DOE Technical Assistance Program

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Procuring and Implementing Solar Projects on Public Buildings

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What is TAP?

DOE's Technical Assistance Program (TAP) supports the Energy Efficiency and Conservation Block Grant Program (EECBG) and the State Energy Program (SEP) by providing state, local, and tribal officials the tools and resources needed to implement successful and sustainable clean energy programs.

How Can TAP Help You?

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

TAP offers:

- One-on-one assistance
- Extensive online resource library, including:
  - Webinars
  - Events calendar
  - TAP Blog
  - Best practices and project resources
- Facilitation of peer exchange

On topics including:

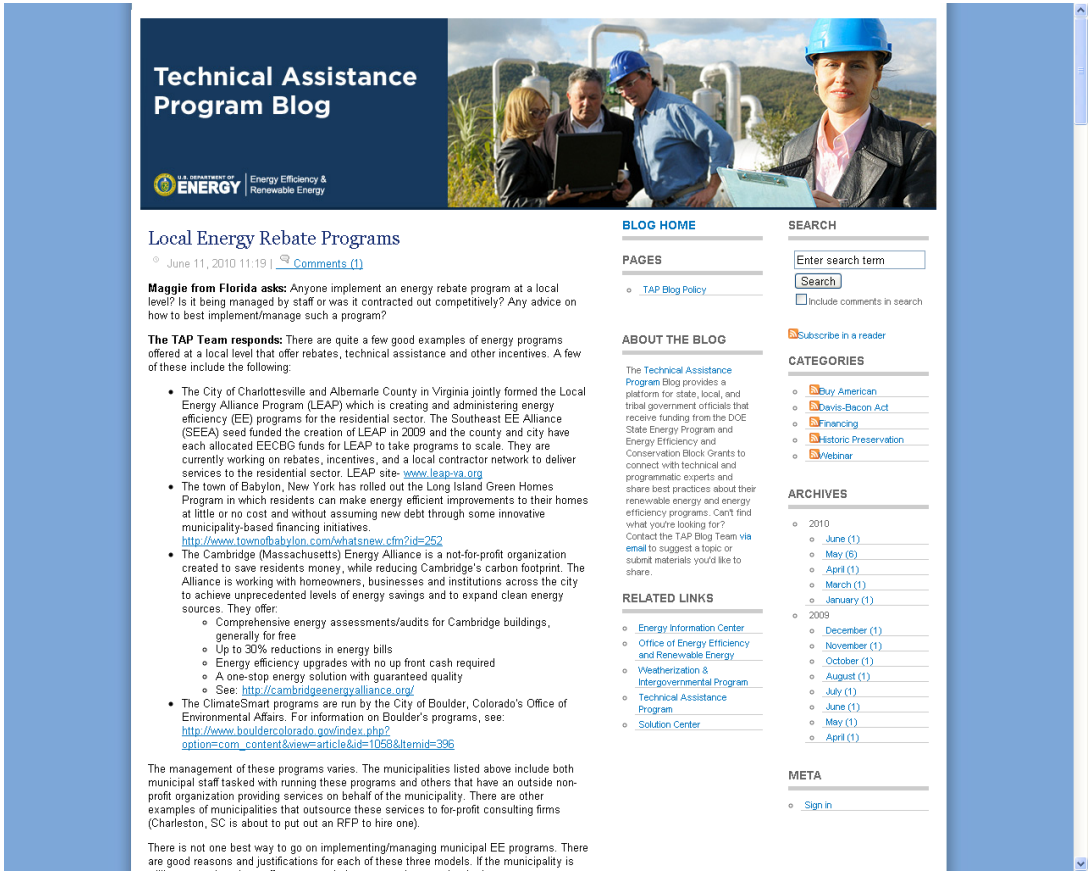
- Energy efficiency and renewable energy technologies
- Program design and implementation
- Financing
- Performance contracting
- State and local capacity building

The TAP Blog

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Access the TAP Blog!
http://www.eereblogs.energy.gov/tap/

Provides a platform for state, local, and tribal government officials and DOE's network of technical and programmatic experts to connect and share best practices on a variety of topics.

