

Improving the Efficiency of the Rooftop Solar Permitting Process



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SunShot
U.S. Department of Energy

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About the 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 US.

IREC

- 501(c)(3) non-profit
- Goal = promote the sustainable development of renewable energy
- Represented in regulatory proceedings by Keyes, Fox & Wiedman, LLP



Speakers

- [Sky Stanfield](#) is Of Counsel with the law firm of Keyes, Fox & Wiedman, LLP in Oakland, California. Ms. Stanfield's practice focuses on the intersection between renewable energy regulation and environmental and land use law, with a particular focus on regulatory policy implementation, compliance and permitting processes. On behalf of IREC, Ms. Stanfield works to improve the efficiency and efficacy of the permitting process for distributed generation solar systems. She also is a leading voice for the improvement of interconnection standards and their interaction with the procurement and land use permitting processes in California.
- [Erica Schroeder](#) is an associate with Keyes, Fox & Wiedman LLP. Ms. Schroeder is deeply involved in IREC's efforts to investigate and improve permitting processes for renewable energy systems, a critical component to supporting renewable energy development nationwide. In addition, Ms. Schroeder represents IREC in state-level rulemakings on many topic areas essential to building sustainable markets for renewable energy including net metering rules, interconnection standards, and community renewables.

IREC's Solar Permitting Work

Rooftop Permitting



Ground-Mounted Permitting



Sharing Success: Emerging Approaches to Rooftop Permitting

- Examines rooftop solar permitting obstacles
- Highlights successful permitting improvements driven by local and state governments, and other entities
- Identifies practical approaches to manage solar permitting and achieve renewable goals



Webinar Agenda

1. Overview of the permitting process

- What are common problems?
- What are some successful solutions?

2. Implementing permitting improvements

- Action at the local and state levels
- Benefits of a regional approach

3. Q&A

Overview of the Permitting Process

Pre-Application – access to information on solar permit requirements and procedures




Application Submittal – application forms, fees and review



Inspections – scheduling inspections and inspector training

Pre-Application: Checklists and Other Guidance Documents



Boulder County
Land Use Department
Publications

Solar Photovoltaic Systems Checklist

Land Use Department
Courthouse Annex Building
2045 13th Street
PO Box 471
Boulder, CO 80302

Building Safety & Inspection
Services Division:
t: 303-441-3925
f: 303-441-4856
e: building_official@bouldercounty.org
w: www.bouldercounty.org/lu

Office Hours:
Monday - Friday 8:00 AM to 4:30 PM
Building Permits can be applied for
and issued until 4:00 PM

Solar Photovoltaic Systems Checklist

Per 2008 NEC (National Energy 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. Three sets of plans (four sets of plans are required if your project is in the town of 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.

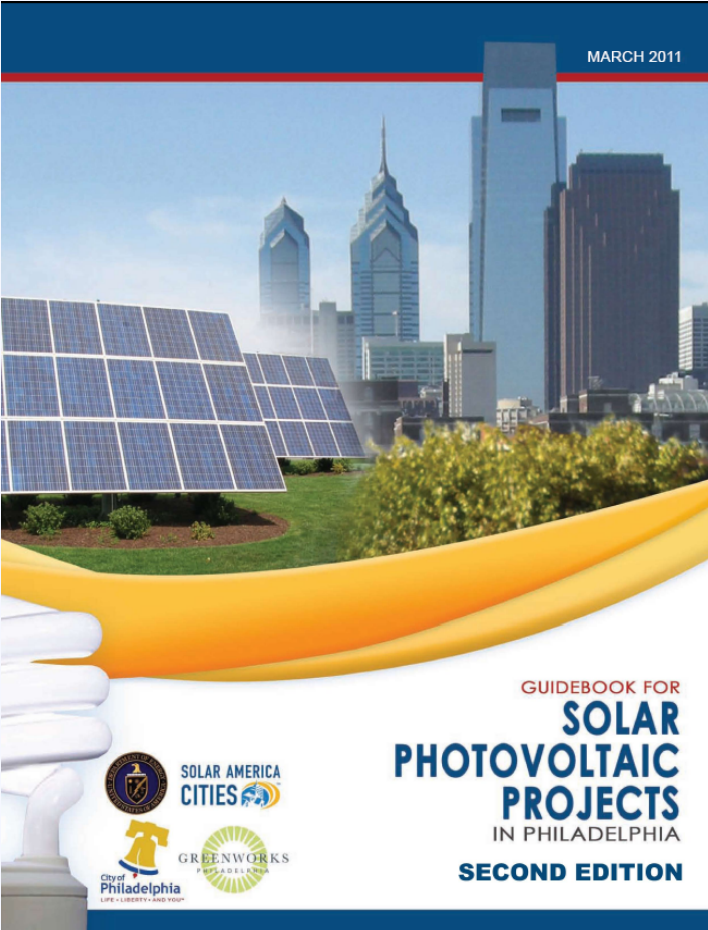
Wiring Requirements

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 ampere ratings (buss ratings).
- Series and parallel configuration of the module connections.

