Solar Finance for Residential and Commercial Customers
Potential Roles of State and Local Government

Powered by SunShot
U.S. Department of Energy

Overview

- Learning Objectives
- Solar Financing Basics
- The Roles of State and Local Governments
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What is SunShot?

- **DOE SunShot Initiative**
  - Collaborative national initiative
  - Make solar cost-competitive
  - Reduce cost of solar 75% by 2020
  - More information at www.energy.gov/sunshot
- **SunShot Solar Technical Assistance Team (STAT)**
  - Solar technology and deployment experts
  - Assist state and local governments
  - Information on policies, regulations, financing, other issues to achieve SunShot goals
  - Request specific assistance through STAT@nrel.gov

Learning Objectives

During this session you will:

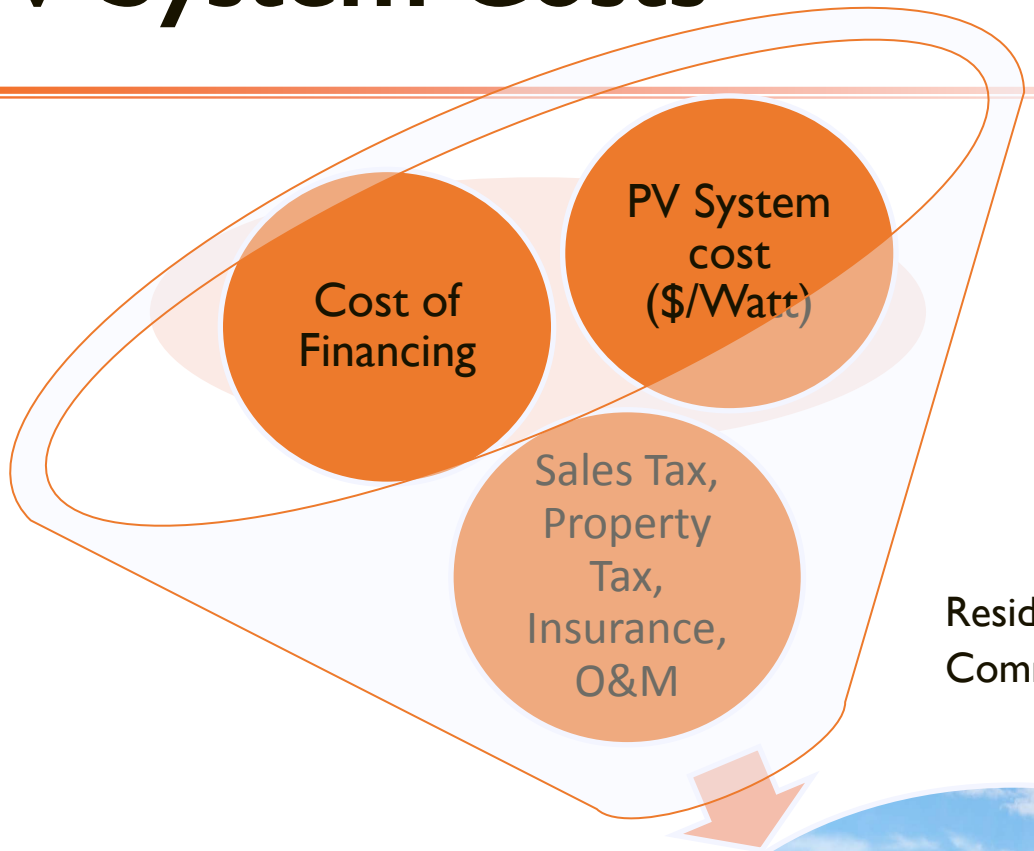
- Learn the basics of solar financing and how projects in the residential and commercial markets are commonly financed.
- Understand the importance of tax-related incentives.
- Discover which incentives state and local governments commonly offer to lower the cost of solar installations to the end-user.