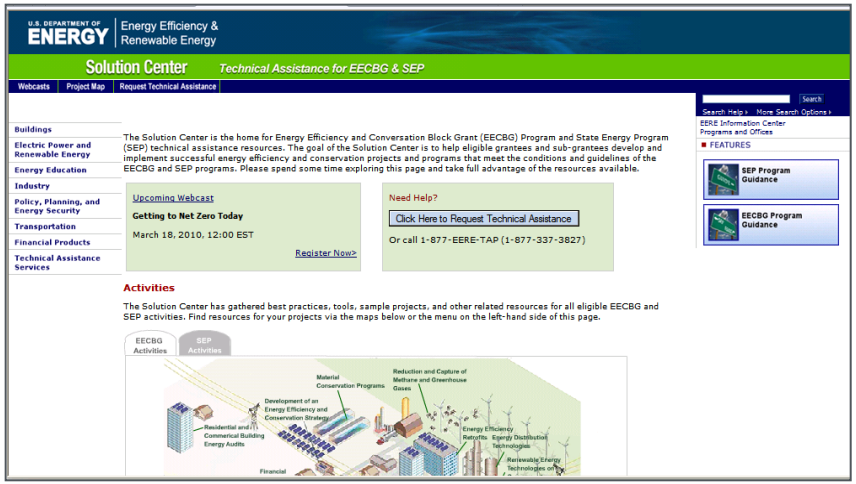


Accessing TAP Resources

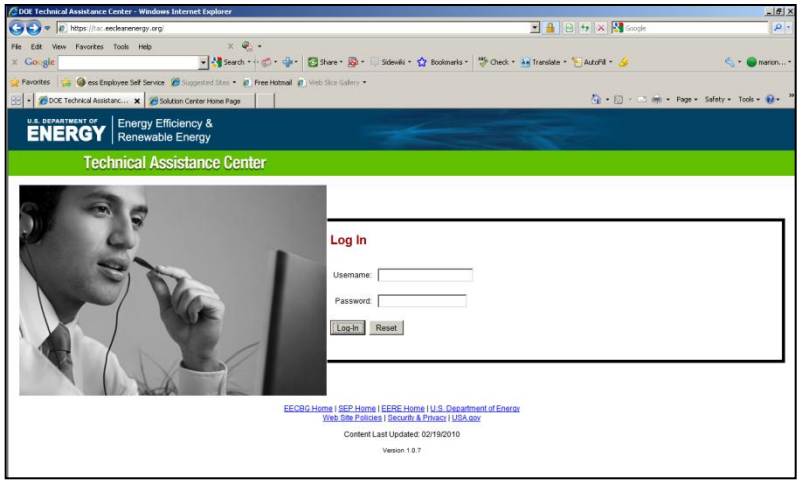
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

We encourage you to:

1) Explore our online resources via the Solution Center



2) Submit a request via the Technical Assistance Center



3) Ask questions via our call center at 1-877-337-3827 or email us at solutioncenter@ee.doe.gov

Audience & Goals for Webinar

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

AUDIENCE

EECBG and SEP grantees that seek guidance on procuring and implementing current and future Solar PV or Solar Water Heating (SWH) projects on public buildings

GOALS

- Outline good practices for PV & SWH RFP process
- Describe how to avoid 5 common PV & SWH pitfalls
- Illustrate practices and pitfalls with a case study
- Direct audience to helpful tools & resources to support solar procurement & implementation

Good Practices for a Solar RFP

- Start the RFP process with the end of the tunnel in mind
  - (1) Involve necessary internal stakeholders/departments
  - (2) Develop bid weights according to agency priorities
  - (3) First do no harm: roofing
  - (4) Attempt for broad qualified bidder participation
  - (5) Show bidders your site homework

Good Practices for a Solar RFP

- Management of the RFP process
  - (6) Apples-to-apples comparisons among bidders
  - (7) Require bidder performance in contract for areas such as permitting, utility interconnection, code compliance, construction schedule, warranties, and electricity output
  - (8) Establish precedents for future renewable investments

