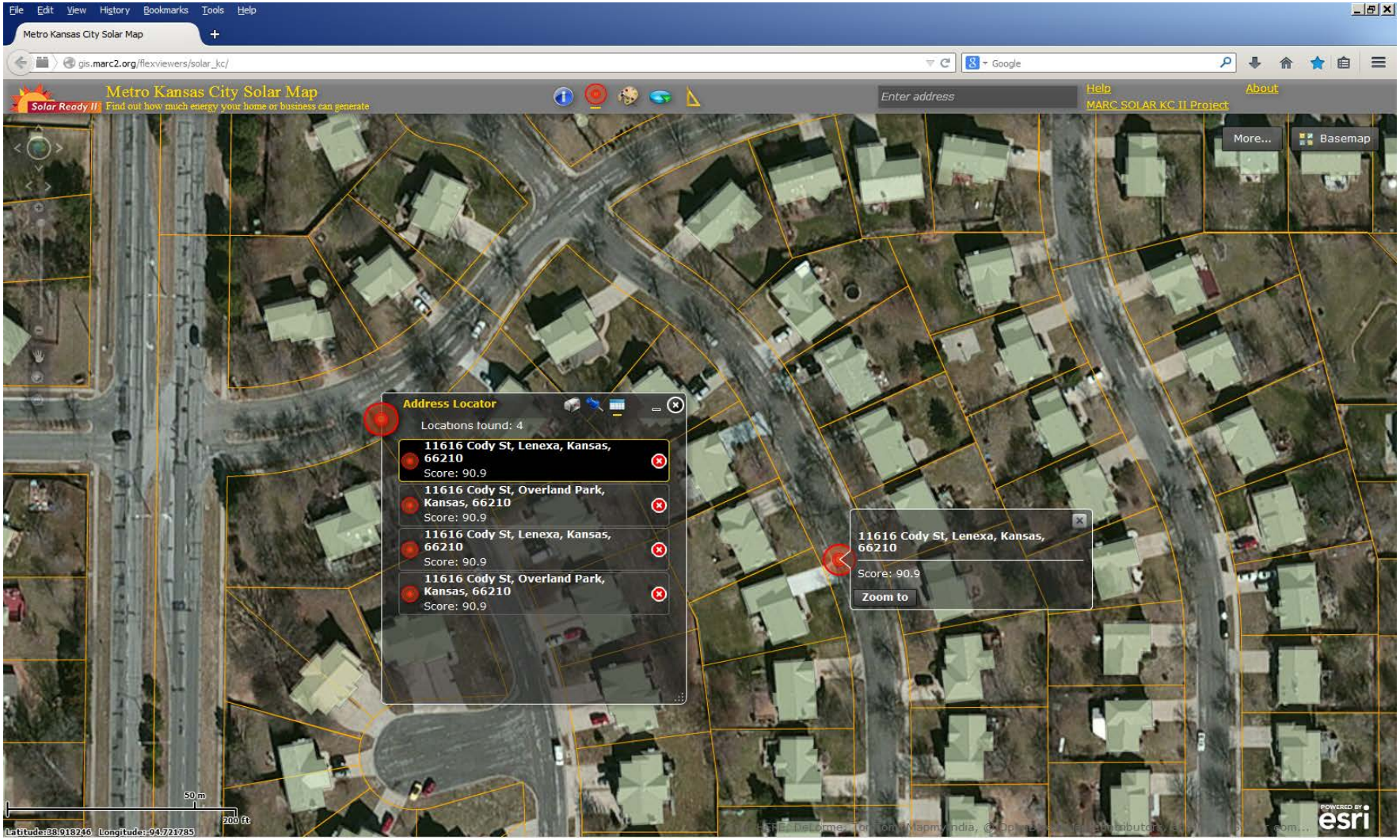
TRUE

Example calculator output for 149 kW system

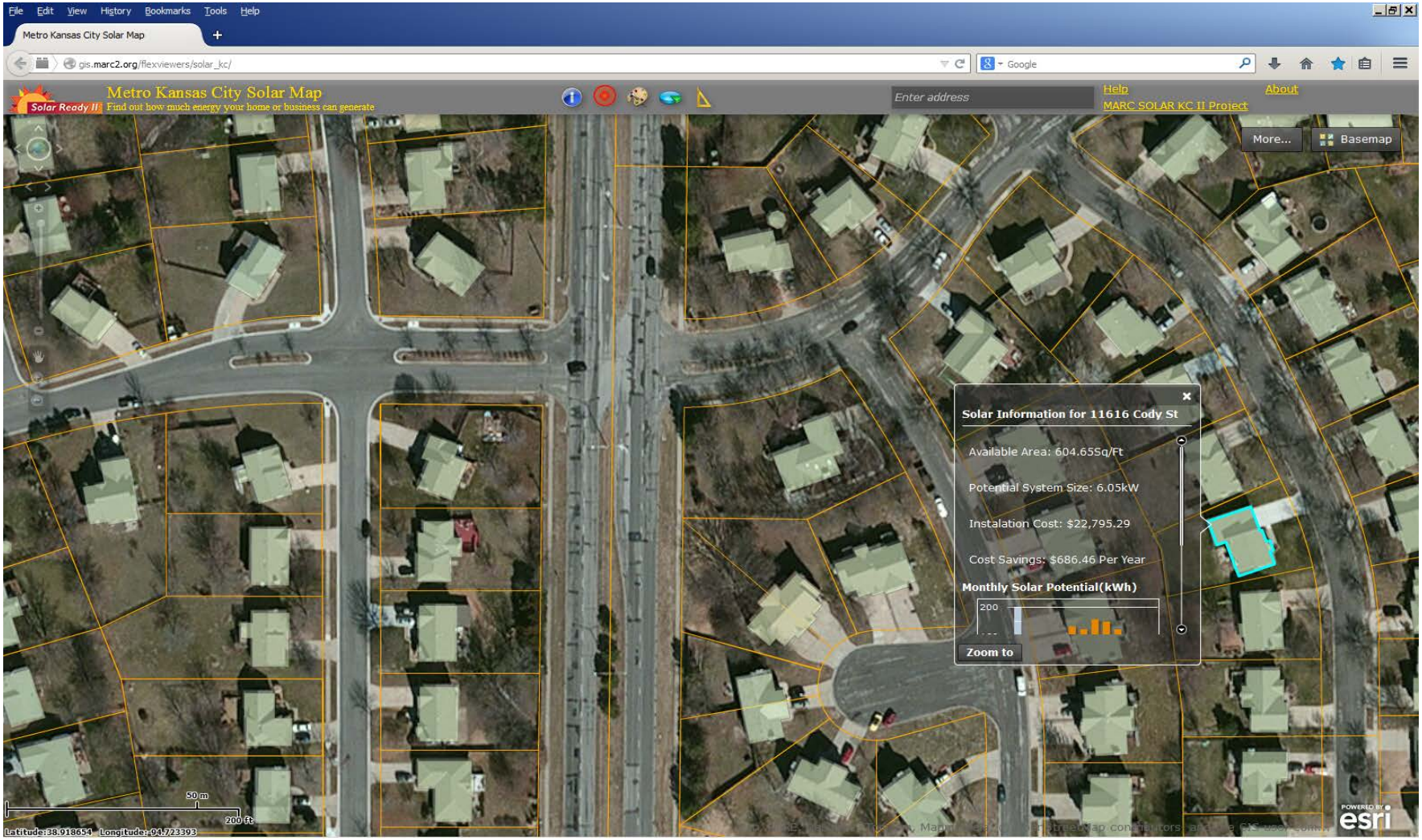
Next Steps: Permitting Guide

- Develop guide using local + national examples of permit checklists, application requirements, and other resources
- Convene a municipal working group
- Host permit training by Meister Consultants Group
- Work one-on-one with municipalities to implement permit best practices

