

Solar Powering Your Community

Addressing Soft Costs and Barriers



Powered by

SunShot

U.S. Department of Energy



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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.

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

Complimentary Services



Technical Resources

Helping Policymakers Understand Best Practices:

- Case Studies
- Fact Sheets
- How-to Guides
- Toolkits

www.solaroutreach.org



One to One
Assistance

Technical Resources

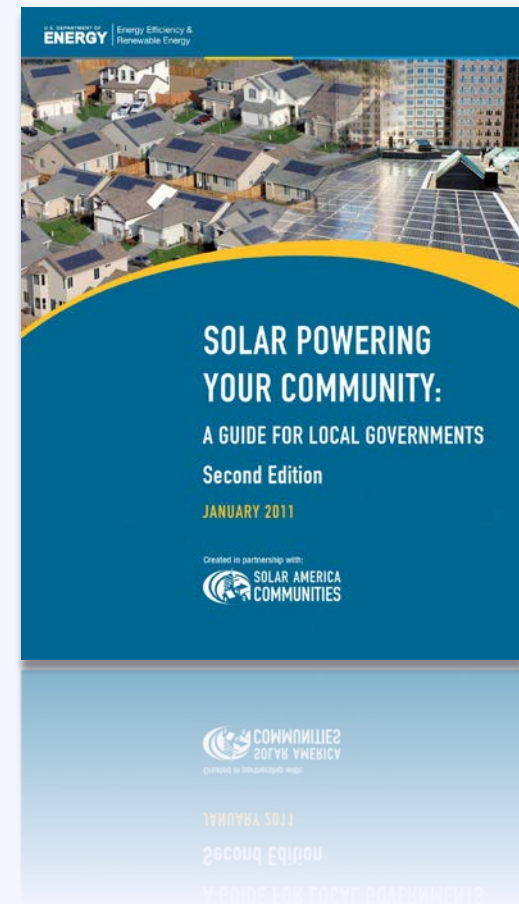
Resource

Solar Powering Your Community Guide

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

www.energy.gov

www.solaroutreach.org



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

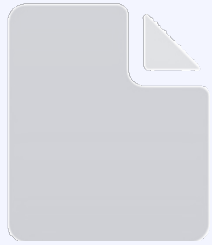


Regional Workshops

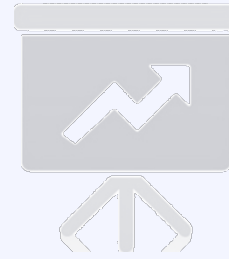


Strategy Session

Complimentary Services



Technical
Resources



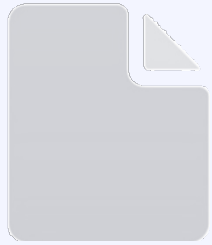
Regional
Workshops

Develop an
implementation
strategy for smart
solar policy

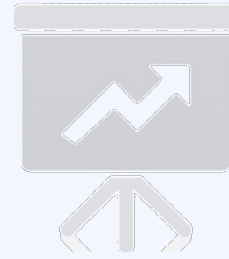


Strategy
Session

Complimentary Services



Technical
Resources



Regional
Workshops



One to One
Assistance

Receive customized
technical support on
implementation of
smart solar policy

After This Session

Talk to Us!

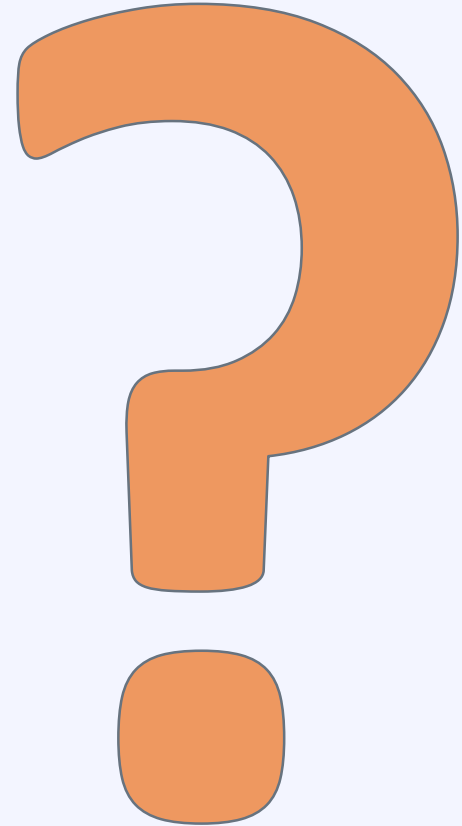
Sign up for a 20 minute
consultation to learn more about
our **free** services

See **Riana Ackley** to sign up.

**We want to get to know you
better...**

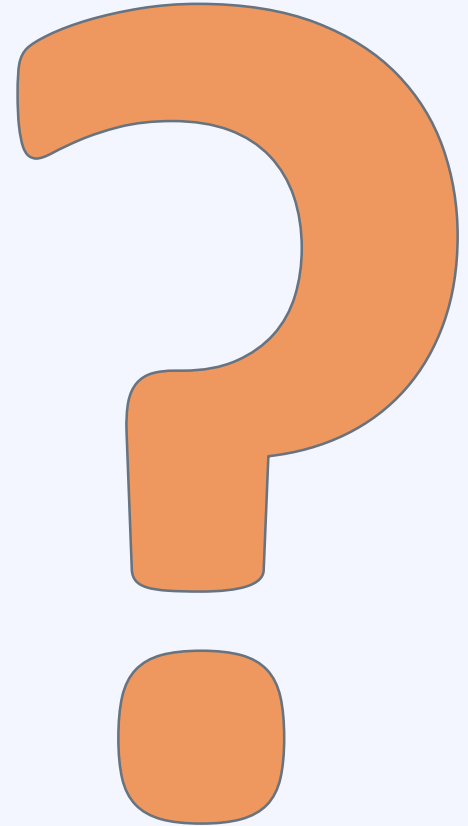
Who are you?

- A. Administrator
- B. Planner
- C. Elected official
- D. Code enforcement official
- E. Solar industry
- F. Academic representative
- G. Community member
- H. Other



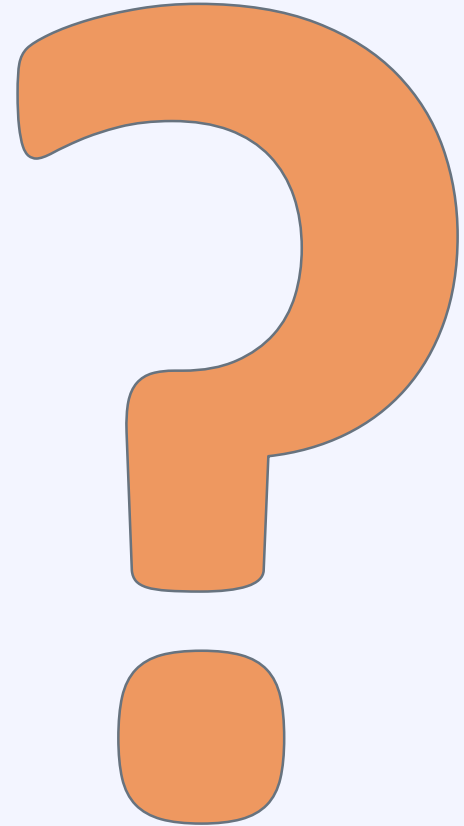
Where are you coming from?

- A. Fremont
- B. The rest of Nebraska
- C. Outside of Nebraska



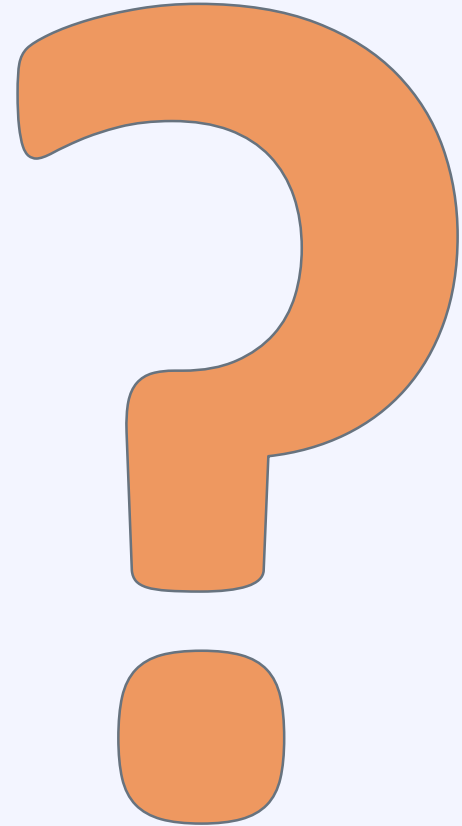
What size is your community?

- A. < 10,000 People
- B. 10,000 – 50,000 People
- C. 50,000 – 100,000 People
- D. > 100,000 People



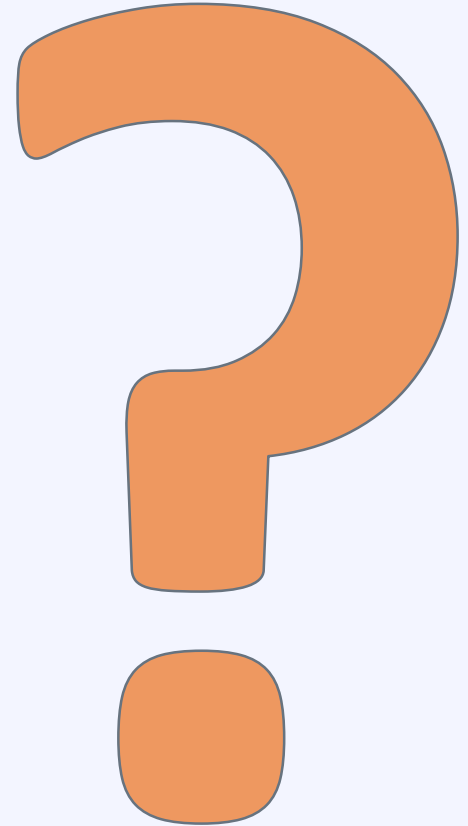
What kind of utility serves your community?

- A. Municipal Utility
- B. Electric Cooperative
- C. Other



How familiar are you with solar?