Good Practices for a Solar RFP

- Involving stakeholders/departments
  - Procurement
  - Finance
  - Facilities/engineering
  - Energy/environmental mgmt.
  - Executive
  - Other

Good Practices for a Solar RFP

- First do no harm: roofing
  - Roof age and condition as important determinants of where and how installations are sited
  - Integration with roof warranty
  - Structural analysis/loading limitations
  - NREL solar rooftop optimization tool (forthcoming)

Good Practices for a Solar RFP

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- Weighing bids according to agency priorities – no one right way

Solar Pitfall #1: RFP Specs are too Restrictive or too Unstructured

- How the pitfall arises
  - Somebody inside the agency or an advisor indicates that a very specific solar configuration is best

    OR
  - Uncertainty on what to request (especially in regions with little prior solar market activity)

Restrictive:

Extensive details on required technology, layout, improvements/add-ons

Unstructured:

At simplest level, any xx kW system on an agency site

Solar Pitfall #1: RFP Specs are too Restrictive or too Unstructured

Avoid pitfall for solar PV and SWH by proactively deciding what level of RFP specificity best meets your agency's solar goals, administrative resources, and general procurement practices

- Overly specified bid requirements can drive up costs (dramatically), cause otherwise qualified bidders to walk away, and lead to inefficient systems
- Unstructured bid specifications can create major problems in standardizing bids (making apples-to-apples and publicly justifiable comparisons), impose high administrative costs to agencies, and result in low quality systems

Restrictive:

Extensive details on required technology, layout, improvements/add-ons

Unstructured:

At simplest level, any xx kW system on an agency site

Solar Pitfall #2: Competing Measures of System Efficiency

Avoid pitfall by (a) clarifying which measure(s) will be the basis of your performance decision, (b) focusing on longer-term performance, and (c) requiring that vendors use reliable sources

- Solar Photovoltaic
  - Installed capacity (kW)
  - Output (kWh)
  - Output efficiency (kWh/kW)
  - Capacity/square foot
  - Output/square foot
  - Effect of degradation: measuring output over 20 years vs. 1 year
  - Reliable & standardized data sources (NREL's PV Watts & SAM)
- Solar Water Heating
  - Installed capacity
  - Output (BTU/ft2 panel)
  - Solar fraction > 0.5
  - Reliable & standardized data sources (SRCC & RETScreen)

Solar Pitfall #3: Finding Enough Qualified Contractors (Bidders)

How to avoid pitfall for Solar PV & Solar Water Heating

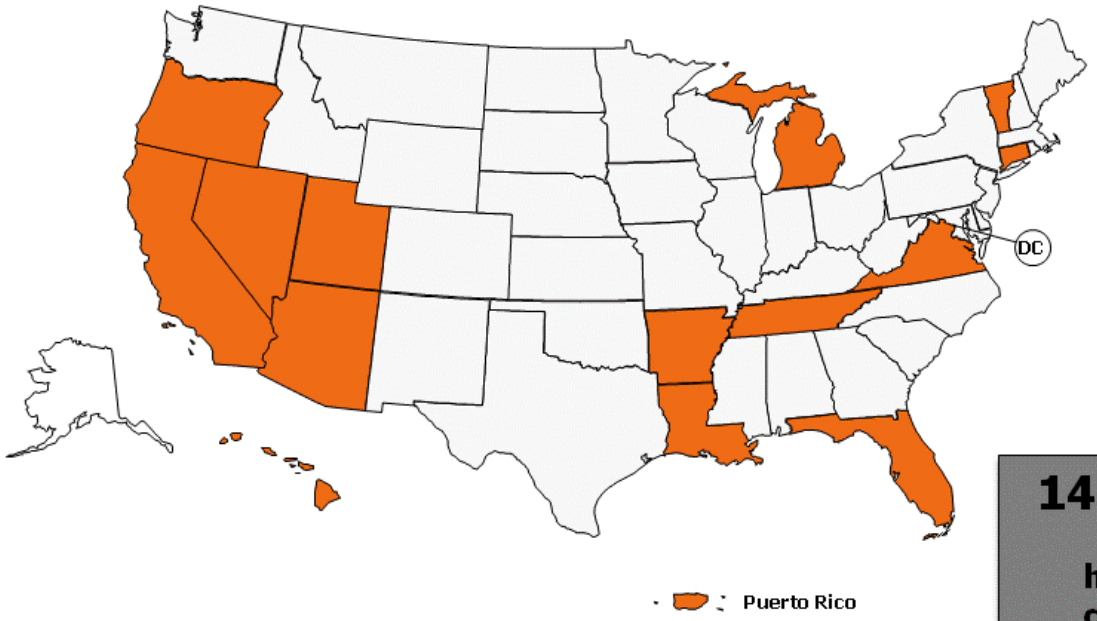
- Publicly release solicitation documents
- Allow sufficient time between release and RFP due date
- Places to advertise include: SEIA chapters (www.seia.org), plumbing, electrical, heating and cooling associations
- Find list of contractors on similar projects from other agencies and from public databases (e.g., California Solar Initiative, http://www.californiasolarstatistics.ca.gov/; & NREL's Open PV, http://openpv.nrel.gov/) or the Utility Solar Water Heating Initiative (USH2O) for SWH.
- Understand industry qualification standards *(e.g., Solar contractor license and certifications (NABCEP))*