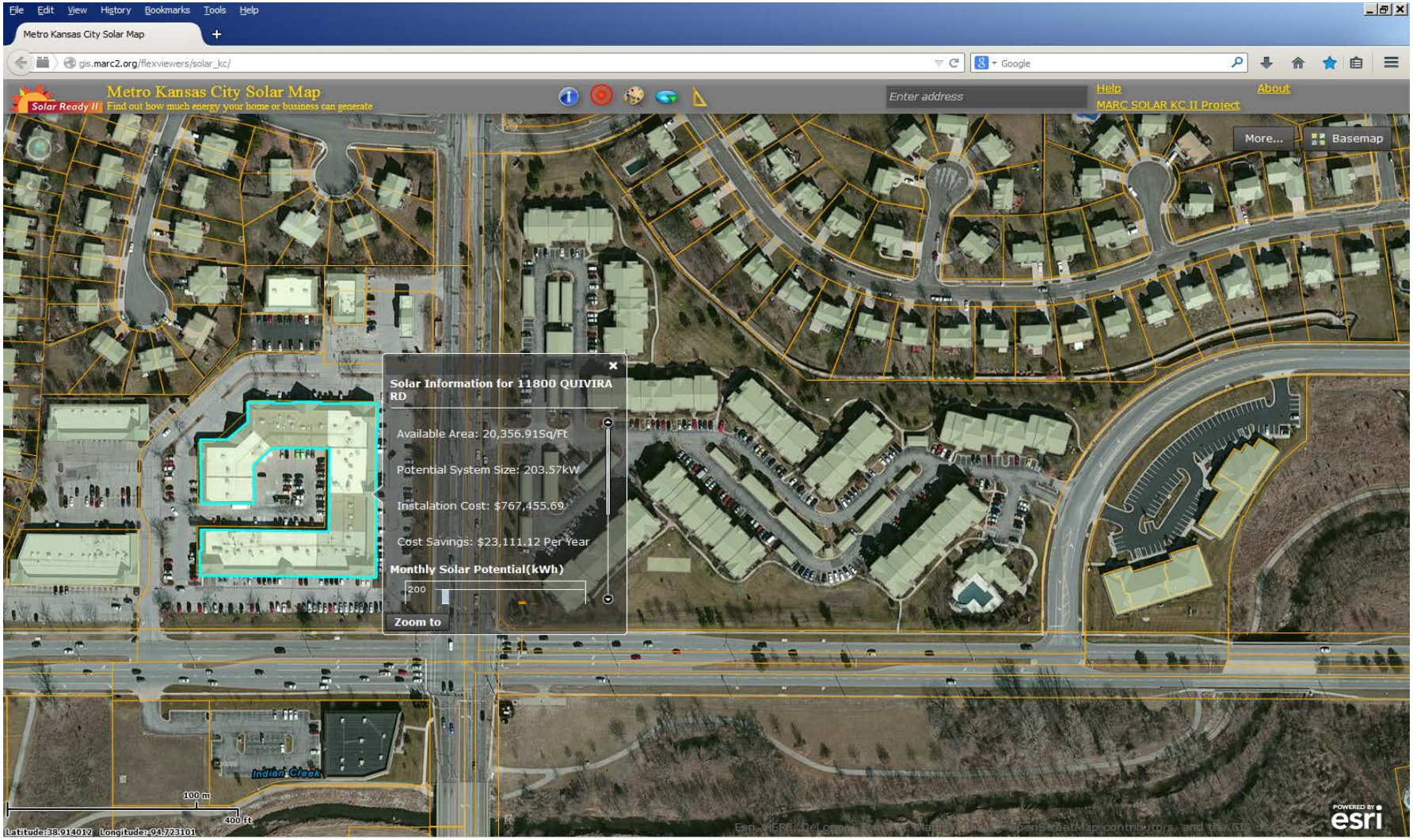
Best Management Practices - Solar Ready Map