Solar Financing Basics

Acronyms in the Solar Finance World

- PV – Photovoltaics
- kW – kilowatts (relates to the size of the system)
- Watts – the cost of PV is usually expressed in "dollars per watt" terms
- kWh – kilowatt hours (relates to the electricity production of the system)
- ITC – Investment Tax Credit (currently 30%)
- MACRS – Modified Accelerated Cost Recovery System (depreciation)
- RECs – Renewable Energy Certificates
- PPA – Power Purchase Agreement
- O&M – Operations and Maintenance
- Treasury 1603 – Cash grant in lieu of the ITC

PV System Costs



Residential PV (5 kW): $22,500 ($4.50/W)
Commercial PV (100 kW): $350,000 ($3.50/W)

PV System Economic Benefits

Tax Credits
- ITC
- MACRS
- State tax credits

Local Incentives
- Utility
- State or local government

Utility Bill Savings
- Net metering
- SRECS

The after tax and incentive cost of a PV installation can be significantly less than the retail cost per watt with the on-going savings materially reducing the end-user's utility bill.

How to Finance a PV System

Key Questions:

1. Are you a tax paying entity?

2. Do you have access to financing /cash on hand?

3. Do you have other investment opportunities or needs?

4. Are you located in a state which allows third-party ownership?

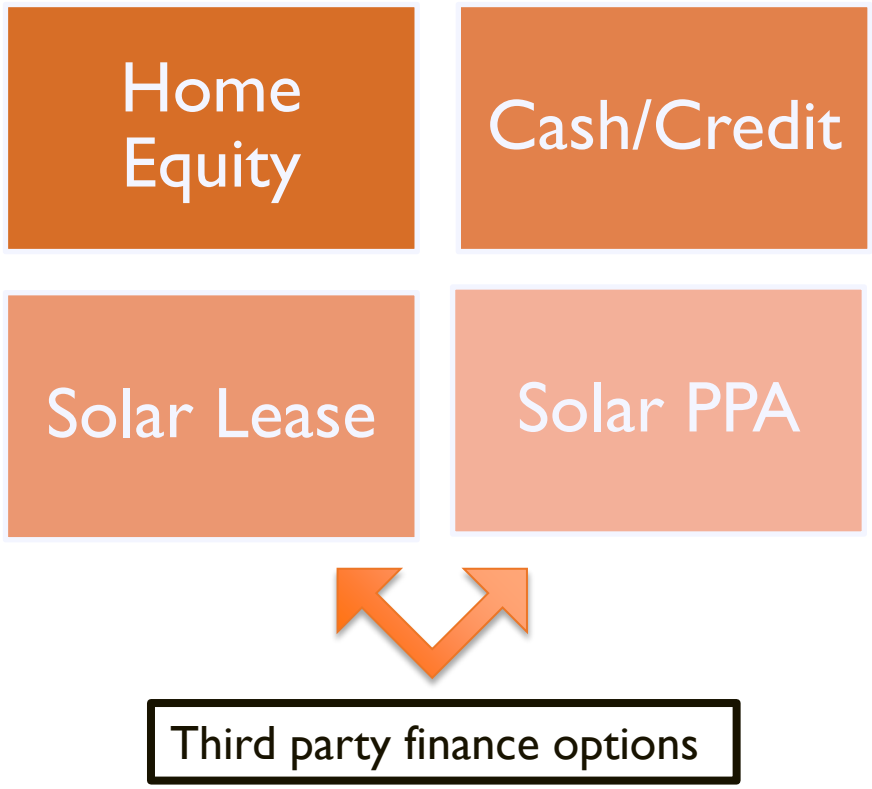
5. Are local rebates and incentives available where you are located?

The answer to these questions frames how you may be able to finance your PV system.