Solar Pitfall #3: Finding Enough Qualified Contractors (Bidders)

DSIRESOLAR™
Database of State Incentives for Renewables & Efficiency

Solar Contractor Licensing Requirements

www.dsireusa.org / September 2010



State Solar Contractor Licensing Requirement

14 states + PR have solar contractor licensing requirements

Solar Pitfall #4: No Effective O&M Program

How to avoid pitfall for Solar PV & Solar Water Heating:

- Consider system warranties linked to rated power output
- Require contractor to provide:
  - Installation and operation and maintenance manuals
  - As-built drawings
  - Onsite training after startup
- Add an option for an annual maintenance contract to ensure continued operation

Solar Pitfall #5: No Strong Monitoring Program

How to avoid pitfall for Solar PV & Solar Water Heating:

- Insist on at least basic customer monitoring:
  - Inverter kWh displays (PV)
  - Flow meter and temperature sensors for BTUs (SWH)
- Monitoring systems may also include: data acquisition system that allows for remote operation, frequent data collection (< =15 minute intervals), data retention (5 years), integration into building monitoring systems or SCADA, and/or displays at public kiosks and on Internet.
- PV Data: system availability, capacity factor, accumulated output, net metering
- SWH Data: solar BTUs, total BTUs, cumulative gallons of hot water, backup electric consumption

Monitoring is essential for proper operation and optimal performance of the system

Solar America Communities is a U.S. Department of Energy program designed to increase the use and integration of solar energy in communities across the United States