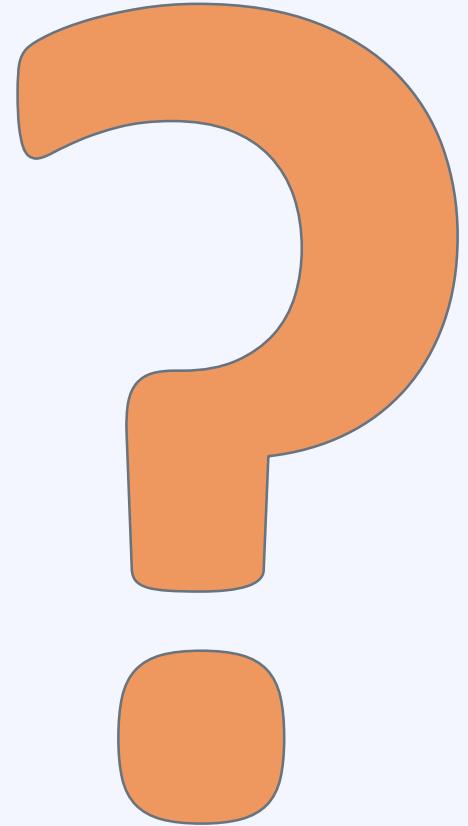
- A. Little to no knowledge
- B. Some knowledge
- C. Solar expert



Do you have solar on your home?

A. Yes

B. No



Solar Development in the US

As of 2014, the US solar industry installed

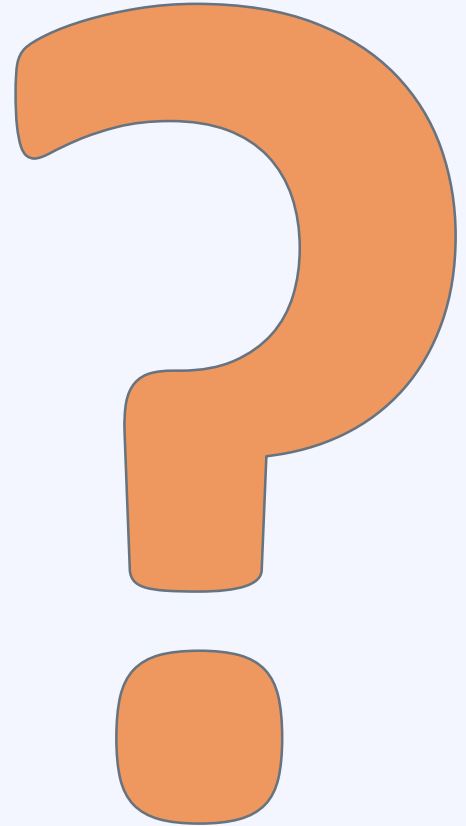
645,000 solar installations

of which

93% were residential projects

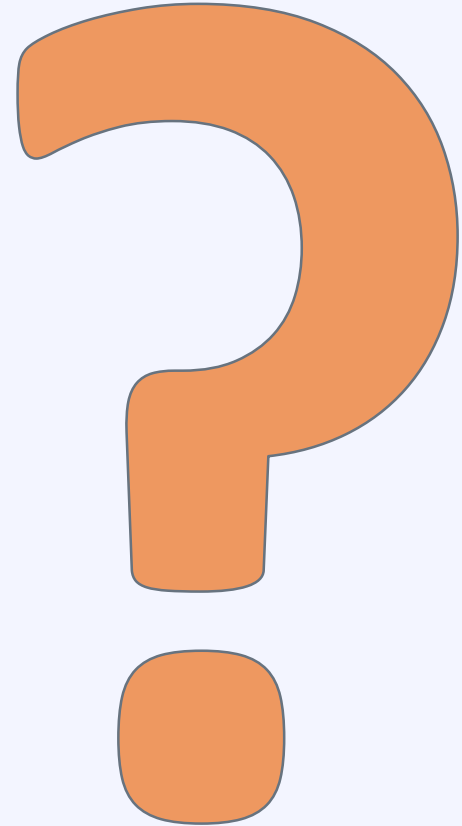
If you do have solar on your home:
How did you finance it?

- A. Cash
- B. Loan
- C. Grant
- D. Other



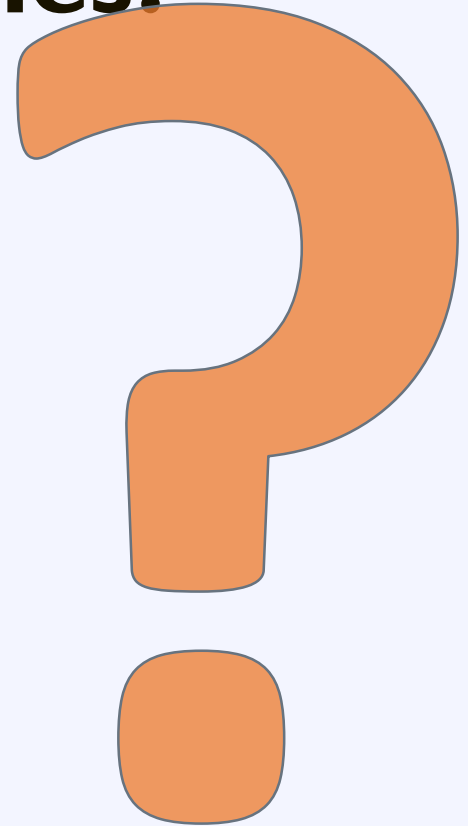
If you don't have solar on your home: **Why not?**

- 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



Agenda

- 10:20 – 10:50** **Putting Solar Energy on the Local Policy Agenda**
- 10:50 – 11:20 State of the Local Solar Market
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Your Community and Next Steps

Solar Technologies



Solar Photovoltaic (PV)



Solar Hot Water



Concentrated Solar Power

Solar Technologies



Solar Photovoltaic (PV)

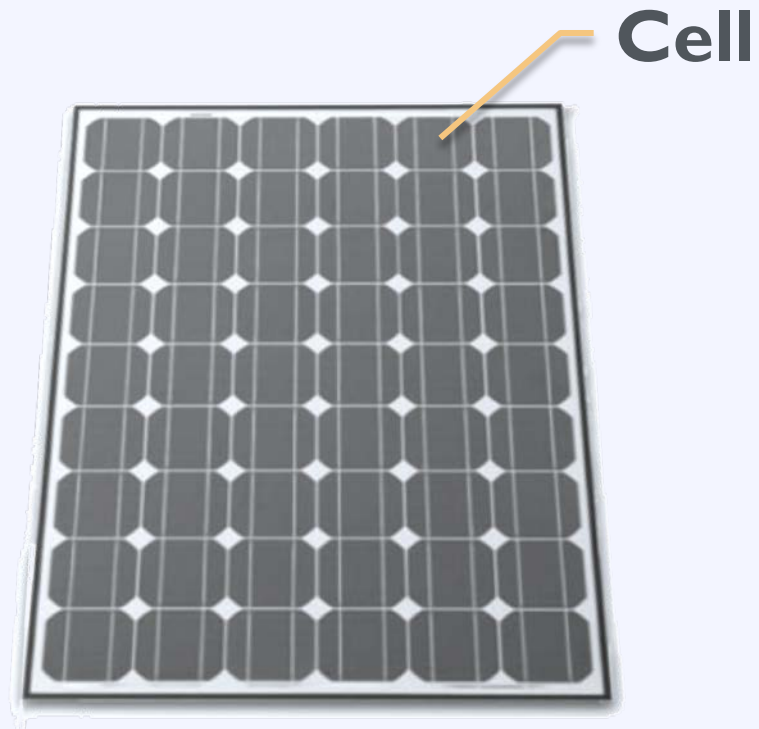


Solar Hot Water



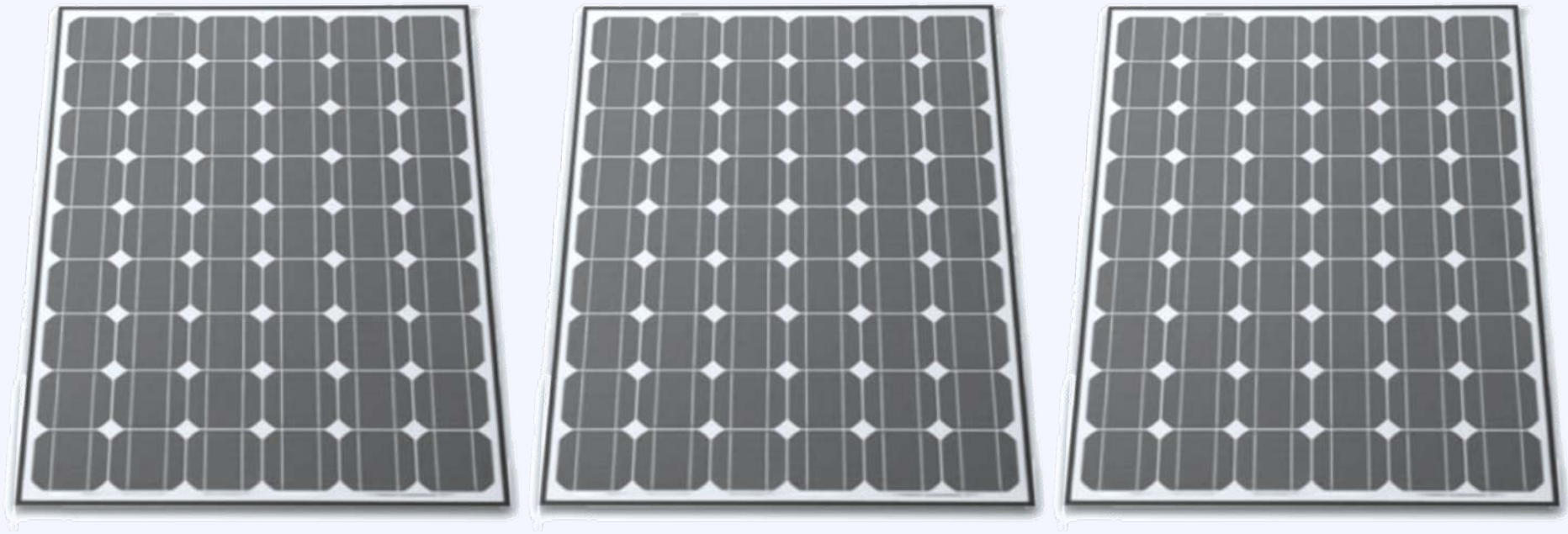
Concentrated Solar Power

Some Basic Terminology



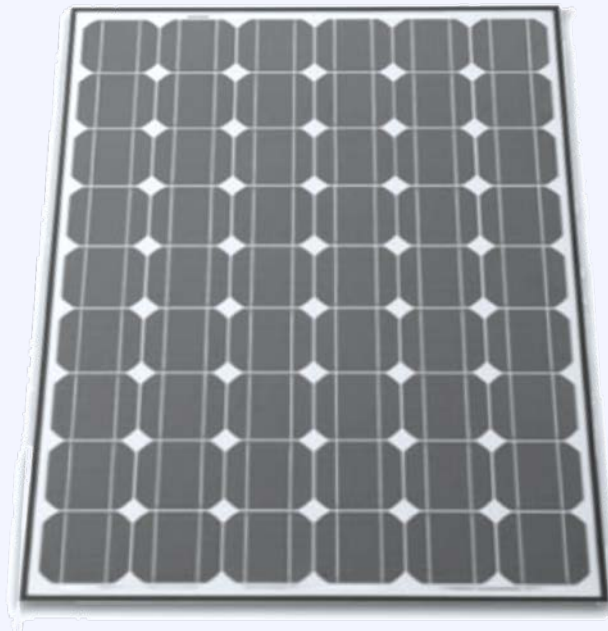
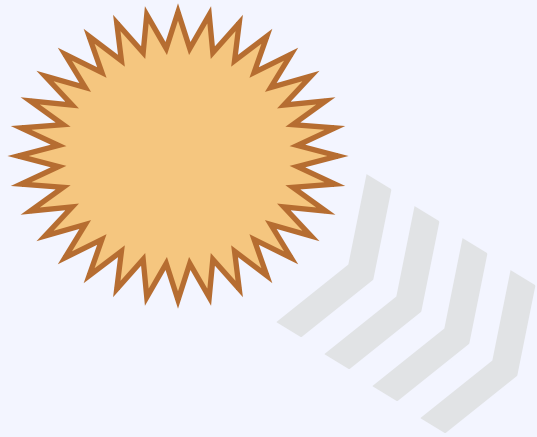
Panel / Module