Residential PV Market

- Initial Cost of $22,500 for a 5 kW system

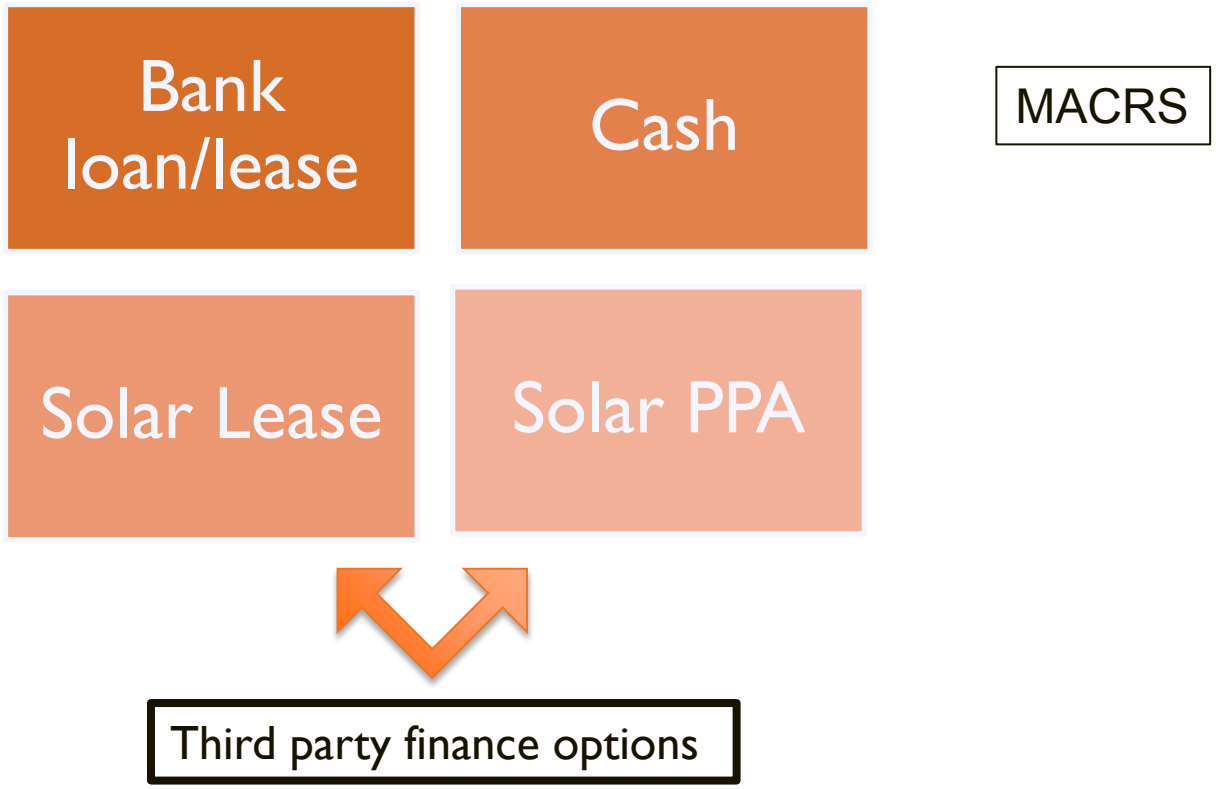
Common Sources of Financing



Commercial PV Market

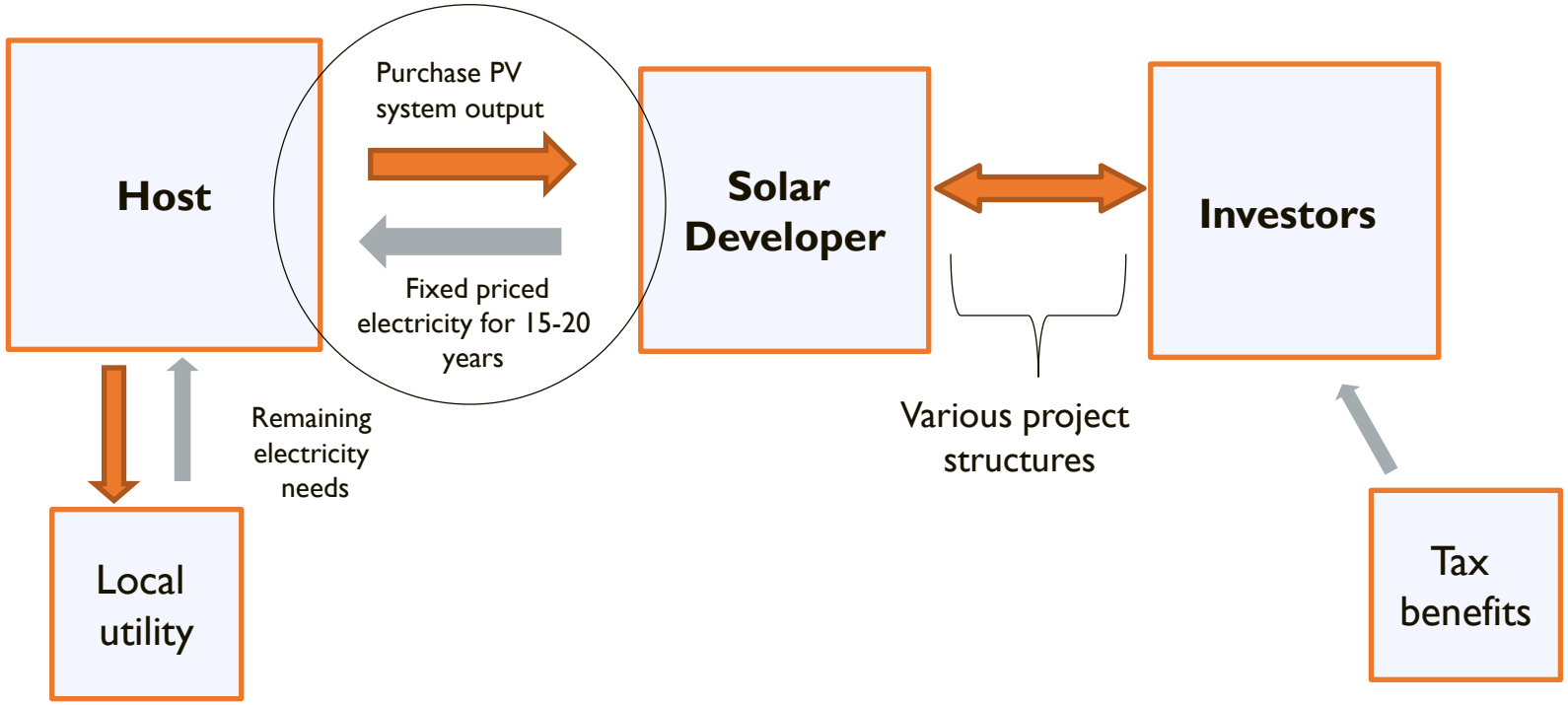
- Initial Cost of $350,000 for a 100 kW System

Common Sources of Financing