SOLAR AMERICA COMMUNITIES

Original 25 Solar America Cities Partnerships

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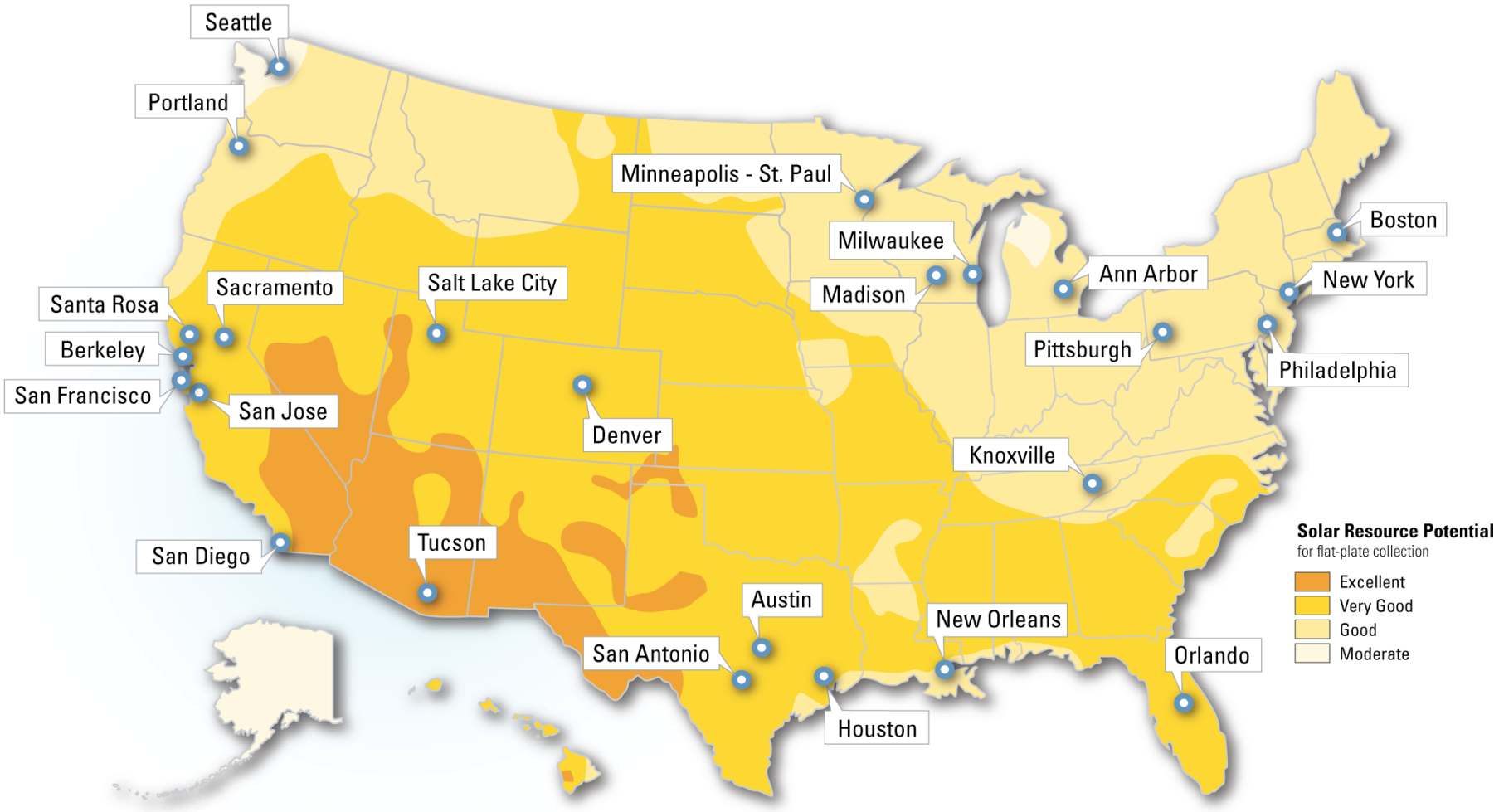


Solar America Cities Special Projects

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

$10M in Recovery Act funding to support local government innovation and bring successful pilot policies and programs to scale for replication across the nation.

Projects awarded in 17 original partner cities and launched in Spring 2010

PROJECT CATEGORY	CITY	PROJECT TITLE
Affordable Housing	San Diego	Affordable Housing Analysis
	San Francisco	Debt-Financed SHW Retrofits for Affordable Housing
Data Monitoring	New York City	Smart Solar City Data Acquisition System
Demonstration Projects	Milwaukee	SWH Demonstration Projects and Best Practices Manual
	Minneapolis - Saint Paul	Solar District Heating
Emergency Preparedness	Boston	Solar Evacuation Route
	San Diego	Solar Fire Shelters
Financing	Madison	MadiSUN Community Solar Financing
	Milwaukee	Property Assessed Clean Energy Financing
	New Orleans	Third Party Solar Tax Credit Implementation
		Sustainable Energy Financing District Implementation
	New York City	Community Solar Financing
	Portland	Neighborhood-Based Volume Solar Purchasing
		Residential Solar PPA Model for Utility-Bill Financing
	Salt Lake City	Financing Options for Mid-Large Scale Systems
		Solar Rebate Program Expansion and Third Party PPA Legal Analysis
	San Francisco	Commercial Solar PPA Model
	San Jose	Property Assessed Solar Financing through Joint Powers Authority
		Solar Loans for City Staff
		QECBs for Revolving Solar Loan Fund
	Seattle	Community Solar Financing through Municipal Utility
	Tucson	Creative Financing for Municipal Solar Installations

