Solar Powering Your Community
Addressing Soft Costs and Barriers

Powered by SunShot
U.S. Department of Energy
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.
About the SunShot Solar Outreach Partnership

- Increase installed capacity of solar electricity in U.S. communities
- Streamline and standardize permitting and interconnection processes
- Improve planning and zoning codes/regulations for solar electric technologies
- Increase access to solar financing options
Complimentary Services

- Technical Resources
- Regional Workshops
- One to One Assistance
- Strategy Session

Email solar-usa@iclei.org to request a 20 minute consultation
Complimentary Services

Technical Resources

Helping Policymakers Understand Best Practices:
- Case Studies
- Fact Sheets
- How-to Guides
- Toolkits

www.solaroutreach.org

Email solar-usa@iclei.org to request a 20 minute consultation
Technical Resources

Resource  Solar Powering Your Community Guide

A comprehensive resource to assist local governments and stakeholders in building local solar markets.

www.energy.gov
Complimentary Services

Quickly get up to speed on key solar policy issues:

- Solar 101
- Planning for Solar
- Implementing an Ordinance
- Streamlining Solar Permits
- Growing your Market

Email solar-usa@iclei.org to request a 20 minute consultation
Complimentary Services

Technical Resources

Regional Workshops

Develop an implementation strategy for smart solar policy

Email solar-usa@iclei.org to request a 20 minute consultation
Complimentary Services

Technical Resources
Regional Workshops

One to One Assistance

Receive customized technical support on implementation of smart solar policy

Email solar-usa@iclei.org to request a 20 minute consultation
After This Session

Talk to Us!

Sign up for a 20 minute consultation to learn more about our free services

See Riana Ackley to sign up.
We want to get to know you better
Who are you?

A. Administrator
B. Planner
C. Elected official
D. Code enforcement official
E. Solar industry
F. Academic representative
G. Community member
H. Other
Where are you coming from?

A. Dover, DE Region
B. The rest of Delaware
C. Outside of Delaware
What size is your community?

A. < 10,000 People
B. 10,000 – 50,000 People
C. 50,000 – 100,000 People
D. > 100,000 People
How familiar are you with solar?

A. Little to no knowledge
B. Some knowledge
C. Solar expert
Do you have solar on your home?

A. Yes
B. No
Solar Development in the US

In 2013, the US solar industry installed 131,000 new solar installations, of which 94% were residential projects.
If you do have solar on your home: How did you finance it?

A. Cash
B. Loan
C. Grant
D. Other
If you don’t have solar on your home: Why not?

A. Shaded roof
B. Structural issues
C. Too expensive
D. Rent your home
E. HOA Rules
F. Don’t know where to start
G. Other
Does your local government have solar on public properties?

A. Yes
B. No
C. I don’t know
Putting Solar Energy on the Local Policy Agenda
State of the Local Solar Market
Federal, State, and Utility Policy Drivers
Break and Grab Lunch
Planning for Solar: Getting Solar Ready
Solar Market Development Tools
Break
Local Speakers
Developing and Solar Policy Implementation Plan for Your Community and Next Steps
Putting Solar Energy on the Local Policy Agenda

State of the Local Solar Market

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Solar Technologies

Solar Photovoltaic (PV)  
Solar Hot Water  
Concentrated Solar Power
Solar Technologies

Solar Photovoltaic (PV)  
Solar Hot Water  
Concentrated Solar Power
Some Basic Terminology

Panel / Module

Cell
Some Basic Terminology

Array
Some Basic Terminology

Capacity / Power
kilowatt (kW)

Production
Kilowatt-hour (kWh)
Some Basic Terminology

- **Residence**: 5 kW
- **Factory**: 1 MW+
- **Office**: 50 – 500 kW
- **Utility**: 2 MW+
What are the top 3 benefits solar can bring to your community?