3rd Party Solar PPA Structure

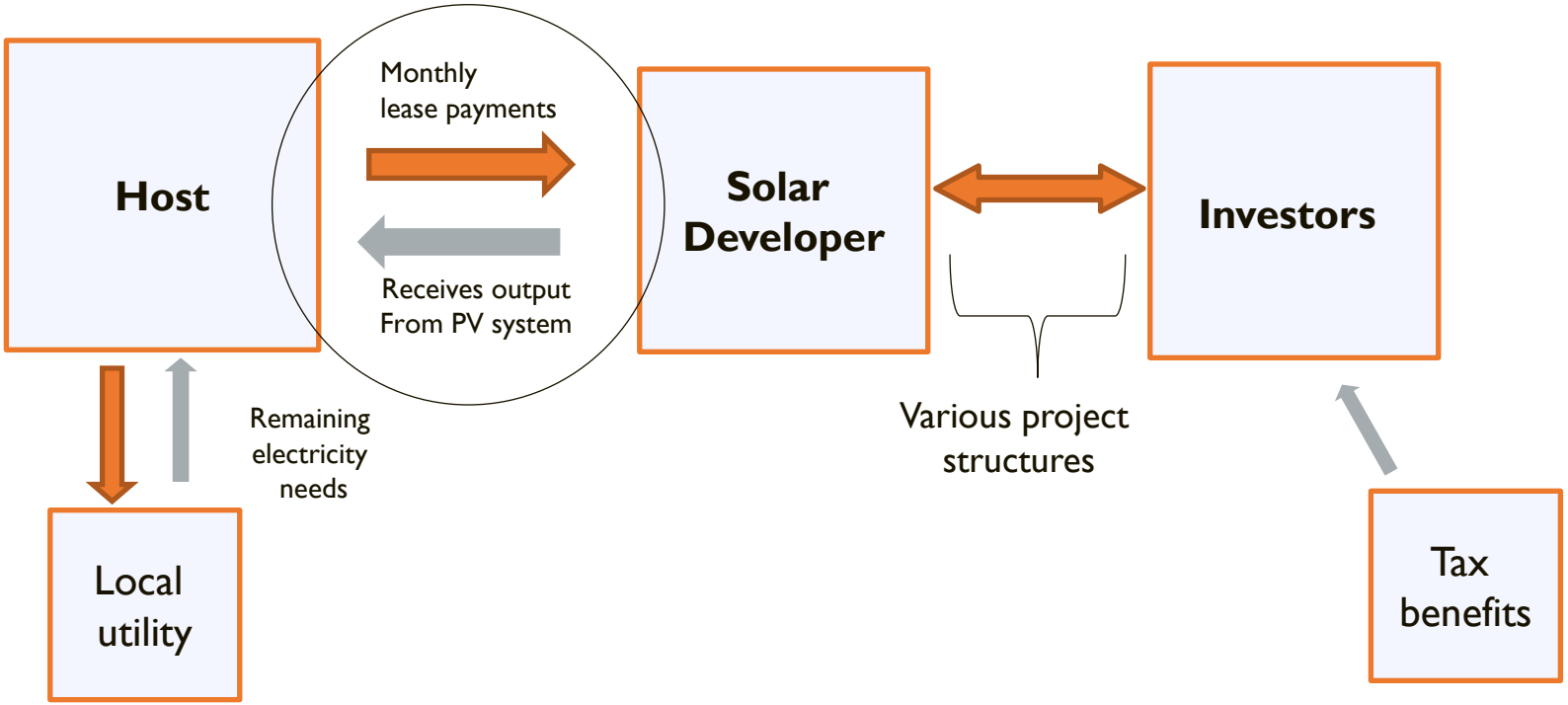
Instead of purchasing a PV system, the property owner agrees to **host** the system and **purchase** the electricity instead. The contract to purchase this electricity is often called the Power Purchase Agreement or PPA.