PROJECT CATEGORY	CITY	PROJECT TITLE
Industry Recruitment	Milwaukee	Solar Hot Water Business Council
Outreach	Berkeley	Smart Solar Regional Expansion and Solar Map Enhancements
	Madison	Target Marketing Solar to Business
		Solar Business Center
	New York City	Smart Solar Virtual Community
	Portland	Solar Now! Regional Outreach Campaign
	San Francisco	San Francisco Sustainable Financing Program Marketing
	San Jose	Green Vision Education and Demonstration Center
	Santa Rosa	Clean Energy Advocate
	Tucson	Solar One Stop
Permitting & Codes	Portland	Neighborhood-Scale Distributed Energy Systems
	San Jose	Streamlined Regional Permitting Process
	Tucson	Integrating Solar into Green Building Codes and Infrastructure Planning
Schools	Austin	Solar Curriculum Development and School Demonstration Projects
	Milwaukee	Solar School Swap
	San Francisco	Solar Financing for Public Schools
Workforce Development	San Jose	Solar Train the Trainer Internship Program
		Solar Career Training for At-Risk Youth

Solar America Communities

In 2010, DOE expanded the *Solar America Cities* program to *Solar America Communities* and initiated actions to begin replicating lessons and results from the original 25 partner cities to communities throughout the United States.

Solar America Communities Outreach Partnership

DOE selected two organizations to lead outreach efforts to local governments across the United States:

- International City-County Management Association (ICMA)
- ICLEI-Local Governments for Sustainability

ICMA and ICLEI will partner with DOE and other organizations to provide information to communities regarding solar policies and regulations, financial incentives, workforce training, utility and community engagement, and other important topics.

SOLAR AMERICA COMMUNITIES

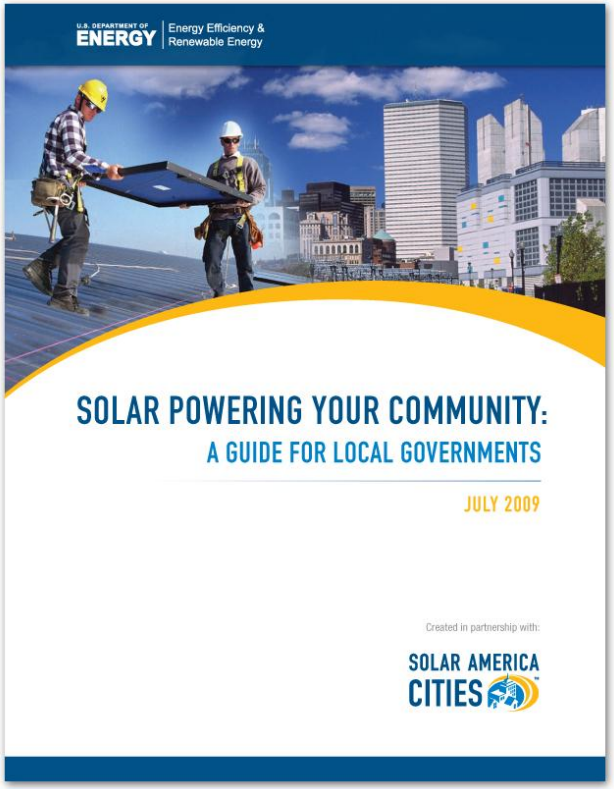
www.solaramericacommunities.energy.gov

Solar America Communities Outreach Partnership

- **Goal:** Provide information on solar best practices to thousands of local governments across the nation
- Leverages investment in the original 25 Solar America Cities and distributes lessons learned to other communities
- ICMA and ICLEI-led teams will receive $10M over 5 years to conduct outreach. Teams are developing a combined outreach plan and *expect to launch activities in early 2011*.
- Activities will likely include nationwide dissemination of information through newsletters and media coverage, regional conferences, and in person presentations for targeted local governments