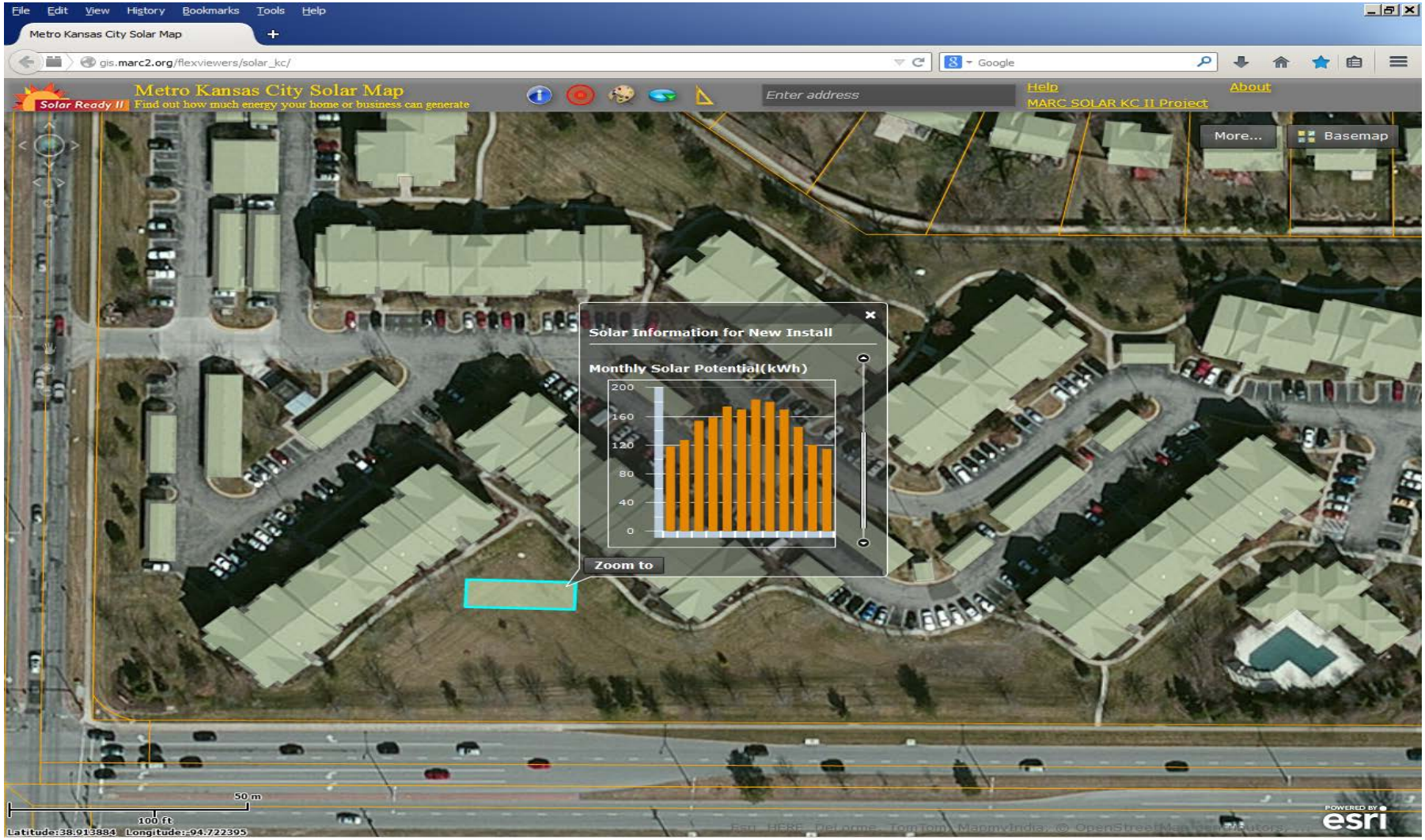
Best Management Practices - Solar Ready Map



Best Management Practices - Solar Ready Map



Best Management Practices - Solar Ready Map



Solar Ready Map: Next Steps

- Research MARCs development model. Evaluate interest and potential to develop this in-house.
- Investigate social media potential?
- Interface with other resources
  - Projectpermit.org
  - Energy Sage

Training Modules

Toolboxes of training materials on solar topics.

- Continuous training beyond the life of the grant by allowing trainings to be replicated
- Provide tools to variety of stakeholders and audiences

Training Module Content

- 1. One-Page Primer
  - 1.1. Target Audiences
  - 1.2. Update Sources
  - 1.3. Contacts
- 2. Helpful Documents
  - 2.1. Unique to Module (e.g. Model Ordinances)
  - 2.2. Follow Up Trainings
- 3. PowerPoint Presentations
  - 3.1. PowerPoint Presentation(s)
  - 3.2. Word document with
    - 3.2.1. Target Audiences if multiple PowerPoints
    - 3.2.2. Update Sources specific to PowerPoint data

Audiences

- Municipalities
- Public interests
- Non-profits
- Solar Advocates
- Installers

Solar 101: Training Modules

1. Introduction to Solar Technology

2. Solar Terminology – How to Speak the Language

3. Basics of Federal, State, and Utility Policy

4. Solar Project Design Considerations

Training Module Contents

- Solar 101
- Best Management Practice (BMP) Trainings
  - Zoning and permitting
  - Potential Future BMPs
    - Standardize Permit Fees
    - Pre-Qualification for Installers
    - Solar Access
    - Education (developers and homeowners)
    - Solar Readiness
    - First Responder BMPs
    - Solarize Programs (Bulk Purchasing)

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    - 3.2.1. Target Audiences if multiple PowerPoints
    - 3.2.2. Update Sources specific to PowerPoint data

Next Steps

- Select BMPS
- Develop BMPs
- Convene participating municipalities for training and technical assistance

- Working Group for Training Modules
  - Doodle Poll

For More Information

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