Form: B/46 - Rev. 01.21.11 - g:/publications/building/B46SolarPhotovoltaicChecklist.pdf

MARCH 2011

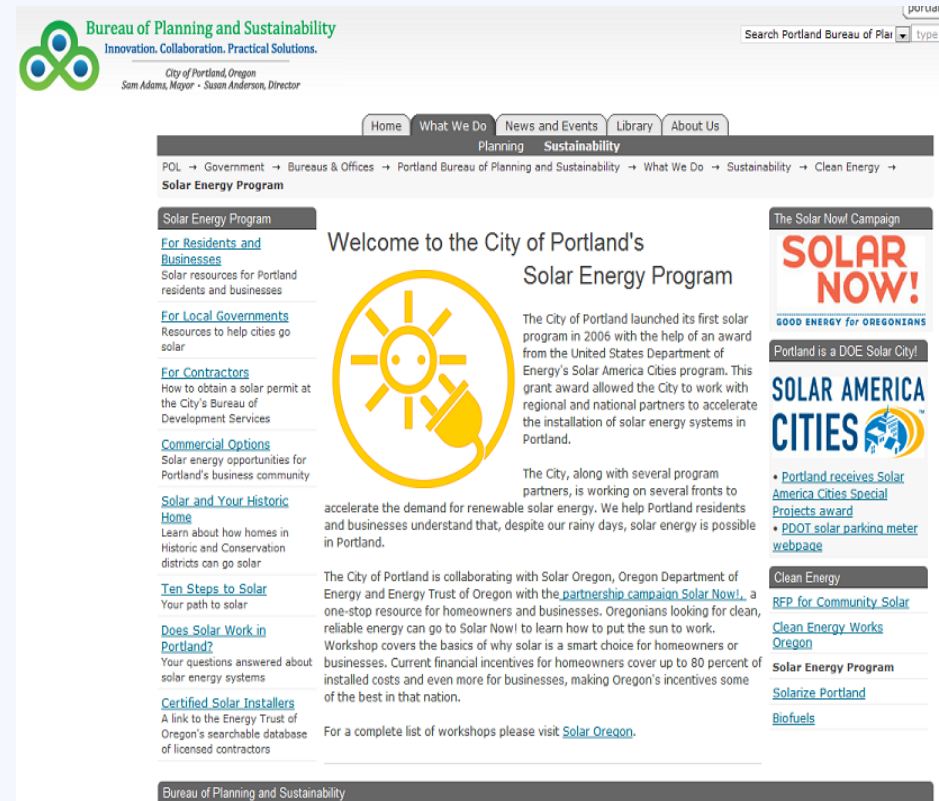


GUIDEBOOK FOR
SOLAR PHOTOVOLTAIC PROJECTS
IN PHILADELPHIA
SECOND EDITION

SOLAR AMERICA CITIES
City of Philadelphia
GREENWORKS PHILADELPHIA
LIFE • LIBERTY • AND YOU™

Pre-Application: Web Sites and Electronic Resources

- Permitting requirements applicable to solar
- The application form and any checklists
- Detail on how the application will be processed
- Links to other regulatory or private entities involved in solar permitting
- Links to additional information and resources



Bureau of Planning and Sustainability
Innovation. Collaboration. Practical Solutions.
City of Portland, Oregon
Sam Adams, Mayor - Susan Anderson, Director

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Solar Energy Program

[For Residents and Businesses](#)
Solar resources for Portland residents and businesses

[For Local Governments](#)
Resources to help cities go solar

[For Contractors](#)
How to obtain a solar permit at the City's Bureau of Development Services

[Commercial Options](#)
Solar energy opportunities for Portland's business community


[Solar and Your Historic Home](#)
Learn about how homes in Historic and Conservation districts can go solar

[Ten Steps to Solar](#)
Your path to solar

[Does Solar Work in Portland?](#)
Your questions answered about solar energy systems

[Certified Solar Installers](#)
A link to the Energy Trust of Oregon's searchable database of licensed contractors

Welcome to the City of Portland's Solar Energy Program



The City of Portland launched its first solar program in 2006 with the help of an award from the United States Department of Energy's Solar America Cities program. This grant award allowed the City to work with regional and national partners to accelerate the installation of solar energy systems in Portland.