ICMA Leaders at the Core of Better Communities
APA
NARC Building Regional Communities
ICLEI Local Governments for Sustainability USA
IREC Interstate Renewable Energy Council
North Carolina State University
DSIRE
MEISTER CONSULTANTS GROUP
SEPA solar electric power associations
THE SOLAR FOUNDATION

Solar Powering Your Community: A Guide for Local Governments



Provides policy and program descriptions, implementation tips and options, and real life examples in areas of:

- Organizing and strategizing efforts
- Accelerating demand through policies and incentives
- Updating and enforcing local rules and regulations
- Engaging utilities
- Creating jobs and supporting economic development
- Accelerating demand through outreach and education
- Leading by example with installations on government properties

www.solaramericacommunities.energy.gov/resources

Updated guide will be available in December 2010!

Resources on the Solar America Communities Website

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Recent publications and tools:

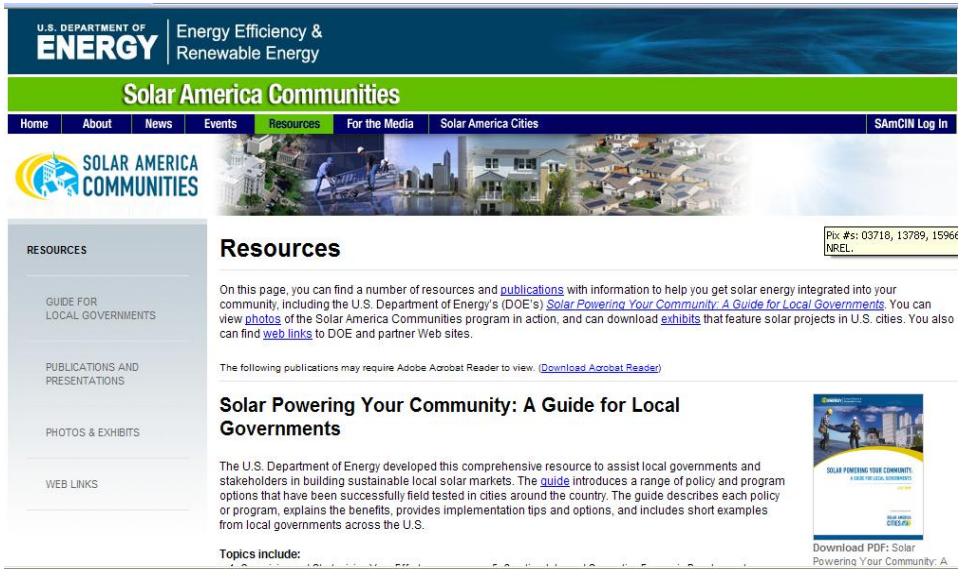
- Report: Interconnecting PV to Network Grids
- Report: Review of Web-based Solar Mapping Tools
- Report: The Impact of Utility Rate Structures on PV System Value – a San Diego Case Study

www.solaramericacommunities.energy.gov

- Read about the program
- Get the latest news and events
- Search the publications database
- See what cities are working on

Upcoming publications and tools:

- Status reports on PACE and Community Solar Financing Models
- Report: Assessing Solar Economic Development Opportunities in your City
- Report: Streamlining Solar Permitting through Standardized Structural Design
- PV / SHW Rooftop Optimization Tool



Other Informational Resources for Solar Procurement

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

SolarTech: Project Finance Templates and Guidelines
http://www.solartech.org/index.php?option=com_st_document&view=general&Itemid=58

NREL: Power Purchase Agreement Checklist
http://www.nrel.gov/docs/fy10osti/46668.pdf

RETScreen International: Clean Energy Project Analysis
http://www.retscreen.net/ang/home.php

NREL: In My Backyard (IMBY) PV System Analysis
http://www.nrel.gov/eis/imby/

This is only a reference list of potentially helpful sources, but is not a DOE endorsement of nor preference for these sources.