A. Economic development & job creation
B. Environmental & public health benefits
C. Reduction and stabilization of energy costs
D. Energy independence & resilience
E. Value to the utility
F. Community pride
G. Other
Solar Economic Growth

Solar Job Growth

Solar Job Growth in the US

Job Creation

Correlation of Market Size & Jobs in Each State

Number of Solar Jobs

Cumulative Installed Capacity (MW)

Sources: Interstate Renewable Energy Council, The Solar Foundation, Meister Consultants Group
The Local Economic Opportunity

1 Megawatt of Residential Solar Development in Delaware:

33 Jobs and $4.1 Million

In economic output

Source: JEDI Model, NREL
There are currently 41 solar companies that employ 5,110 people.
Benefit: Stabilize Energy Prices

Historical Avg Real-Time LMP (NEMABOS)

Source: NEPOOL
Valuable to Community & Utilities

Source: Rocky Mountain Institute
([http://www.rmi.org/Content/Files/eLab-DER_cost_value_Deck_130722.pdf](http://www.rmi.org/Content/Files/eLab-DER_cost_value_Deck_130722.pdf))
Smart Investment for Homeowners

Average Home Value Premium for Solar PV Systems in California

- 1 kW: $8,892
- 3 kW: $20,714
- 8 kW: $47,312

Source: LBNL, Exploring California PV Home Premiums (2013)
Smart Investment for Businesses

Top 20 Companies by Solar Capacity

- Walmart
- Costco
- Kohl's
- Apple
- Ikea
- Kohl's
- Costco
- Walmart
- Johnson and Johnson
- Macy's
- Ikea
- Apple
- Kohl's
- Costco
- Walmart
- Dow Jones and Co
- White Rose Foods
- Toys 'R' Us
- General Motors
- L'Oreal
- Intel
- FedEx
- Safeway
- Target
- Walgreen's
- Volkswagen
- Kaiser Permanente
- Bed Bath and Beyond
- U.S. Foods
- Campbell's Soup
- Staples
- McGraw Hill
- Johnson and Johnson
- Macy's

445 megawatts deployed as of August 2013 – enough to power 73,400 homes

Source: Solar Energy Industries Association
Smart Investment for Governments

Source: Borrego Solar
Smart Investment for Schools

Current:

\[ \times 3,752 \]

\[ = \$77.8m \]

Potential:

\[ \times 40,000 - 72,000 \]

\[ = \$800m \]

Source: The Solar Foundation (http://schools.tsfcensus.org)
Currently only nine K-12 Delaware schools with solar.

Up to 99% of non-solar schools can “go solar” cost-effectively, with a net present value of over $8 million.

Source: The Solar Foundation (http://schools.tsfcensus.org)
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<td>Planning for Solar: Getting Solar Ready</td>
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<td>12:10 – 12:45</td>
<td>Solar Market Development Tools</td>
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<td>12:45 – 1:00</td>
<td>Break</td>
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Delaware Solar Market

Source: SEIA/GTM Research, Solar Market Insight

Enough to power over 6,270 DE homes

~59 Megawatts

Source: SEIA/GTM Research, Solar Market Insight
US Solar Market

Installed Capacity by State (MW) 2013

California - 0.5% of US Capacity

Source: IREC, Solar Market Trends 2013
Delaware Solar Market

Delaware

61 watts per person

US

39 watts per person

Source: IREC Solar Market Trends 2013
World Solar Market

Solar PV Capacity and Additions, Top 10 Countries, 2013

- Germany: 26% (~8.5% of World Total)
- USA: 8.6%

Source: REN 21
US Solar Resource
What are the top 3 barriers to solar adoption in your community?

A. High upfront cost
B. Lack of education
C. Lack of policy support
D. Lack of utility support
E. Private interests
F. Lack of HOA support
G. Historic preservation
H. Reliability concerns
I. Environmental impact
J. Other
Regional Workshop Surveys

Q: What is the greatest barrier to solar adoption in your community?
Activity: Addressing Barriers

- High upfront cost
- Lack of education
- Lack of policy support
- Lack of utility support
- Lack of HOA support
- Historic Preservation
- Reliability concerns
- Environmental Impact
- Other

Historic Preservation
Lack of HOA support
Reliability concerns
Environmental Impact
Other
Lack of utility support
Lack of policy support
Lack of education
High upfront cost
The Cost of Solar PV

US Average Installed Cost for Behind-the-Meter PV

33% drop in price
2010 - 2013

Tracking the Sun VII: The Installed Cost of Photovoltaics in the US from 1998-2013 (LBNL)
The Cost of Solar PV