Some Basic Terminology



Array

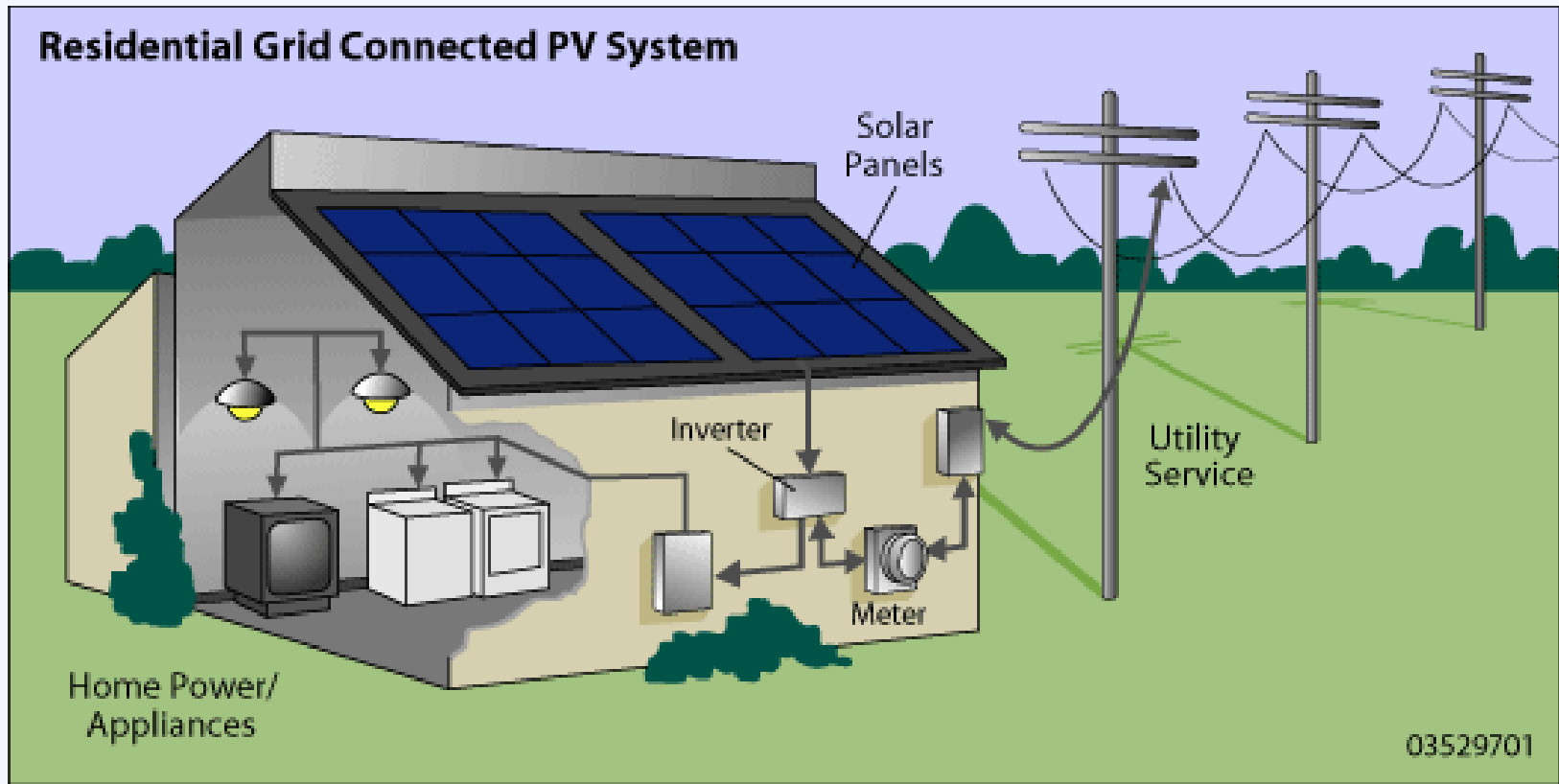
Some Basic Terminology



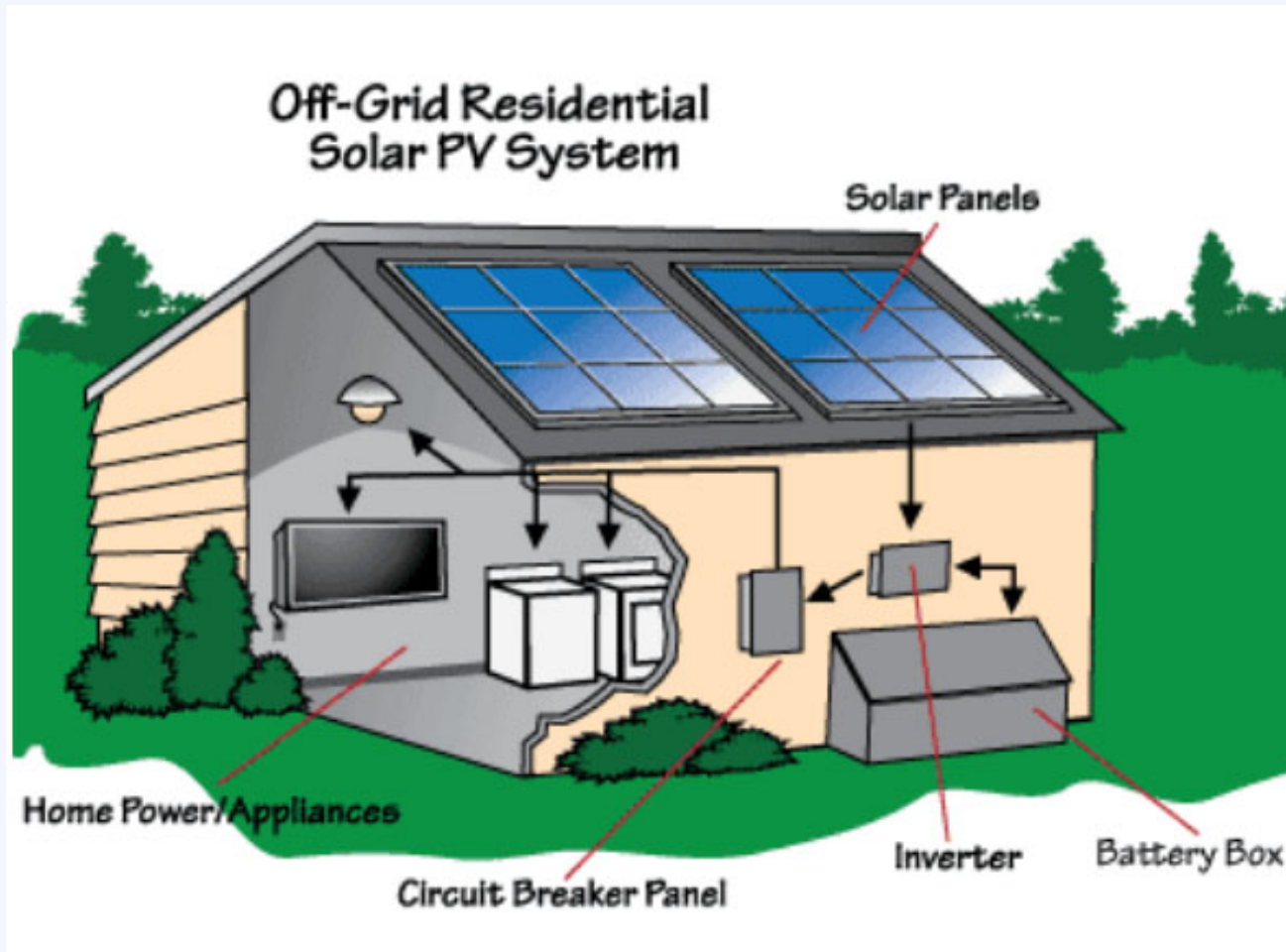
Production
Kilowatt-hour (kWh)

Capacity / Power
kilowatt (kW)