- The third parties take the various incentives in these transactions
- May also hear the term "Solar Power & Services Agreement"

3rd Party Solar Lease Structure

The building owner ("host") agrees to **lease the PV system** from the owner of the system. No sale of electricity involved!

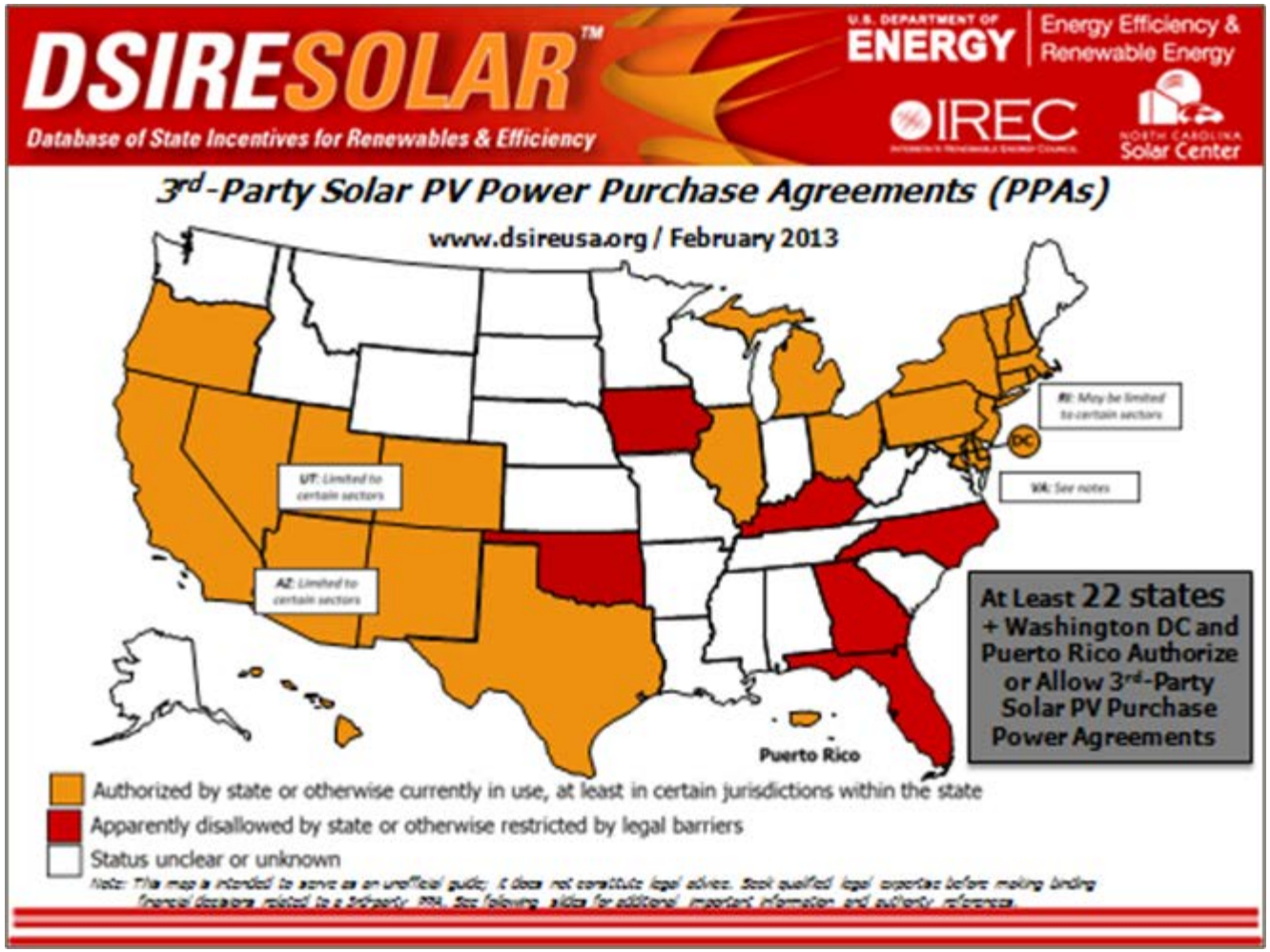


Prepaid leases and partial pre-paid leases also exist

Why Enter into a PPA or Lease?

- Eliminates the upfront capital cost
- Can allow for better utilization of tax credits
- Predictable PPA or lease payment
- Transfers O&M to a third party
- Creates a path to ownership
- Various end of term options

Legal Status of PPAs Varies Across States



Source: http://dsireusa.org/documents/summarymaps/3rd_Party_PPA_map.pdf