Source: Solar Electric Power Association

<table>
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<th>Stage 1</th>
<th>Time</th>
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</table>

- **Solar Price**
- **Retail Price**
- **Wholesale Price**
Subsidies and Support

Subsidies for Conventional and Solar Energy, 1950-2010

- Oil: $369 Billion
- Natural Gas: $121 Billion
- Coal: $104 Billion
- Nuclear: $73 Billion
- Solar: $17 Billion

Value of Subsidies and Support ($ billions)

The Cost of Solar PV

Stage 1
Stage 2

Today

Source: Solar Electric Power Association
The Cost of Solar PV

Source: Solar Electric Power Association
The Cost of Solar in the US

Comparison of US and German Solar Costs

$ per Watt

$6.00
$5.00
$4.00
$3.00
$2.00
$1.00
$-

US Solar Cost

German Solar Cost

Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
The Cost of Solar in the US

Comparison of US and German Solar Costs

Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
The Cost of Solar in the US

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Comparison of US and German Solar Costs

Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
LBNL (http://emp.lbl.gov/sites/all/files/lbnl-6350e.pdf)
(http://www1.eere.energy.gov/solar/pdfs/sunshot_webinar_20130226.pdf)
The Cost of Solar in the US

Comparison of US and German Solar Costs

Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
Challenge: Installation Time

New York City’s Goal: 100 days from inception to completion

Germany Today: 8 days from inception to completion
Time to Installation

Average Time to Permit a Solar Installation

Source: NREL, LBNL
Permitting Costs

Average Cost of Permitting in the US and Germany

Cost per Watt

US

Germany

21x the cost for permitting in the US

Source: NREL, LBNL
Consistency and Transparency through Standardized Processes
The Cost of Solar in the US

Change in Soft Costs and Hardware Costs Over Time

No change in soft costs between 2010 and 2012

- Soft Costs
- Hardware Costs

2010: $3.28
2012: $3.32
2014: $1.90
2016: $3.32
2018: $-
2020: $-
Workshop Goal

Enable local governments to replicate successful solar practices to reduce soft costs and expand local adoption of solar energy.
Agenda

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Solar Market: Trends

Source: Solar Electric Power Association

Stage 1
Stage 2
Stage 3

Cost of Electricity

Today

Solar Price
Retail Price
Wholesale Price

Source: Solar Electric Power Association
Solar Market: Trends

A policy driven market designed to mitigate costs and increase the value of solar production.

Source: Solar Electric Power Association
A Policy Driven Market

Federal
- Investment Tax Credit
- Accelerated Depreciation
- Qualified Energy Conservation Bond

State & Utility
- Renewable Portfolio Standard
- Net Metering
- Interconnection
- Solar Access
- Property Tax Exemption
- Utility Rebate Programs
### A Policy Driven Market

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Investment Tax Credit

**Type:** Tax Credit

**Eligibility:** For-Profit Organization

**Value:** 30% of the installation cost

**Availability:** Through 2016
Accelerated Depreciation

Modified Accelerated Cost-Recovery System (MACRS)

- Straight Line
- 50% Bonus (2013)
- MACRS (2014+)

Year
Project Value
Qualified Energy Conservation Bond

US Treasury

Local Gov

Project

Bond Holders

+ 3.7%

+ 2.3%

QECB
A Policy Driven Market

- Federal
- Investment Tax Credit
- Accelerated Depreciation
- Qualified Energy Conservation Bond

- State & Utility
  - Renewable Portfolio Standard
  - Solar Access

- Net Metering
- Property Tax Exemption
- Interconnection
- Utility Rebate Programs
Renewable Portfolio Standard

Retail Electricity Sales

Any electricity source

Renewable Energy
Renewable Portfolio Standard

Retail Electricity Sales

- Solar carve-out
- Renewable Energy
- Any electricity source

Powered by SunShot U.S. Department of Energy
Renewable Portfolio Standard

- Fossil Fuel
- Renewable Energy

Two revenue streams
29 states, + Washington DC and 2 territories have Renewable Portfolio Standards.