The City, along with several program partners, is working on several fronts to accelerate the demand for renewable solar energy. We help Portland residents and businesses understand that, despite our rainy days, solar energy is possible in Portland.

The City of Portland is collaborating with Solar Oregon, Oregon Department of Energy and Energy Trust of Oregon with the [partnership campaign Solar Now!](#), a one-stop resource for homeowners and businesses. Oregonians looking for clean, reliable energy can go to Solar Now! to learn how to put the sun to work. Workshop covers the basics of why solar is a smart choice for homeowners or businesses. Current financial incentives for homeowners cover up to 80 percent of installed costs and even more for businesses, making Oregon's incentives some of the best in that nation.

For a complete list of workshops please visit [Solar Oregon](#).

The Solar Now! Campaign
SOLAR NOW!
GOOD ENERGY for OREGONIANS
Portland is a DOE Solar City!
SOLAR AMERICA CITIES


- [Portland receives Solar America Cities Special Projects award](#)
- [PDOT solar parking meter webpage](#)

Clean Energy
[RFP for Community Solar](#)
[Clean Energy Works Oregon](#)
Solar Energy Program
[Solarize Portland](#)
[Biofuels](#)

Bureau of Planning and Sustainability

<http://www.portlandonline.com/bps/index.cfm?c=43478>

Solar Permit Application Form



City of Phoenix
DEVELOPMENT SERVICES DEPARTMENT

Solar Water Heating System
Residential Permit Application

Date: _____

Project Name: _____

Project Address: _____

Subdivision Name: _____ Lot #: _____

Project Square Footage: _____ Project Valuation: \$ _____

Description of Work:

Installation of a solar water heating system. Roof mounted collectors: Yes No

Quantity and size of collectors: _____ Roof mounted storage tank: Yes No

Weight of system including weight of working fluid in the collectors/tanks: _____ psf
(Structural analysis of existing roof system is required if weight exceeds 5 psf)

SRCC #: _____ System model name: _____

System type: _____

Owner Information:

Owner/Business Name: _____

Address: _____ City: _____ State: _____ Zip Code: _____

Contact Person: _____ Phone: _____ Fax: _____

Contractor Information:

Business Name: _____

Address: _____ City: _____ State: _____ Zip Code: _____

Contact Person: _____ Phone: _____ Fax: _____

Local Business (Phoenix PLT) #: _____

State Tax #: _____ State License Class and Number (ROC): _____

Applicant Signature:

Check One: Owner Contractor Other _____

X: _____ Print Name: _____

Address: _____ City: _____ State: _____ Zip Code: _____

Company Name: _____ Phone: _____ Fax: _____

Staff Use Only Initials: _____

Permit Type: _____ Permit #: T _____ Permit Name: _____

Project Number: _____ CITA Yes No C Of O Yes No

Census: _____ Qtr Sec: _____ Cncl Dist: _____ Zoning: _____

Units: 0 Occupancy: N/A Const Type: I:VB Scope Code: SOLAR W/H Struc Class: 026

Review Fee Code: _____ Fee: _____ Permit Fee Code: _____ Fee: _____

Total: _____

This publication can be made available in alternate formats (Braille, large print, computer diskette, or audiotape) upon request. Contact the Development Services Department at (802) 282-7811 voice or (802) 534-5500 TTY.

S:\Solar Water Heater Application.doc TRT/DOC/00464
WEB New 8/09

Bill Brooks, Solar ABCs, Expedited Permit Process for PV Systems (model form)

EXPEDITED PERMIT PROCESS FOR PV SYSTEMS

The information in this guideline is intended to help local jurisdictions and contractors identify when PV system installations are simple, needing only a basic review, and when an installation is more complex. It is likely that 50%-75% of all residential systems will comply with these simple criteria. For projects that fail to meet the simple criteria, resolution steps have been suggested to provide as a path to permit approval.

Required Information for Permit:

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). PV arrays on dwellings with a 3' perimeter space at ridge and sides may not need separate fire service review.
2. Electrical diagram showing PV array configuration, wiring system, overcurrent protection, inverter, disconnects, required signs, and ac connection to building (see supplied standard electrical diagram).
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.

Step 1: Structural Review of PV Array Mounting System

Is the array to be mounted on a defined, permitted roof structure? Yes No
If No due to non-compliant roof or a ground mount, submit completed worksheet for the structure WKS1.