The Roles of State and Local Government

Spectrum of Actions

Remove barriers to solar installations

- Building codes and standards
- Streamline permitting process
- Education and outreach

Support solar installations

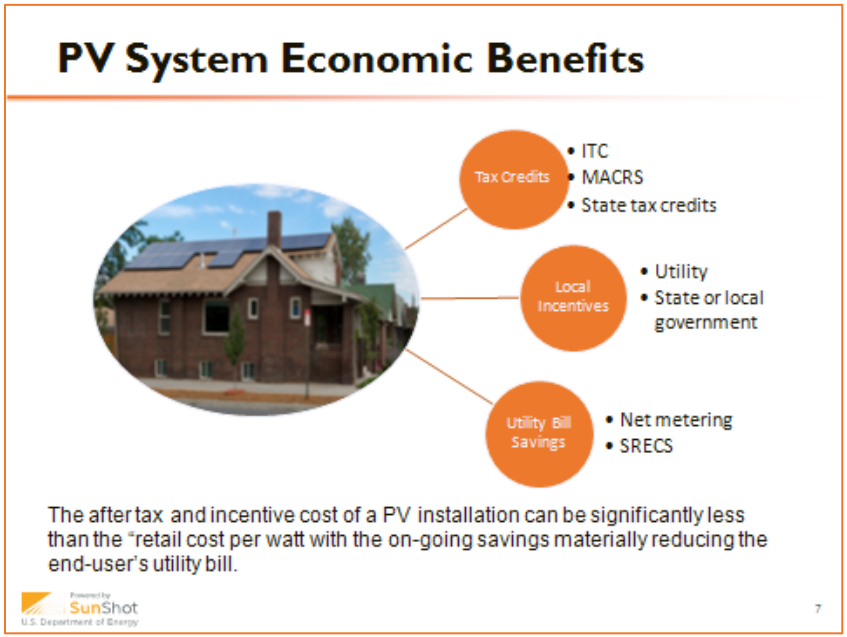
- Solar site assessments
- Support group purchases
- Lower sales/property taxes
- Offer incentives/rebates

Public sector installations

- Install Solar: Convention Centers, schools, firehouses, libraries, police stations, parking garages, landfills, fleet maintenance yards, etc…

State and Local Policy Spectrum

- What can state and local governments do to improve the economics of a solar installation and enhance the overall attractiveness of their solar market in general?