(9 states and 2 territories have renewable portfolio goals)
### RPS Impacts: Solar Deployment

#### RPS and Solar/DG Status of Top Ten Solar States by Cumulative Installed Capacity (as of Q4 2013)

<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>RPS?</th>
<th>Solar/DG Provision?</th>
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<tbody>
<tr>
<td>1</td>
<td>California</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2</td>
<td>Arizona</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>New Jersey</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>4</td>
<td>North Carolina</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>5</td>
<td>Nevada</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>6</td>
<td>Massachusetts</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>7</td>
<td>Hawaii</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>8</td>
<td>Colorado</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>9</td>
<td>New York</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>10</td>
<td>New Mexico</td>
<td>Y</td>
<td>Y</td>
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RPS: Delaware Overview

- Applies to IOUs, munis, co-ops, and retail electricity suppliers
- Standard increases annually until 2025
- 25% renewable energy by compliance year 2025-2026
  - 11.5% for compliance year 2014-2015
RPS: Delaware Solar Carve-Out

- Increases annually until 2025
- 3.5% solar by compliance year 2025-2026
- Solar Renewable Energy Certificates (SRECs) are used to demonstrate compliance
- Sept. 2014 online auction saw SRECs sell for $55
A Policy Driven Market

Federal
Investment Tax Credit
Accelerated Depreciation
Qualified Energy Conservation Bond

State & Utility
Renewable Portfolio Standard
Solar Access
Net Metering
Property Tax Exemption
Interconnection
Utility Rebate Programs
Net metering allows customers to export power to the grid during times of excess generation, and receive credits that can be applied to later electricity usage.
Net Metering

Selling Energy Back to the Utility: Net Metering

- Solar Output Exceeding Demand Sold Back to Utility/Credited to Customer Bill
- Grid Energy Savings from Self-Supply
- Remaining Customer Energy Demand from Grid

Hourly Customer Demand (No PV)
Net Metering: Market Share

More than 93% of distributed PV Installations are net-metered

Net Metering

Source: DSIRE (July 2013)

43 states, + Washington DC and 4 territories have Net Metering Policies
Net Metering: Resources

Resource   Freeing the Grid

Provides a “report card” for state policy on net metering and interconnection

http://freeingthegrid.org/
Net Metering: Delaware

Net Excess Credit Value
Retail Rate

System Capacity Limit
25 kW- Residential
2 MW- Non-residential (DP&L)
500 kW- Non-residential (DEC & munis)
100 kW- Farm customers on res. rates

Credit Rollover
Yes- indefinite rollover with option of annual payment

REC Ownership
Customer

Source: Freeing the Grid
A Policy Driven Market

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Standardized interconnection rules require utilities to provide a fair and transparent pathway for customer-generators and other developers of distributed energy resources to interconnect with the utility’s grid.
Interconnection: Delaware

Applicable Technologies
Includes solar thermal electric & solar PV, among others

System Capacity Limit
10 MW

Applicable Utilities
All utilities

Bonus
Electronic applications & agreements; insurance waived up to 25 kW

Source: Freeing the Grid
A Policy Driven Market

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Renewable Portfolio Standard
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Interconnection

Solar Access
Property Tax Exemption
Utility Rebate Programs

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U.S. Department of Energy
A landowner does not have any legal right to the free flow of light and air across the adjoining land of his neighbor.
Solar Access

Solar Access Laws:

1. Increase the likelihood that properties will receive sunlight
2. Protect the rights of property owners to install solar
3. Reduce the risk that systems will be shaded after installation
Solar Access

Source: Database of State Incentives for Renewables & Efficiency (www.dsireusa.org)
Delaware Solar Access Law

**Solar Rights:**

- Delaware solar rights law became effective in 2010
  - Prohibits private covenants that prohibit or unreasonably restrict the use of solar PV systems on residential rooftops
  - Only applies to single-family residences
  - Does not apply to covenants in existence prior to January 1, 2010
Solar Access