Roof Information:

1. Is the roofing type lightweight (Yes = composition, lightweight masonry, metal, etc...)? _____
If No, submit completed worksheet for roof structure WKS1 (No = heavy masonry, slate, etc...).
2. Does the roof have a single roof covering? Yes No
If No, submit completed worksheet for roof structure WKS1.
3. Provide method and type of weatherproofing roof penetrations (e.g. flashing, caulk) _____

Mounting System Information:

1. Is the mounting structure an engineered product designed to mount PV modules? Yes No
If No, provide details of structural attachment certified by a design professional.
2. For manufactured mounting systems, fill out 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 (b ÷ c) _____ lbs (if greater than 45 lbs, see WKS1)
 - e. Maximum Spacing Between Attachment 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 (b ÷ f) _____ lbs/ft²
If distributed weight of the PV system is greater than 5 lbs/ft², see WKS1.

Step 2: Electrical Review of PV System (Calculations for Electrical Diagram)

In order for a PV system to be considered for an expedited permit process, the following must apply:

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, and 15 kWSTC or less.
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 (690.64(B)).
5. The electrical diagram (E1.1) can be used to accurately represent the PV system.

Fill out the standard electrical diagram completely. A guide to the electrical diagram is provided 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.

2 EXPEDITED PERMIT PROCESS FOR PV SYSTEMS

Solar Permit Fees

- Sierra Club, Loma Prieta Chapter – encourages fees based upon staff time it takes to process solar permit application
- The Vote Solar Initiative, Project: Permit – community-led fee-reduction campaign
- State fee statutes – Colorado, Arizona
- Fee waivers – City and County of Honolulu

Application Submittal and Review

- In-person submittal with later review
 - Most common process
 - Improvement: Expedited review for pre-qualified projects, plans or installers
- Over-the-counter submittal and review – for qualified systems
 - Often more efficient for city and applicant
 - Example: Scottsdale, AZ – for all residential plan review, including solar

Application Submittal and Review

- Online or electronic submittal and review
 - Potential to be significantly more efficient for city and applicant
 - Can improve communication
 - However, can present high upfront costs



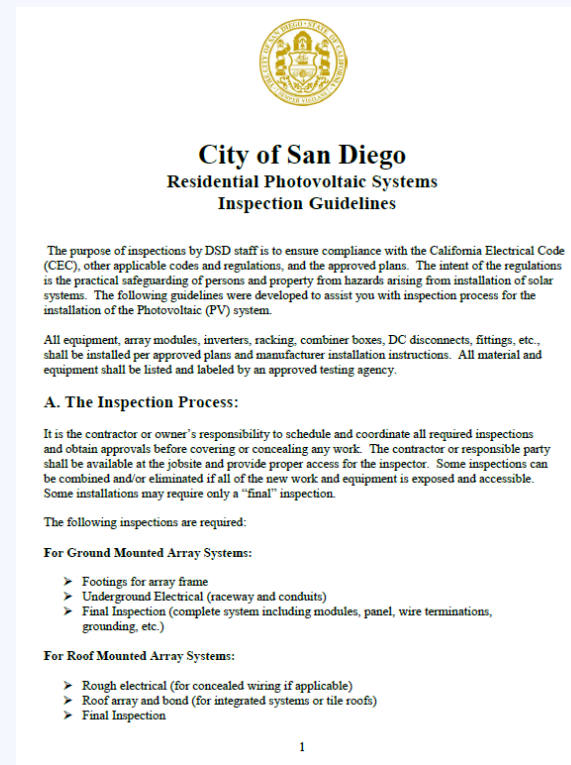
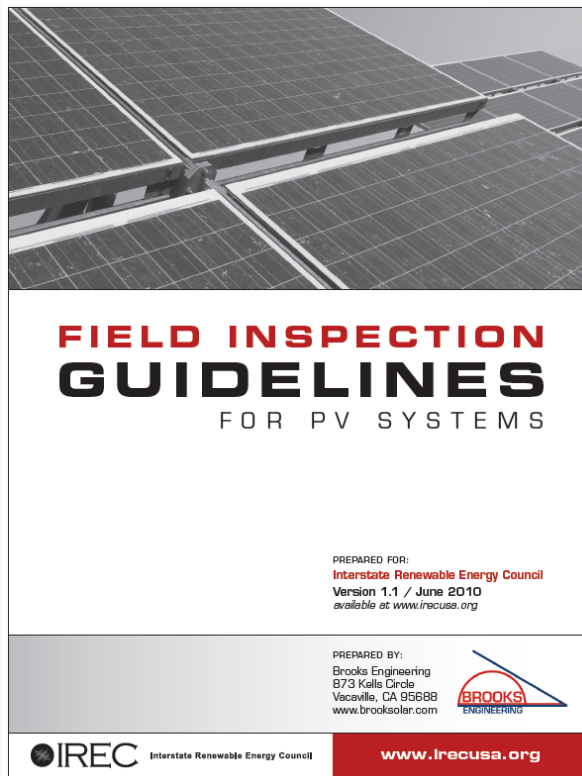
The screenshot shows the City of Sacramento Community Development Customer Service website. The page features a navigation menu with links for 'About the City', 'Departments', 'Jobs', 'News', 'Business', 'Emergency', and 'Community Development Link'. A search bar is located in the top right corner. The main content area is titled 'Sacramento Streamline Program' and includes a sub-header 'Improvements Now Available'. The text describes the program's goal to make the building permit process easier and lists several improvements: Appointment Scheduling Program (NEW), ePlan Check (NEW), and Submittal Requirements for E-Plan Check - Commercial Building Permits. A 'Return to CDD Homepage' link is visible at the bottom left of the page.