State Level Actions

- Renewable Portfolio Standard (RPS)
  - Solar Carve Out/SREC Market
- PPA legislation to allow for 3rd party finance
- State-based rebate and incentive programs
- State Income Tax Credits
- Sales Tax Reductions

RPS With Solar Carve Outs Examples

New Jersey

- 20.38% Class I and Class II renewables by energy year 2020-2021 + 4.1% solar-electric by energy year 2027-2028 (DSIRE)
- SREC price of $90-$113/MWh in early 2013 (SREC Trade)

Colorado

- Investor-owned utilities: 30% by 2020
- Electric cooperatives: 10% by 2020
- Municipal utilities with > 40,000 customers: 10% by 2020 (DSIRE)
- Production-based incentive of $0.08 - $0.13/kWh as of March 2013 in return for the SRECs generated by the system(Xcel Energy)

Allow Third Party Finance Models

1. Third party financing allowed
   - e.g., California and Colorado

2. PPAs allowed for certain customers
   - e.g., Arizona and Utah

3. Leasing permitted but not PPAs
   - e.g., Florida

http://www.nrel.gov/docs/fy10osti/46723.pdf

New York Case Study

Cost: $5.41/W for residential and $5.01/W for non-residential systems (as of 4Q12)*

Incentives Available

- Up to a $1.50/Watt (funded by SBC)
- 25% personal state income tax credit
  - (up to $5,000)
- State sales tax exemption

http://dsireusa.org/incentives/index.cfm?re=0&ee=0&spv=0&st=0&srp=1&state=NY

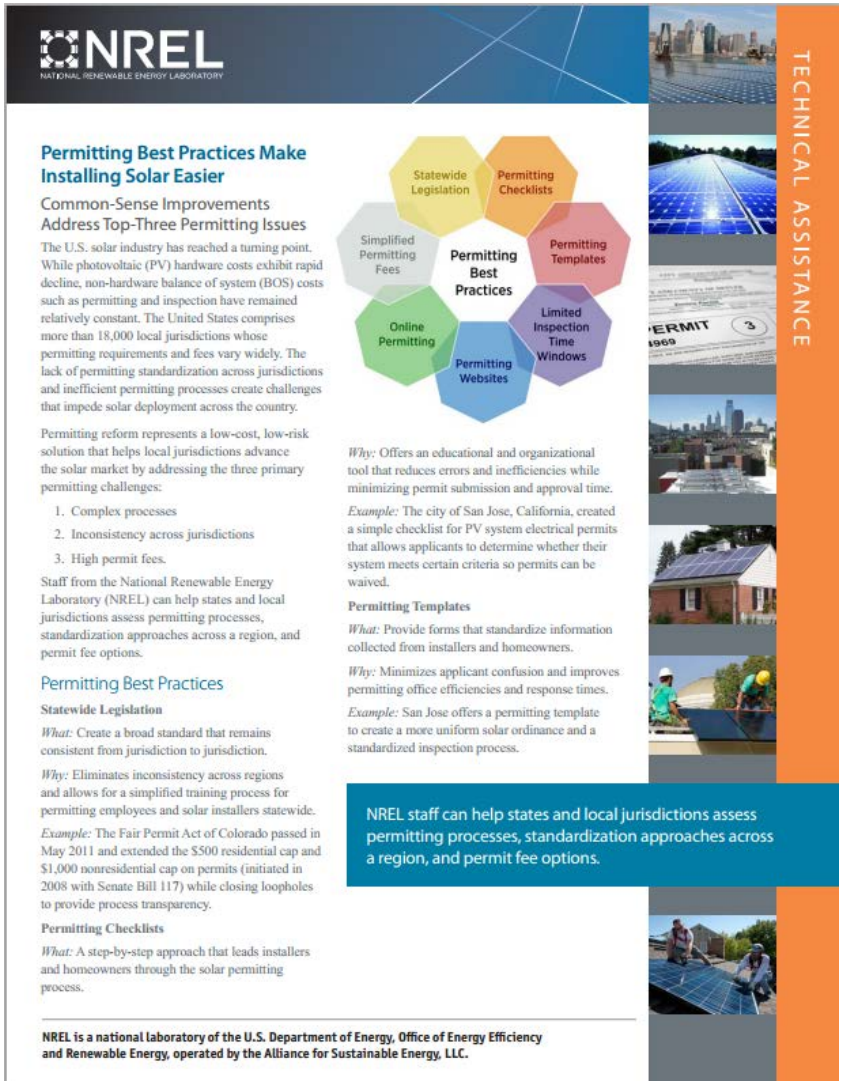
* Greentech Media 4Q and 2012 annual report. Pg 67.