Resource  Solar America Board for Codes & Standards

A comprehensive review of solar access law in the US – Suggested standards for a model ordinance

www.solarabcs.org
## A Policy Driven Market

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Property Tax Exemption

- Delaware does not have property tax laws specific to solar PV
- However, under state law, counties & other political subdivisions are prohibited from taxing tangible or intangible personal property
- Sussex & Kent counties classify all PV equipment as personal property, exempting it from property taxes
A Policy Driven Market

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Powered by SunShot
U.S. Department of Energy
Incentives available for solar PV and solar water heating systems

40% funding is available for residential customers

Solar PV Rebates
- $0.25-$0.85/W for residential & non-residential
- $1.00-$1.75/W for non-profits

Solar Thermal Rebates
- $1.00/ annual kWh ($2.00/ annual kWh for non-profits)
Green Power Program: DEMEC

- Incentives available for solar PV and solar thermal systems
- Values vary by municipality
  - General incentives are 33.3% of PV installation costs and 50% solar thermal installation costs
- City of Dover and City of Milford have suspended their programs
Green Power Program: DEC

- Rebates for solar PV and solar thermal systems
- Solar PV incentives: $0.45-$0.90/W ($0.52-$1.05/W for non-profits)
  - Value depends upon system size
- Solar Thermal: 20% of installed costs
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Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Effective Solar Permitting Process

Solar in Development Regulation

Solar Market Development Tools
Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Visioning & goal setting

Effective Solar Permitting Process

Solar Market Development Tools
Solar advances your energy goals

A. Strongly Agree
B. Agree
C. Somewhat Agree
D. Neutral
E. Somewhat Disagree
F. Disagree
G. Strongly Disagree
Solar advances your economic development goals

A. Strongly Agree
B. Agree
C. Somewhat Agree
D. Neutral
E. Somewhat Disagree
F. Disagree
G. Strongly Disagree
Solar advances your environmental & health goals

A. Strongly Agree
B. Agree
C. Somewhat Agree
D. Neutral
E. Somewhat Disagree
F. Disagree
G. Strongly Disagree
Visioning: Scales & Contexts

Poll

Is solar on residential rooftops appropriate for your community?
Visioning: Scales & Contexts

Poll

Is solar on residential rooftops appropriate for your community?

A. Yes
B. Only in limited circumstances
C. No

83% Yes
17% Only in limited circumstances
0% No
Visioning: Scales & Contexts

Poll
Is solar on commercial rooftops appropriate for your community?
Poll

Is solar on commercial rooftops appropriate for your community?

A. Yes
B. Only in limited circumstances
C. No
Poll

Is solar on historic structures appropriate for your community?
Visioning: Scales & Contexts

Poll

Is solar on historic structures appropriate for your community?

A. Yes
B. Only in limited circumstances
C. No

65%
26%
10%
Visioning: Scales & Contexts

Poll
Is solar on brownfields appropriate for your community?
Visioning: Scales & Contexts

Poll

Is solar on brownfields appropriate for your community?

A. Yes
B. Only in limited circumstances
C. No

100% Yes
0% Only in limited circumstances
0% No
Visioning: Scales & Contexts

Poll

Is solar on greenfields appropriate for your community?
Visioning: Scales & Contexts

Poll

Is solar on greenfields appropriate for your community?

A. Yes
B. Only in limited circumstances
C. No

46% 51% 3%

Only in limited circumstances
Yes No
Poll
Is solar on parking lots appropriate for your community?
Visioning: Scales & Contexts

Poll

Is solar on parking lots appropriate for your community?

A. Yes
B. Only in limited circumstances
C. No

81% Yes
13% Only in limited circumstances
6% No
Visioning: Scales & Contexts

Poll

Is building-integrated solar appropriate for your community?
Visioning: Scales & Contexts

Poll

Is building-integrated solar appropriate for your community?

A. Yes
B. Only in limited circumstances
C. No

81%
19%
0%
Planning for Solar Development

Communitywide Comprehensive Plan

- Neighborhood Plans
- Corridor Plans
- Special District Plans
- Green Infrastructure Plans
- Energy Plan
- Climate Action Plan

Source: American Planning Association
Comprehensive Plan

Part II – Plan Goals: Natural Resources and Environmental Protection

**Goal 3: Encourage Green Development and Sustainable Energy Practices**

Begin the process of creating both Code amendments and/or policy amendments and revisions which encourage environmentally sensitive development and allow for emerging “green” trends to flourish in the City.