System Components



System Components – Off-Grid



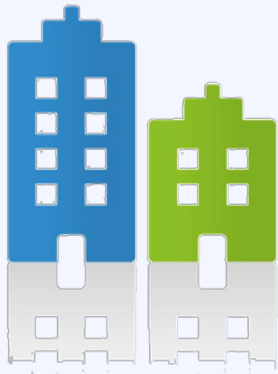
Some Basic Terminology



Residence
5 kW



Factory
1 MW+



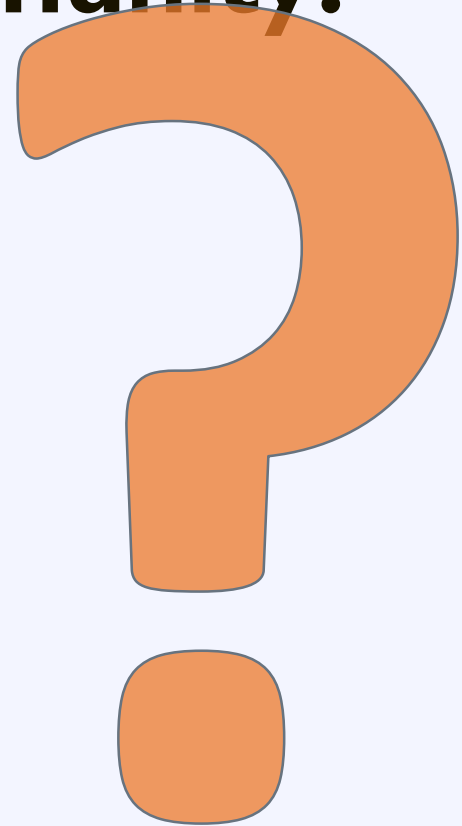
Office
50 – 500 kW



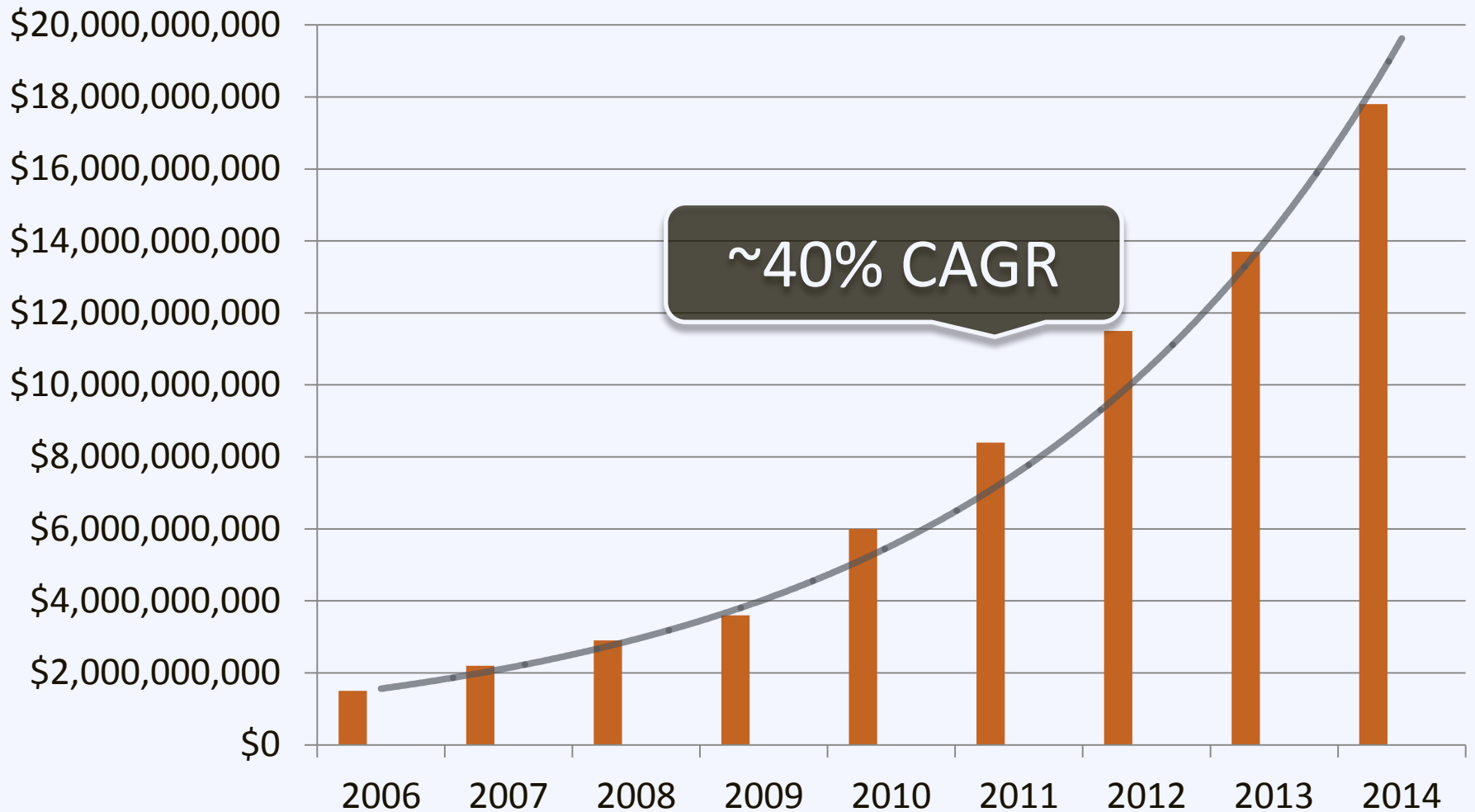
Utility
2 MW+

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

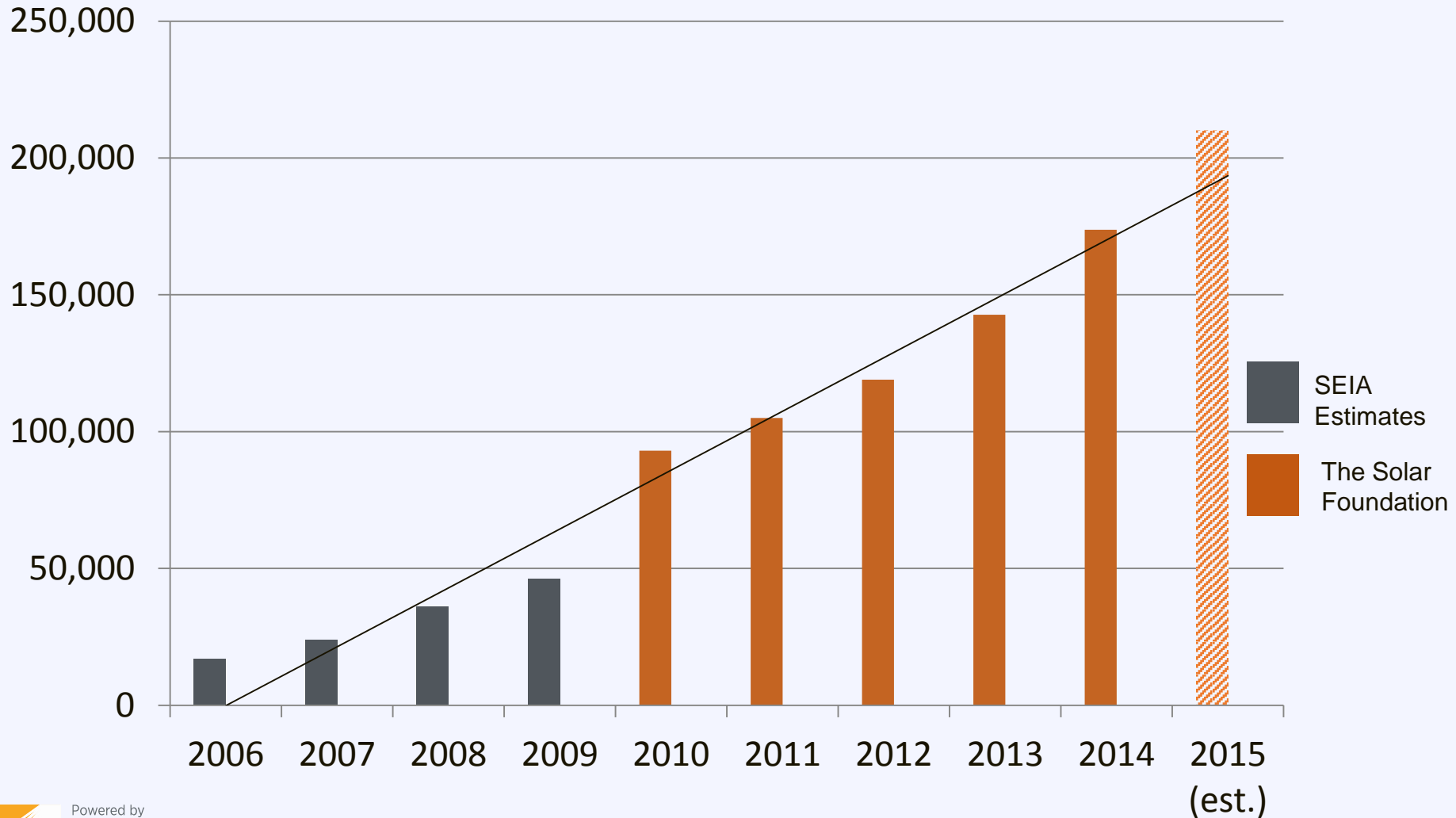


Benefits: Solar Economic Growth



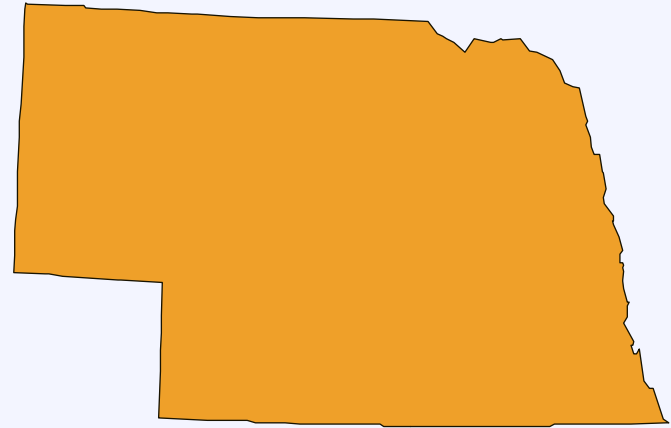
Benefits: Solar Job Growth

Solar Job Growth in the US