Local Government Actions

- Permit fees and processing
- Building codes and standards
- Property tax exemptions

Permit Fees

- Harmonize across AHJs
- Online permitting
- Eliminate permit fees
- Cap permitting fees
- Speed up permit processing



NREL
NATIONAL RENEWABLE ENERGY LABORATORY

TECHNICAL ASSISTANCE

Permitting Best Practices Make Installing Solar Easier

Common-Sense Improvements Address Top-Three Permitting Issues

The U.S. solar industry has reached a turning point. While photovoltaic (PV) hardware costs exhibit rapid decline, non-hardware balance of system (BOS) costs such as permitting and inspection have remained relatively constant. The United States comprises more than 18,000 local jurisdictions whose permitting requirements and fees vary widely. The lack of permitting standardization across jurisdictions and inefficient permitting processes create challenges that impede solar deployment across the country.

Permitting reform represents a low-cost, low-risk solution that helps local jurisdictions advance the solar market by addressing the three primary permitting challenges:

1. Complex processes
2. Inconsistency across jurisdictions
3. High permit fees.

Staff from the National Renewable Energy Laboratory (NREL) can help states and local jurisdictions assess permitting processes, standardization approaches across a region, and permit fee options.

Permitting Best Practices

Statewide Legislation

What: Create a broad standard that remains consistent from jurisdiction to jurisdiction.

Why: Eliminates inconsistency across regions and allows for a simplified training process for permitting employees and solar installers statewide.

Example: The Fair Permit Act of Colorado passed in May 2011 and extended the $500 residential cap and $1,000 nonresidential cap on permits (initiated in 2008 with Senate Bill 117) while closing loopholes to provide process transparency.

Permitting Checklists

What: A step-by-step approach that leads installers and homeowners through the solar permitting process.

Why: Offers an educational and organizational tool that reduces errors and inefficiencies while minimizing permit submission and approval time.

Example: The city of San Jose, California, created a simple checklist for PV system electrical permits that allows applicants to determine whether their system meets certain criteria so permits can be waived.

Permitting Templates

What: Provide forms that standardize information collected from installers and homeowners.

Why: Minimizes applicant confusion and improves permitting office efficiencies and response times.

Example: San Jose offers a permitting template to create a more uniform solar ordinance and a standardized inspection process.

NREL staff can help states and local jurisdictions assess permitting processes, standardization approaches across a region, and permit fee options.

NREL is a national laboratory of the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

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http://www.nrel.gov/docs/fy13osti/57104.pdf

Session Summary

- PV system costs continue to decline, but in most market incentives are still important.
- Third party financing options for PV are driving material market growth in many markets.
- Given budgetary issues across state and local government entities, there are a number of lower cost ways to support solar markets.

Resources for Policy Makers

DOE SunShot Initiative Solar Energy Resource Center

http://www4.eere.energy.gov/solar/sunshot/resource_center/

- Solar Powering your Community: A Guide to Local Governments
- Regulatory and Legislative Challenges for Third Party PPA System Owners
- Solar Ready Building Guidelines
- Distributed PV Permitting and Inspection Processes

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