**Recommendation 6: Research and Implement a Green Energy Program**

- Revise the City Code to eliminate/minimize barriers to “green” and environmentally friendly development.
- The City should support the use of “green” development practices wherever possible.
A guide for planners on determining and implementing local solar goals, objectives, policies, and actions

www.planning.org
Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Effective Solar Permitting Process

Solar in Development Regulation

Solar Market Development Tools
What is the cost of convoluted regulations or “regulatory silence”? 

A. Increased risk of inappropriate development
B. Increase in internal review costs
C. Loss of development opportunities
D. All of the above

Bar chart showing:
- Increased risk of inappropriate development: 65%
- Increase in internal review costs: 26%
- Loss of development opportunities: 9%
- All of the above: 0%
# Zoning Standards

<table>
<thead>
<tr>
<th>Section</th>
<th>Topics to Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitions</td>
<td>Define technologies &amp; terms</td>
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<td>Applicability</td>
<td>Primary vs. accessory use</td>
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<td>Dimensional Standards</td>
<td>• Height</td>
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<td></td>
<td>• Size</td>
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<td>Design Standards</td>
<td>• Signage</td>
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<td>• Disconnect</td>
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<td></td>
<td>• Screening</td>
</tr>
<tr>
<td></td>
<td>• Fencing</td>
</tr>
</tbody>
</table>

Source: American Planning Association
**Zoning Standards: Small Solar**

**Typical Requirements:**

- Permitted as accessory use
- Minimize visibility if feasible
- Requirements:
  - District height
  - Lot coverage
  - Setback
Zoning Standards: Large Solar

Typical Requirements:

- Allowed for primary use in limited locations

Requirements:

- Height limits
- Lot coverage
- Setback
- Fencing and Enclosure

Allows solar energy systems for on-site energy use as permitted accessory uses in all zoning districts. Encourages rooftop panels on side and back roof slopes rather than ground-mounted systems.

[https://www.planning.org/pas/infopackets/open/pdf/30intro.pdf](https://www.planning.org/pas/infopackets/open/pdf/30intro.pdf)
Typical Requirements:

- Prevent permanent loss of “character defining” features
- Possible design requirements
  - Ground mounted
  - Flat roof with setback
  - Panels flush with roof
  - Blend color

Source: SolarCentury
Zoning Standards: Historic

Resource North Carolina Clean Energy Technology Center

Provides sample design principles and example regulations incorporating historic preservation into sustainability and energy projects.

www.solaroutreach.org
Guide for HOAs on solar access law and simple recommendations for reducing barriers to solar in association-governed communities.

www.solaroutreach.org
Solar in HOAs: Best Practices

✓ Provide clear, unambiguous design guidelines

✓ Post rules and requirements online

✓ Provide a list of all required documents

✓ Waive design rules that significantly increase cost or decrease performance

✓ Allow exceptions from tree removal rules for solar
Solar Ready Construction:
Preparing a building for solar at the outset can help make future solar installations easier and more cost effective.
Update Building Code

Require builders to:

✓ Minimize rooftop equipment
✓ Plan for structure orientation to avoid shading
✓ Install a roof that will support the load of a solar array
✓ Record roof specifications on drawings
✓ Plan for wiring and inverter placement
60% Savings when a building is solar ready

Installation Soft Costs

- Other Paperwork
- Permitting & Inspection
- Financing Costs
- Customer Acquisition
- Installation Labor

$0.55 Per watt
Installation Labor Roadmap

Source: NREL (http://www.nrel.gov/docs/fy13osti/59155.pdf)
This Essential Info Packet provides example development regulations for solar.

https://www.planning.org/pas/infopackets/open/pdf/30intro.pdf
Effective Local Solar Policy

- Local Solar Policy
- Planning for Solar
- Solar in Development Regulation
- Effective Solar Permitting Process
- Solar Market Development Tools
Challenge: Inconsistency