The Local Economic Opportunity

1 Megawatt of Residential Solar
Development in Nebraska:



37 Jobs *and* **\$3.8 Million**
In economic output

Economic Development in Nebraska

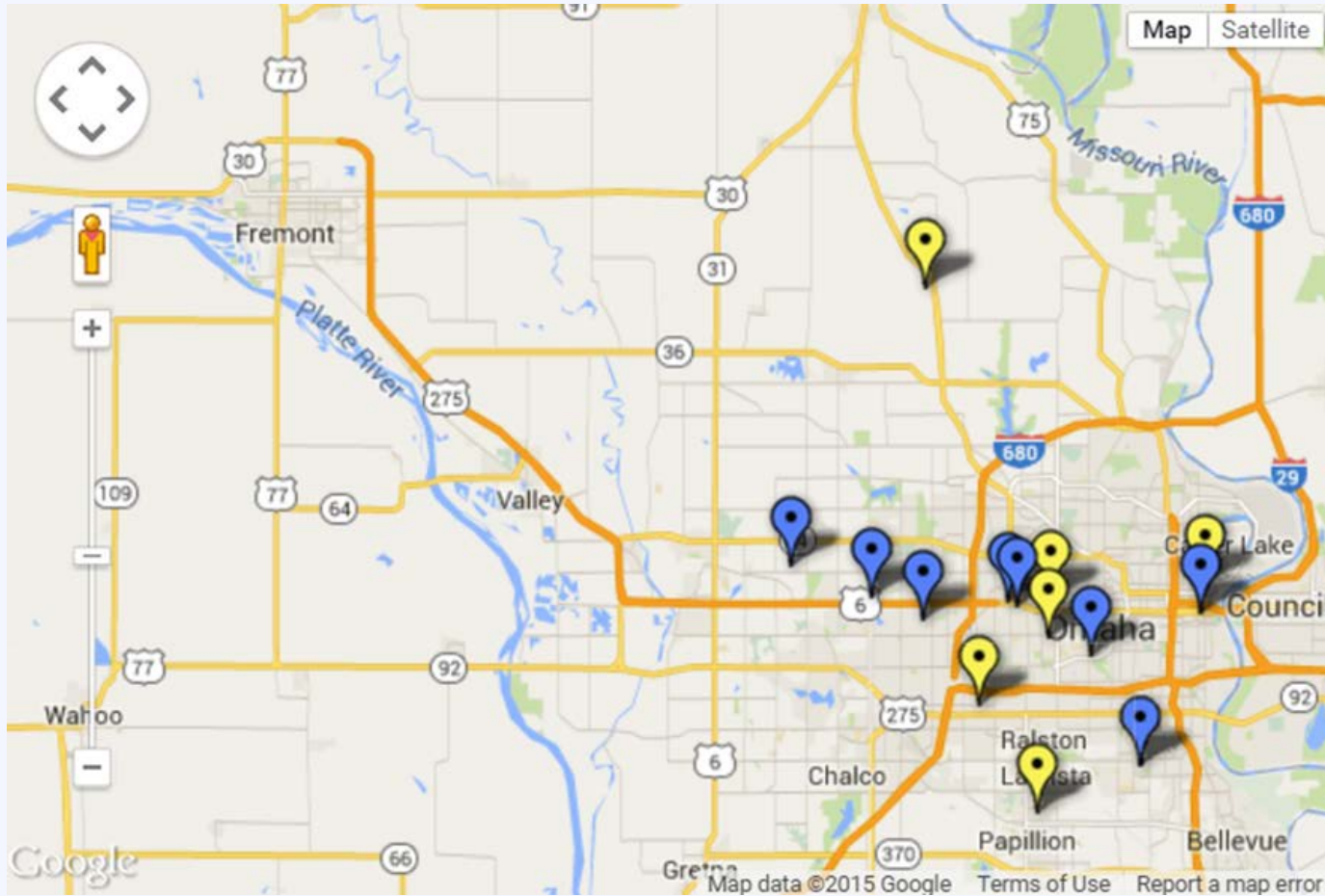
There are currently

18 solar companies

that employ

400 people

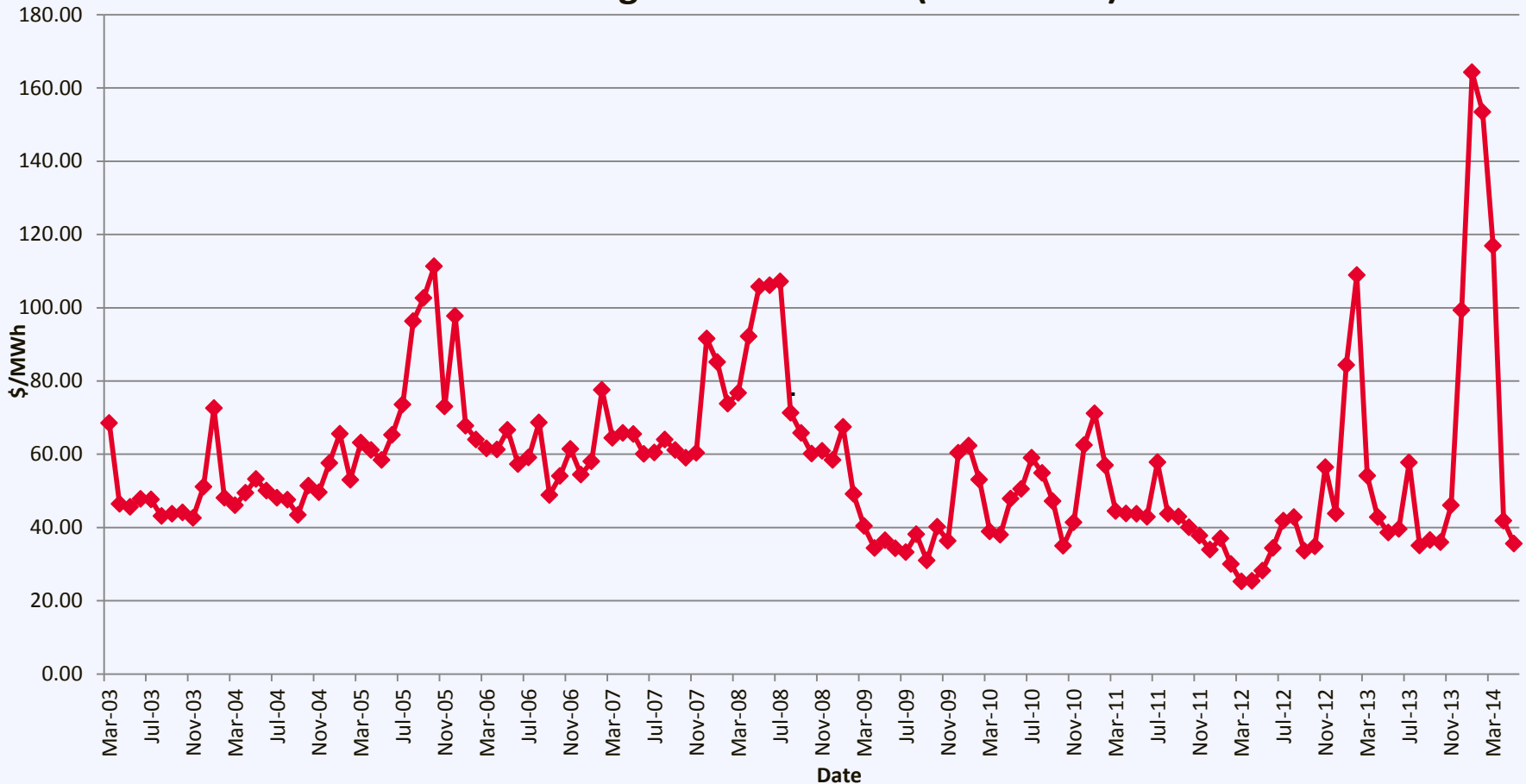
Economic Development in Nebraska



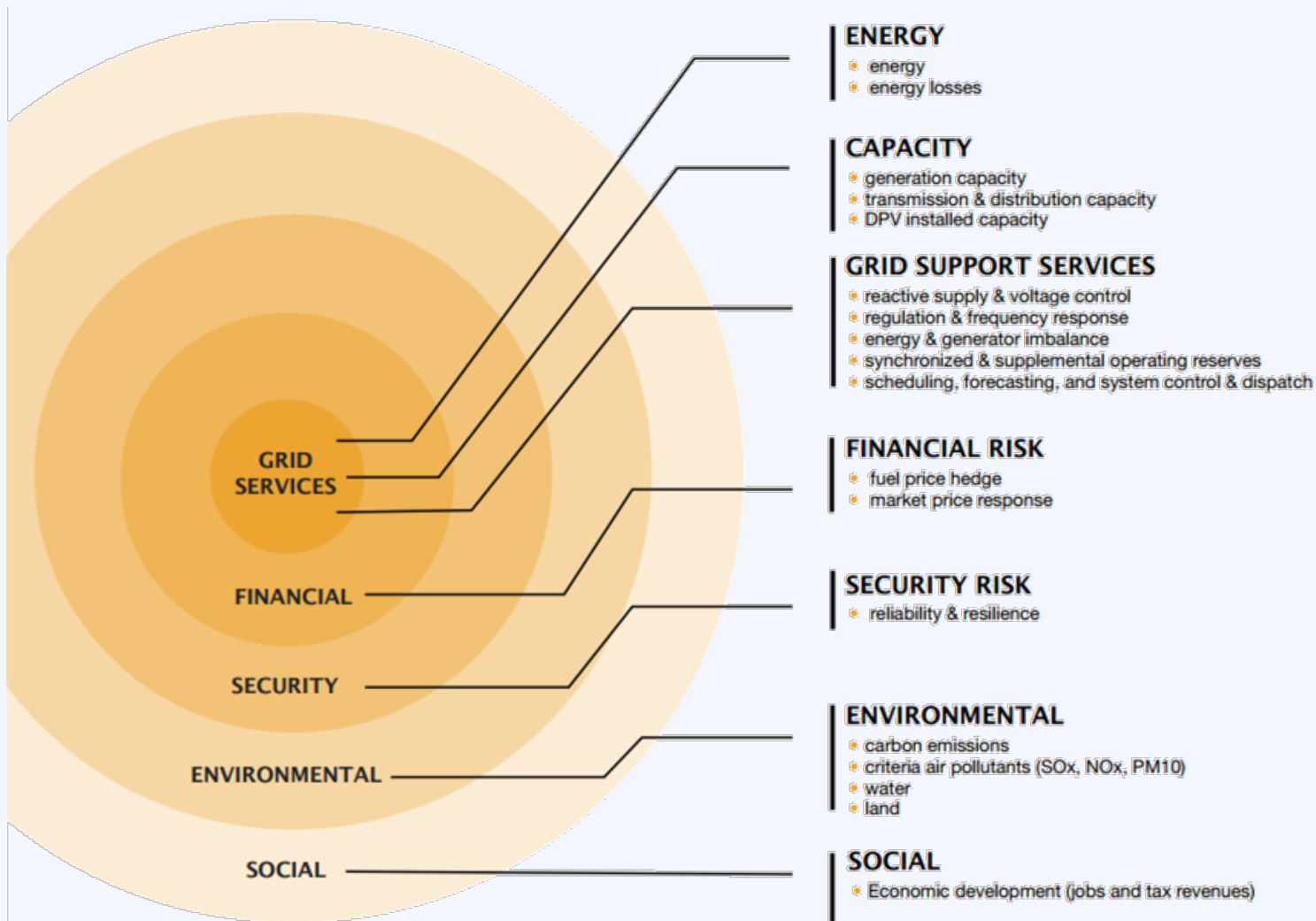
Key:  Manufacturer  Installer  Other

Benefit: Stabilize Energy Prices

Historical Avg Real-Time LMP (NEMABOS)