Inspection Scheduling

- **Frequency and timing of inspections = critical cost component of solar installation**
 - Rough or in-progress inspection
 - Electrical contractor or engineer on site
 - Reasonable time window
 - Ease of scheduling
- **Coordination with interconnection inspection?**

Inspector Training and Resources

To enable inspectors to know what to look for in a solar inspection, specifically



Photovoltaic Online Training Platform (PVOT)

- No-Cost online training for code officials
- Six basic learning modules covering the major topics of concern for field inspection and expedited permitting
- Seventh module is immersive activity imbedded in an open-source, game-based framework with its own assessment
- Will be available in mid-June 2012

Framework for the Efficient Processing of Solar Permits

1. Consistent technical and procedural requirements across the region or U.S.
2. Increased and readily available access to information about permit requirements.
3. Simplified standards and processes focused only on solar installations.
4. Fee structures designed to fully compensate permitting authority while also keeping solar development costs at a minimum.

Implementing Improvements: Key Principles

- **Responsibility** for change should be shared between permitting authorities and the solar industry.
- Changes to permitting policies should **benefit** municipal governments as well as solar installers and their customers.

Implementing Improvements: Local Government's Role

- Typically, local government controls the solar permitting process
- Importance of balancing government's needs and demands with encouraging solar energy and economic development



Implementing Improvements: Potential for State Involvement

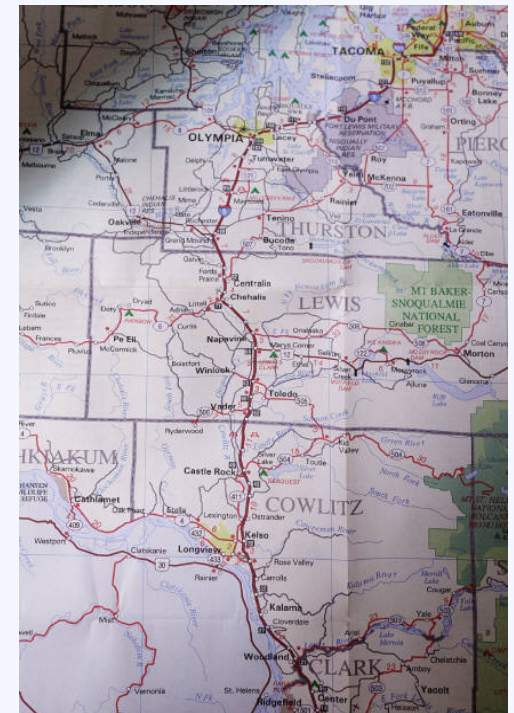
- Regulatory structure provides for state control over permitting (Vermont)
- State chooses to make mandatory statewide permitting policy decisions
 - Building codes (Oregon)
 - Other statutes (Colorado)
- State offers non-mandatory permitting guidance (California)

Implementing Improvements: Regional Approach

- Standardization across a geographically significant region
- Examples:
 -  Long Island Unified Solar Permitting Initiative (LIUSPI)
 -  East Bay Green Corridor: Permitting Initiative
 - County standardization efforts

Benefits of a Regional Approach to Permitting Reform

- Regional economic development
- Collaborative, cooperative and local
- Leverage existing regional relationships
- Administrative economies of scale
- Benefits to solar industry



Resources

- *Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting* – <http://www.irecusa.org/2012/05/irec-releases-report-identifying-successful-strategies-for-permitting-solar-rooftop-systems>
- IREC – www.irecusa.org
- ICLEI – www.iclei.org
- Resource Center – http://www4.eere.energy.gov/solar/sunshot/resource_center/



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Questions?