18,000+ local jurisdictions with unique zoning and permitting requirements

Source: http://www.nrel.gov/docs/fy12osti/54689.pdf
Consumer Challenges

Source: Forbes
Regulatory Barriers

- $0.00
- $0.20
- $0.40
- $0.60
- $0.80
- $1.00
- $1.20
- $1.40
- $1.60

$0.17 Per Watt

- Other Paperwork
- Permitting & Inspection
- Financing Costs
- Customer Acquisition
- Installation Labor
Planning & Permitting Roadmap

Added Cost Per Watt

- Current Trajectory
- Roadmap Target

Year: 2010 to 2020
Cost: $0.00 to $0.25
Expediting Permitting

**Solar Permitting Best Practices:**

- Post Requirements Online
- Implement an Expedited Permit Process
- Enable Online Permit Processing
- Ensure a Fast Turn Around Time

Source: IREC/Vote Solar
Expedited Permitting

Solar Permitting Best Practices:

✓ Collect Reasonable Permitting Fees

✓ No Community-Specific Licenses

✓ Narrow Inspection Appointment Windows

✓ Eliminate Excessive Inspections

✓ Train Permitting Staff in Solar

Source: IREC/Vote Solar
Permitting: Best Practices

Outlines leading best practices in residential solar permitting and provides examples of implementation.

Expedited Permitting:

- Simplifies requirements for PV applications
- Facilitates efficient review of content
- Minimize need for detailed studies and unnecessary delays

1-1. Example Design Criteria:

- Size < 10-15 kW
- Code compliant
- Weight < 5 lb / sqft
- 4 strings or less
Putting Solar Energy on the Local Policy Agenda

State of the Local Solar Market

Federal, State, and Utility Policy Drivers

Break and Grab Lunch

Planning for Solar: Getting Solar Ready

Solar Market Development Tools

Break

Local Speakers

Developing and Solar Policy Implementation Plan for Your Community and Next Steps
Effective Local Solar Policy

Local Solar Policy

Planning Solar Development

Effective Solar Permitting Process

Solar Market Development Tools

Understanding solar financing
Expanding financing options
Addressing customer acquisition
## The Solar Equation

**Cost**
- Installed Cost
- Maintenance
- Direct Incentive

**Benefit**
- Avoided Energy Cost
- Excess Generation
- Performance Incentive
Ownership Options for Solar

Direct Ownership

Third-Party Ownership
Direct Ownership

Customer

Utility
Third Party Ownership

Customer

$ $

Power Purchase Agreement

Incentives

Developer
Third Party Ownership

Third Party Ownership

**Benefits**
- No upfront cost
- No O&M costs
- Low risk
- Predictable payments

**Drawbacks**
- Investor needs higher ROI
- Not available in all states
Third Party Ownership

- Other Paperwork
- Permitting & Inspection
- Financing Costs
- Customer Acquisition
- Installation Labor

$0.30 Per watt

$ per Watt

$1.60

$1.40

$1.20

$1.00

$0.80

$0.60

$0.40

$0.20

$0.00
Ownership Options for Solar

Direct Ownership

Third-Party Ownership

Expand direct ownership options by engaging local lenders
Engage Local Lenders

Fewer than 5%
of the
6,500 banks in the US
are actively financing solar PV projects
Third Party Ownership: Cost

Weighted Average Cost of Capital

- Third Party Ownership: 14.0%
- Direct Ownership with Debt: 6.0%
Engage Local Lenders: Resources

Resource Local Lending for Solar PV

A guide for local governments seeking to engage financial institutions

www.solaroutreach.org
Customer Acquisition

- Other Paperwork
- Permitting & Inspection
- Financing Costs
- Customer Acquisition
- Installation Labor

Source: National Renewable Energy Laboratory
Customer Acquisition

5% of homeowners that request a quote choose to install solar.
Customer Acquisition

Barriers

High upfront cost

Complexity

Customer inertia
The Solarize Program

Group purchasing for residential solar PV
Solarize: Partnership

Program Sponsor
- Community ties
- Technical knowledge

Solar Contractor
- Solar installations
- Volume discounts

Citizen Volunteers
- Campaign support
- Neighborhood outreach

Community Residents
- Program participation
- Word of mouth
Solarize: Process

- Select Installer
- Marketing & Workshops
- Enrollment
- Site Assessment
- Decision & Installation
Solarize Plano: Case Study