Valuable to Community & Utilities



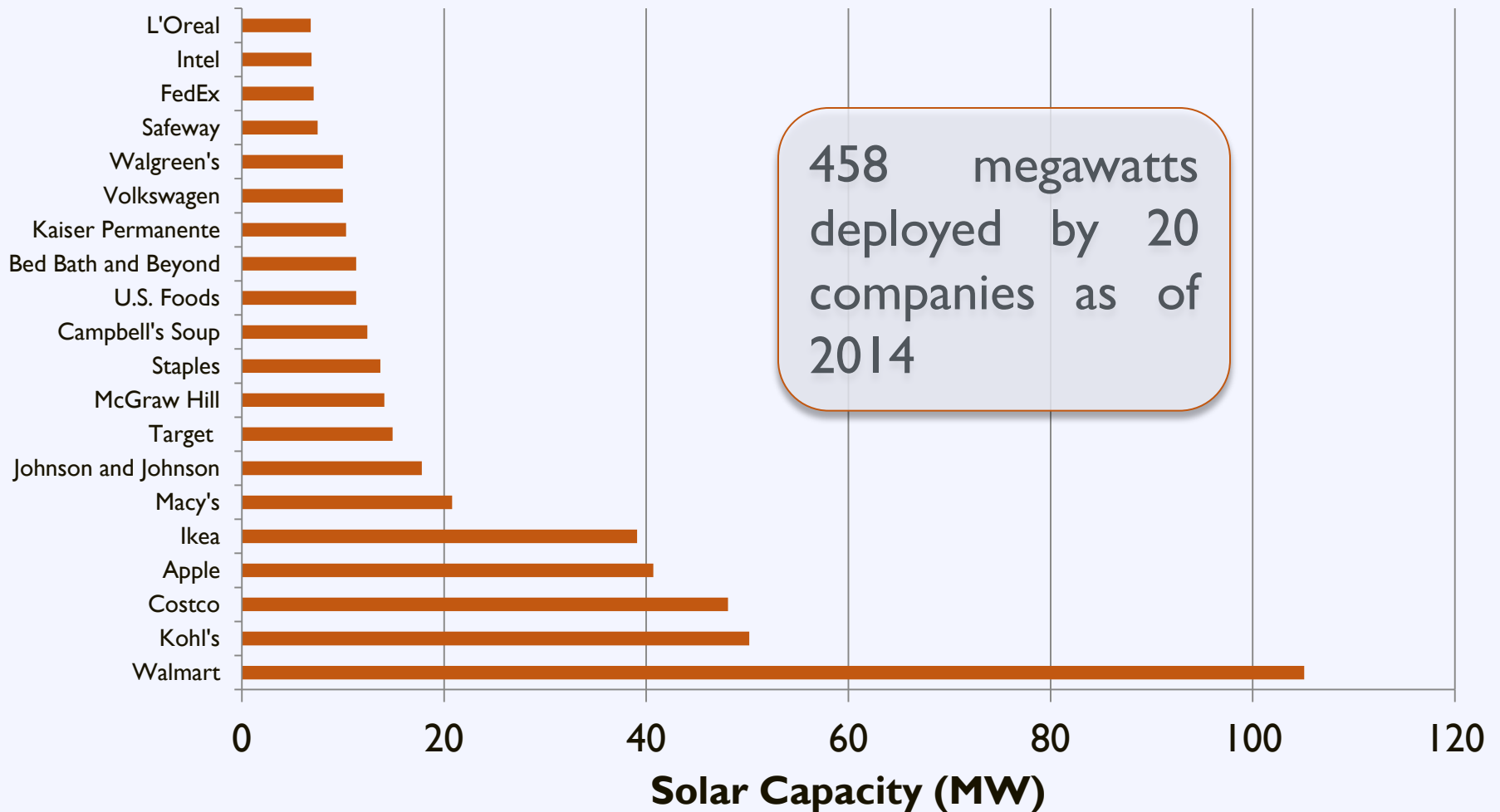
Smart Investment for Homeowners

A typical residential solar system increases a home's property value by

an average of \$11,000

Smart Investment for Businesses

Top 20 Companies by Solar Capacity



Smart Investment for Governments



Smart Investment for Schools

Current:



×

3,752



=

\$77.8m

Potential:



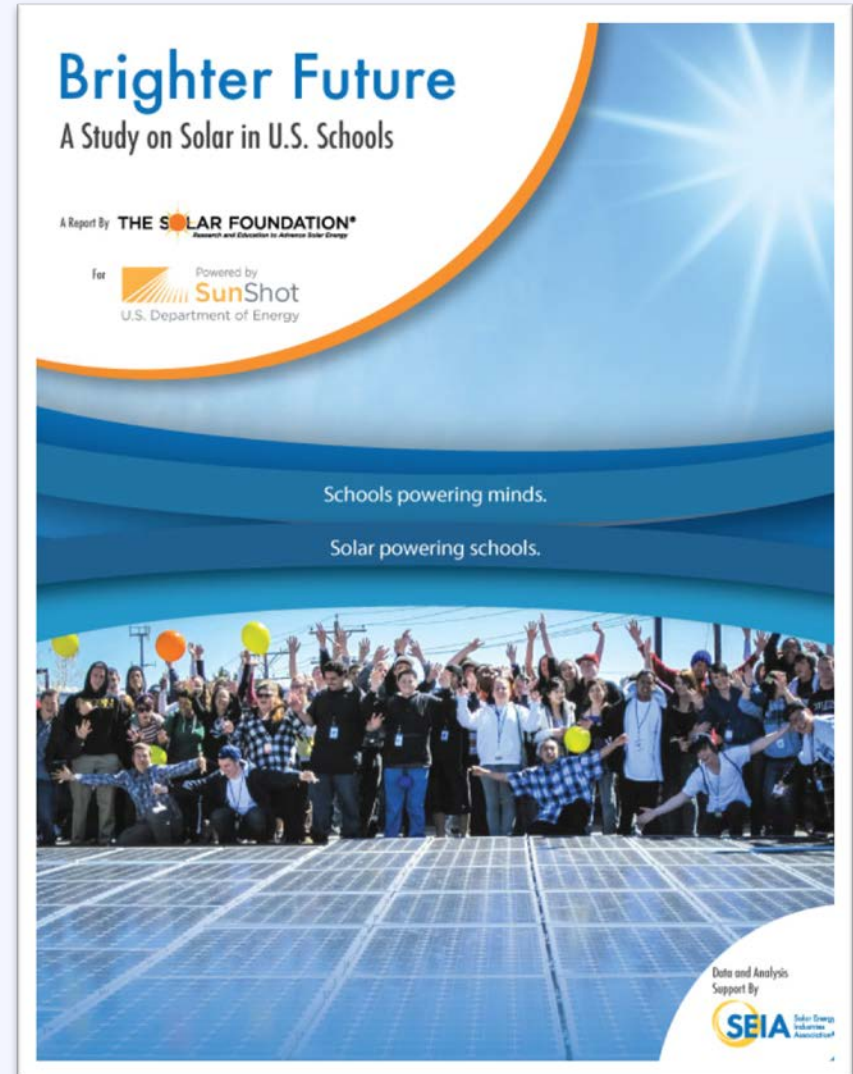
×

40,000 –
72,000



=

\$800m

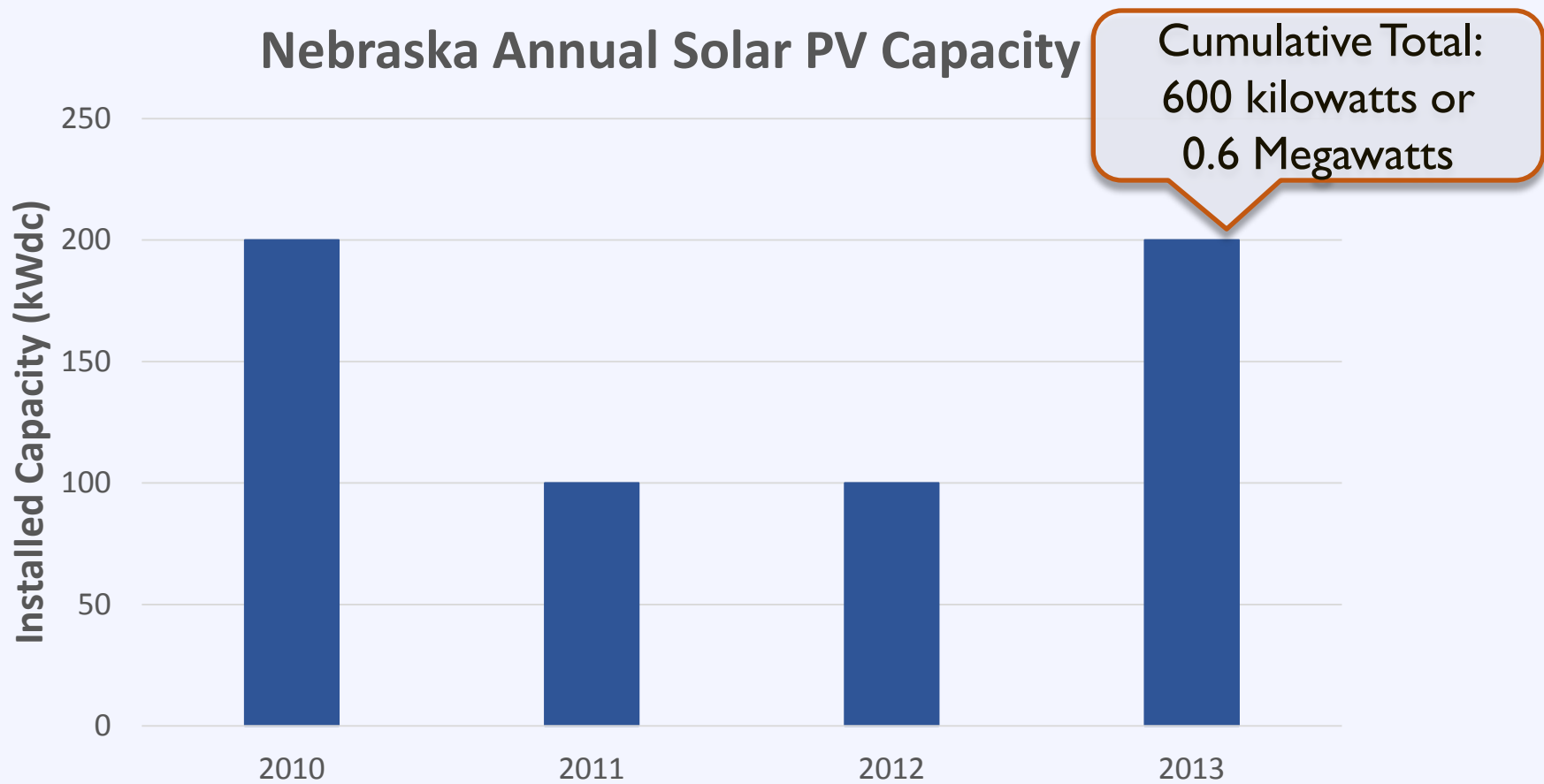


Agenda

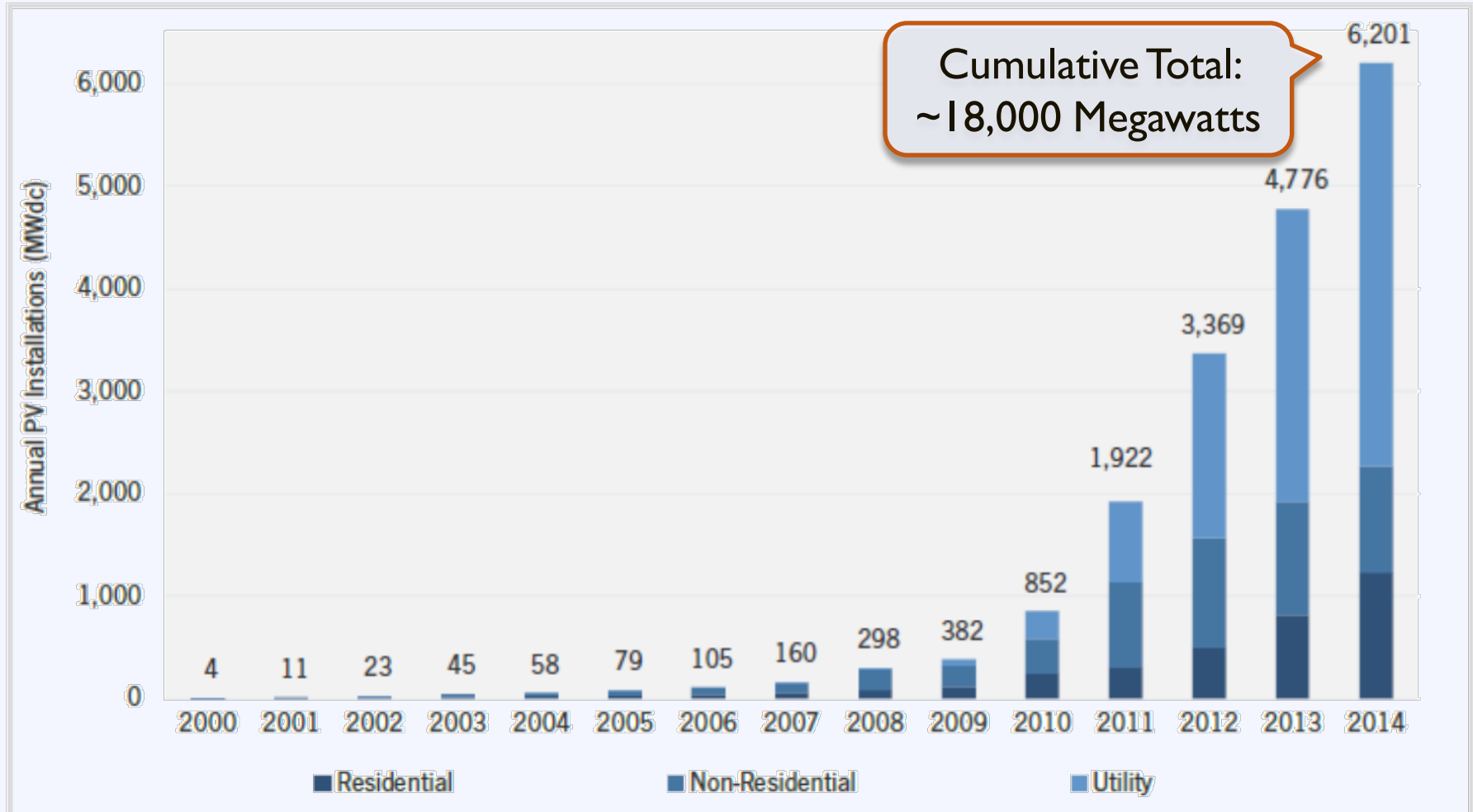
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Your Community and Next Steps