Other Informational Resources for Solar Procurement

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Vote Solar: Sample Municipal Solar RFPs
http://votesolar.org/?s=SAMPLE+RFP&x=0&y=0

Nat'l Assn. of State Energy Officials (NASEO): ARRA RFP Library
http://www.naseo.org/arra/rfp/index.html

Nat'l Assn. of Counties (NACO): EECBG RFP Library
http://www.naco.org/programs/csd/Pages/EECBGRFPLibrary.aspx

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Solar Public Interest Waiver

The Solar Public Interest Waiver increases the number of solar panels that can be used in a solar project; it permits the use of:

- Domestically-manufactured modules containing foreign-manufactured cells
- Foreign-manufactured modules, when comprised exclusively of domestically-manufactured cells

It also allows grantees to use non-domestic ancillary items (except inverters and batteries):

- Any ancillary items and equipment (including, but not limited to, charge controllers, breakers and fuses, racks, trackers, cables and all otherwise incidental equipment *with the exception of inverters and batteries*) when utilized in a solar installation involving a U.S. manufactured PV module, or a module manufactured abroad but comprised exclusively of domestically-manufactured cells.

Why Include the Solar Public Interest Waiver in your RFPs?

- Broadens the number of potential bidders, because it lowers the risk and responsibility for contractors

- Makes clear to potential bidders that the Buy American provisions will be enforced - flowing down the Buy American provisions may provide indemnification by contractors later if a mistake is made

- Clarifies what items need to be compliant with the Buy American provisions up-front for accurately priced bids

Milwaukee Case Study

City of Milwaukee

Milwaukee SHINES
FOR A SUSTAINABLE SOLAR FUTURE

SOLAR AMERICA COMMUNITIES

Milwaukee's RFP Experience: Third Time's a Charm

Presented by:
Andrea Luecke
***Milwaukeee Shines* Project Manager 2008-2010**
www.MilwaukeeShines.com

City of Milwaukee's Context

Advantages

1. Committed Mayor Tom Barrett
   - Greenhouse Gas Reduction Goal: 7% below 1990 levels by 2012
   - Office of Environmental Sustainability Created 2007
2. We Energies (utility) and Focus on Energy (public benefits fund) rebates
3. Solar America City Designation 2008

Disadvantages/Barriers

1. Low energy costs
2. Older housing stock
3. Shading problems
4. Underdeveloped installer workforce
5. Unclear permitting/codes
6. Time consuming rebate application process
7. General sense that solar doesn't work

Milwaukee Case Study

3 RFPs for SWH systems on city firehouses over the course of 3 years!

1st RFP: Fall 2007 – 9 SWH systems
2nd RFP: Spring 2009 – 9 SWH systems
3rd RFP: Spring 2010 – 4 SWH systems

Milwaukee Case Study

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

1st RFP: Fall 2007 – 9 SWH installations

Pitfall #1: RFP too specific
(i.e. project overdesigned)

Milwaukee Case Study

2nd RFP: Spring 2009 – 9 SWH installations

Pitfall #1: RFP too specific

(i.e. cost of structural reinforcements too high)

Pitfall #4: No effective O&M program

(i.e. time and cost of O&M not factored in)

Milwaukee Case Study

3rd RFP: Spring 2010 – 4 SWH installations on city firehouses

Pitfall #3: Finding enough qualified contractors

Milwaukee Case Study

In the end, it was a team effort. Special thanks to:

DOE and NREL
City of Milwaukee DPW and Common Council
Caleffi Hydronics Solutions
Midwest Renewable Energy Association
Milwaukee Solar

Upcoming Webinars

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Please join us again:

Title: ESPC Pricing and Financing
Date: December 16, 2010
Time: 1:30 – 2:30pm EST

For the most up-to-date information and registration links, please visit the Solution Center webcast page at www.wip.energy.gov/solutioncenter/webcasts

Q & A

- Questions from webinar attendees
- Please submit electronically