Plano, Texas
Population: 272,000
Solarize Plano: Case Study

Pricing Tiers

- **Prevailing solar market price**
  - Tier 1: 1 kW - 15 kW
  - Tier 2: 15 kW - 35 kW
  - Tier 3: 35 kW - 55 kW
  - Tier 4: 55 kW - 80 kW
  - Tier 5: 80 kW +

20% discount
Solarize Plano: Case Study

Select Installer

Marketing & Workshops
*July – August 2013*

Enrollment

Site Assessment

Decision & Installation

July 2013

February 2014

Powered by SunShot
U.S. Department of Energy
Marketing Strategy:

- Used Google for online communications
- Online Solar 101 presentations and videos
- Local newspaper and media
- Utility bill insert

How did you learn about Solarize Plano?

- Utility Bill Insert
- Social Media
- PSA Blog
- Other
- NTREG
- nextdoor.com
- Newspaper Article
- LGP Newsletter
- Info Session
- HOA
- Friend

Source: Solarize Plano & NCTCOG
Solarize Plano: Case Study

Select Installer

Marketing & Workshops

Enrollment

Aug – Sep 2013

Site Assessment

Decision & Installation

July 2013

220 households signed up

February 2014

220 households signed up

220 households signed up

July 2013

August – September 2013

February 2014

220 households signed up

220 households signed up

220 households signed up

220 households signed up
Solarize Plano: Case Study

Select Installer
Marketing & Workshops
Enrollment
Site Assessment

Decision & Installation
Jan – Feb 2014

23 final contracts

July 2013
February 2014
Solarize Plano: Case Study

Results:

23 new installations totaling 112 kW

45% of assessed sites signed contracts

20% reduction in solar price

Round 2 of Solarize Plano in 2014

5 new Solarize communities in Texas
## The Solarize Program

<table>
<thead>
<tr>
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<th>Solutions</th>
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<td>Group purchase</td>
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<td>Community outreach</td>
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<td>Customer inertia</td>
<td>Limited-time offer</td>
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</table>
A household is **0.78%** more likely to adopt solar for each additional installation in their zip code.

Source: NYU Stern and Yale School of Forestry – Peer Effects in the Diffusion of Solar Panels
Solarize: Lasting Impact

Annual Portland Residential PV Installations

Source: NREL
A roadmap for project planners and solar advocates who want to create their own successful Solarize campaigns.

www.nrel.gov
Solarize: Resources

Resource Planning and Implementing a Solarize Initiative

Presents two successful state-driven Solarize programs (Solarize Mass and Solarize Connecticut) to provide best practices to stakeholders interested in replicating these successes.

<table>
<thead>
<tr>
<th>Time</th>
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2:00 – 3:00    Developing and Solar Policy Implementation Plan for Your Community and Next Steps
Activity: Solar in Your Community

1. Recognize successes
2. Identify opportunities
3. Select strategies & best practices
4. Outline implementation plan
5. Discuss barriers to implementation
Activity: Solar in Your Community

Part 1: Take 5 minutes to complete the questions in the Developing Effective Solar Policies in Your Community handout.
Activity: Solar in Your Community

Part 2: Spend the next 10 minutes discussing your responses to Questions 8 – 12 with the others at your table. Discuss strategies for overcoming potential obstacles to implementation.
Which “best practice” did you select to pursue first?

A. Integrate solar in plans
B. Address solar in zoning code
C. Adopt solar ready guidelines
D. Define permitting process
E. Expedite typical solar permits
F. Implement fair permit fees
G. Expand financing options
H. Implement solarize program
How difficult will it be to implement this policy/program?

1. Very easy
2. Somewhat easy
3. Moderate
4. Somewhat difficult
5. Very difficult
Discussion

What obstacles stand in the way of implementation?
Discussion
What are possible strategies to overcome those obstacles?
Activity: Next Steps

What do you pledge to do when you leave today’s workshop? [Orange Card]
Next Steps

1. Meet with us for 20 minutes
2. Apply for free Technical Assistance
3. Complete a DOE solar policy audit
4. Host a in-person strategy session
5. Implement policy changes & programs