Nebraska Solar Market

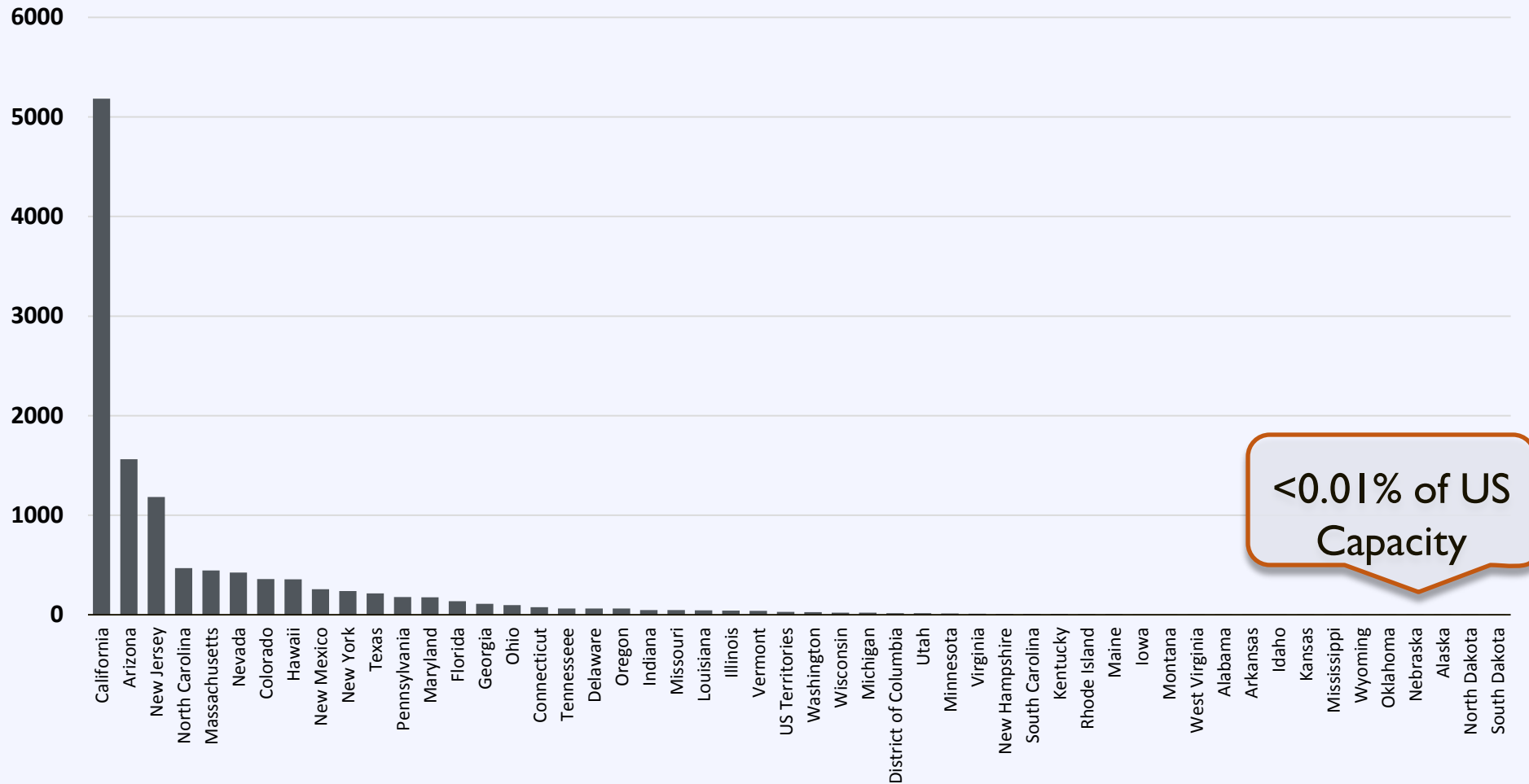


US Solar Market



US Solar Market

Installed Capacity by State (MW) 2013



<0.01% of US Capacity

Nebraska Solar Market

Nebraska



0.32

watts per person

US

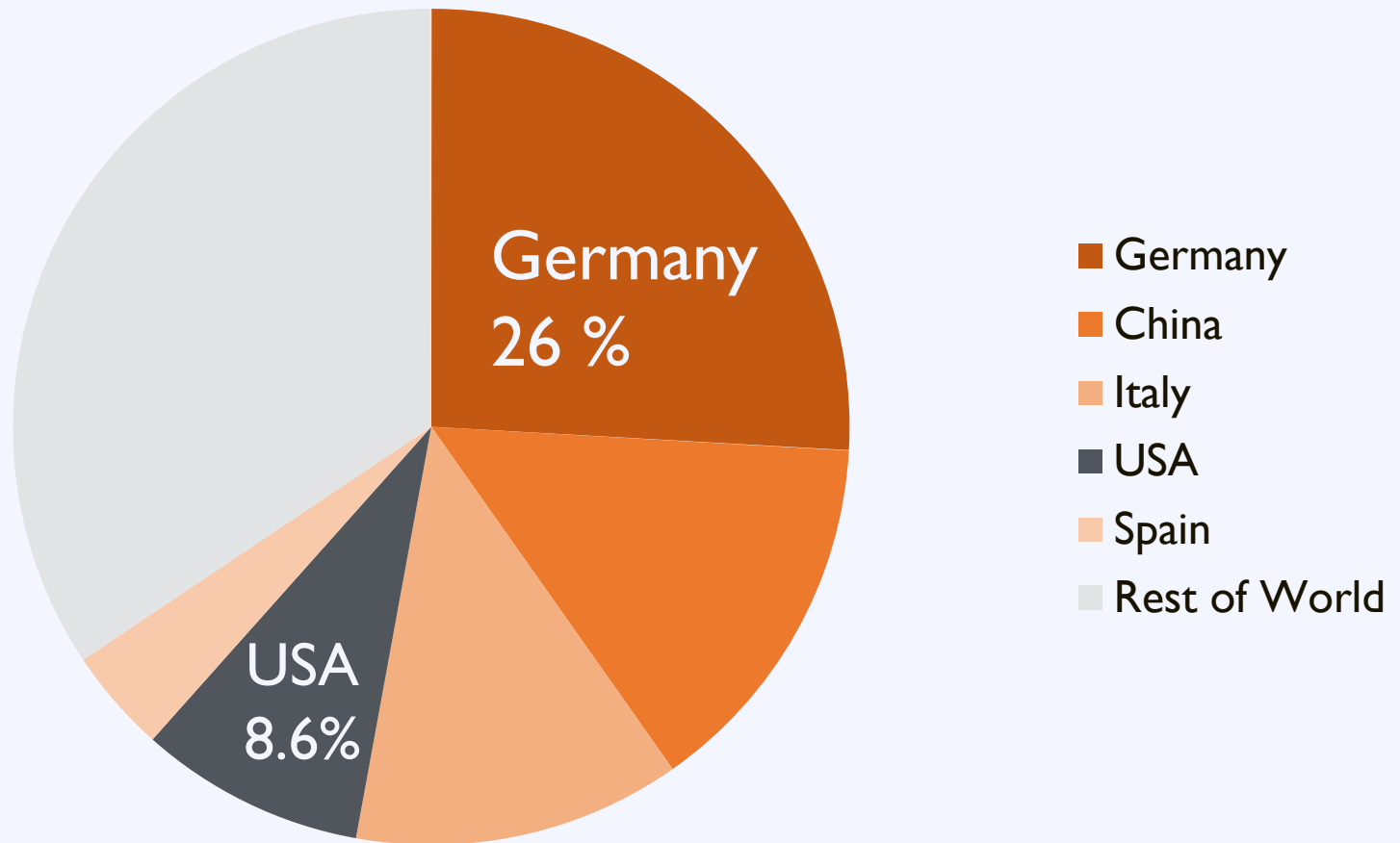


38

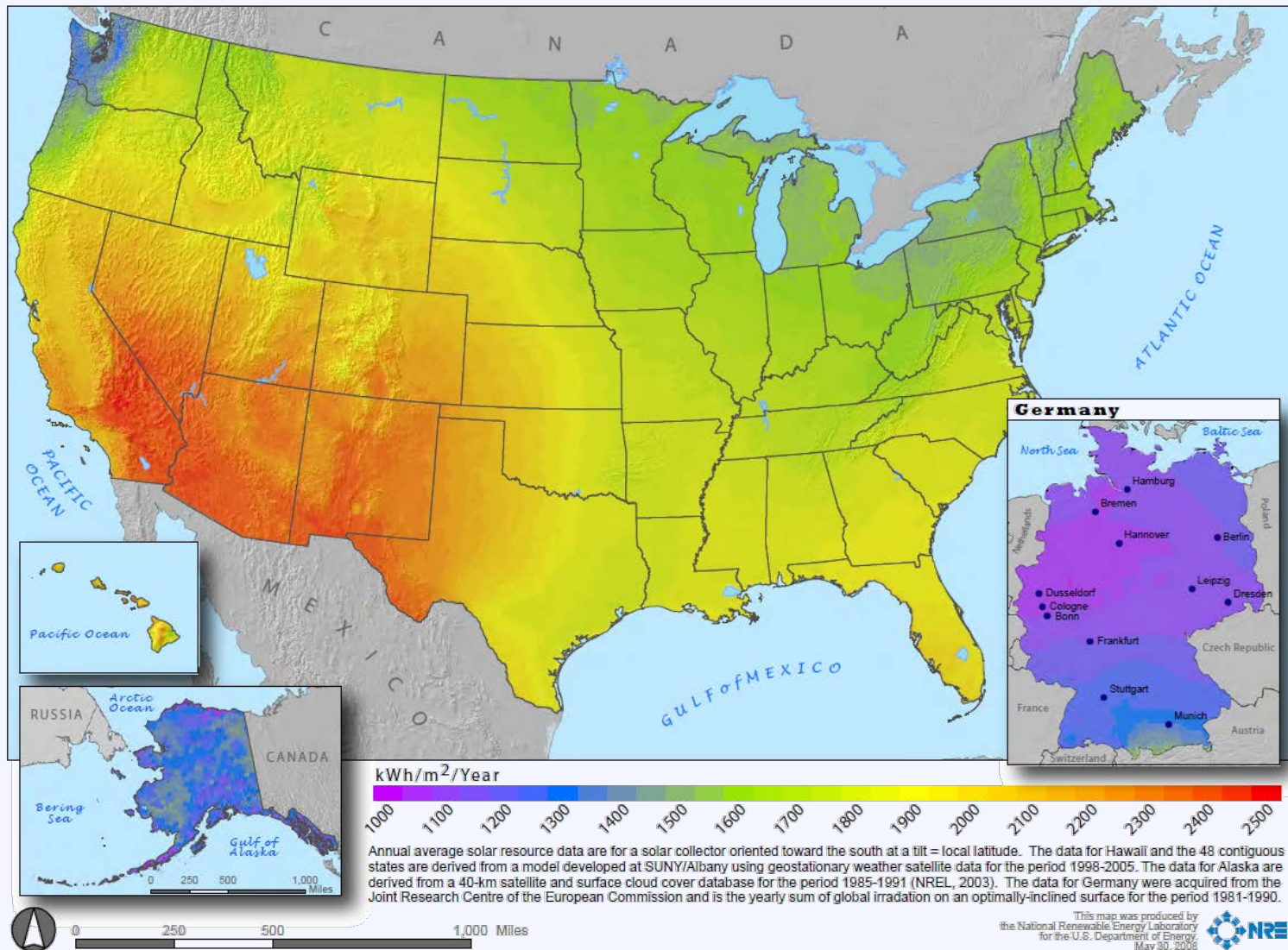
watts per person

World Solar Market

Top 5 Countries Solar Operating Capacity (2013)

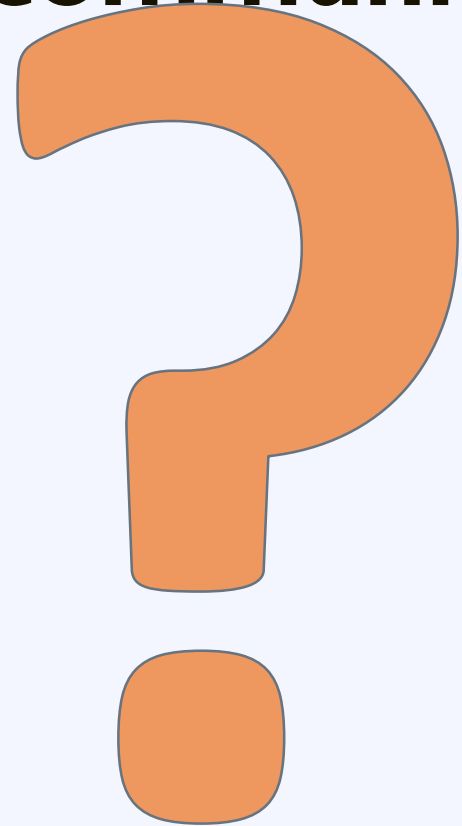


US Solar Resource



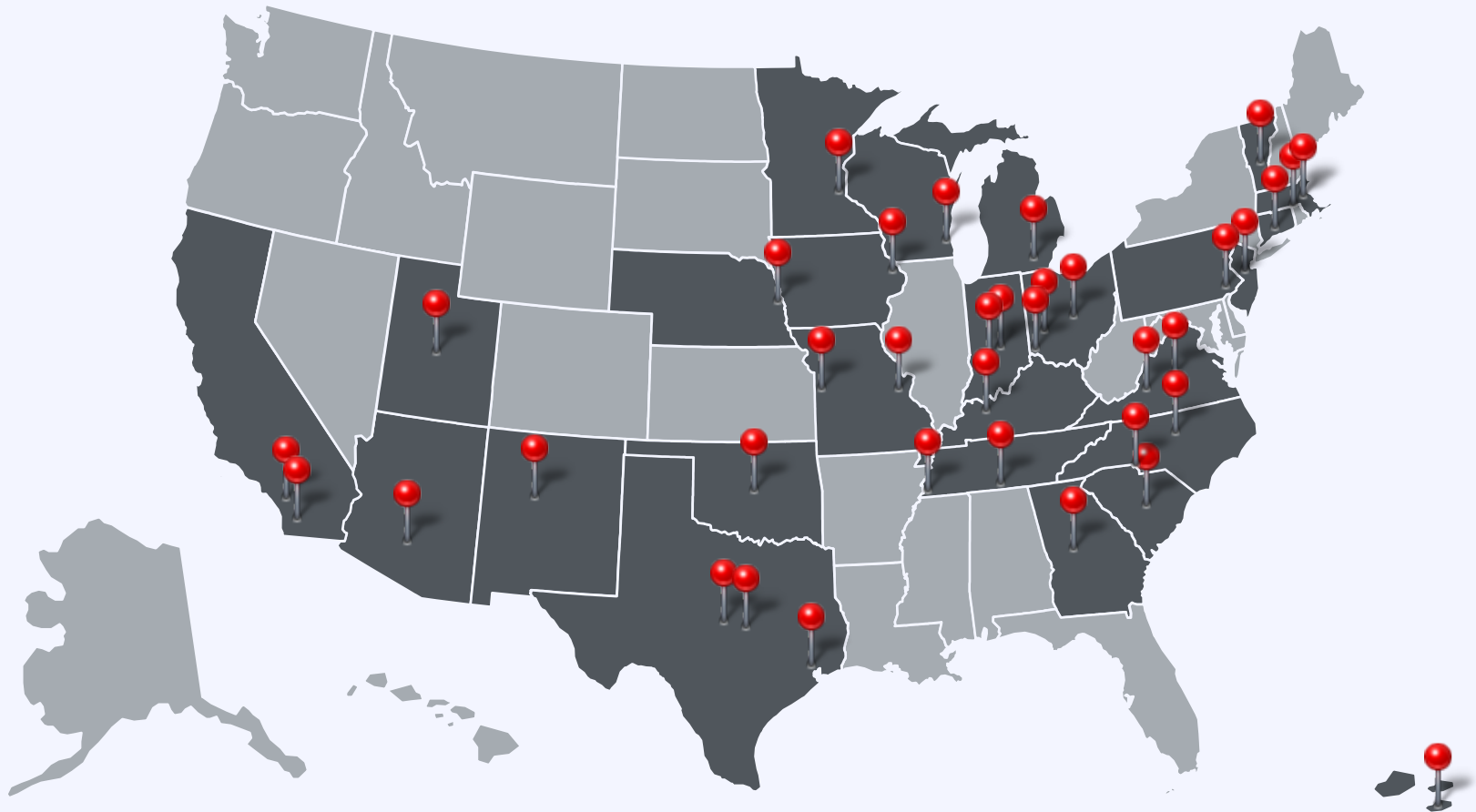
What are the top 3 barriers to solar adoption in your community?

- 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

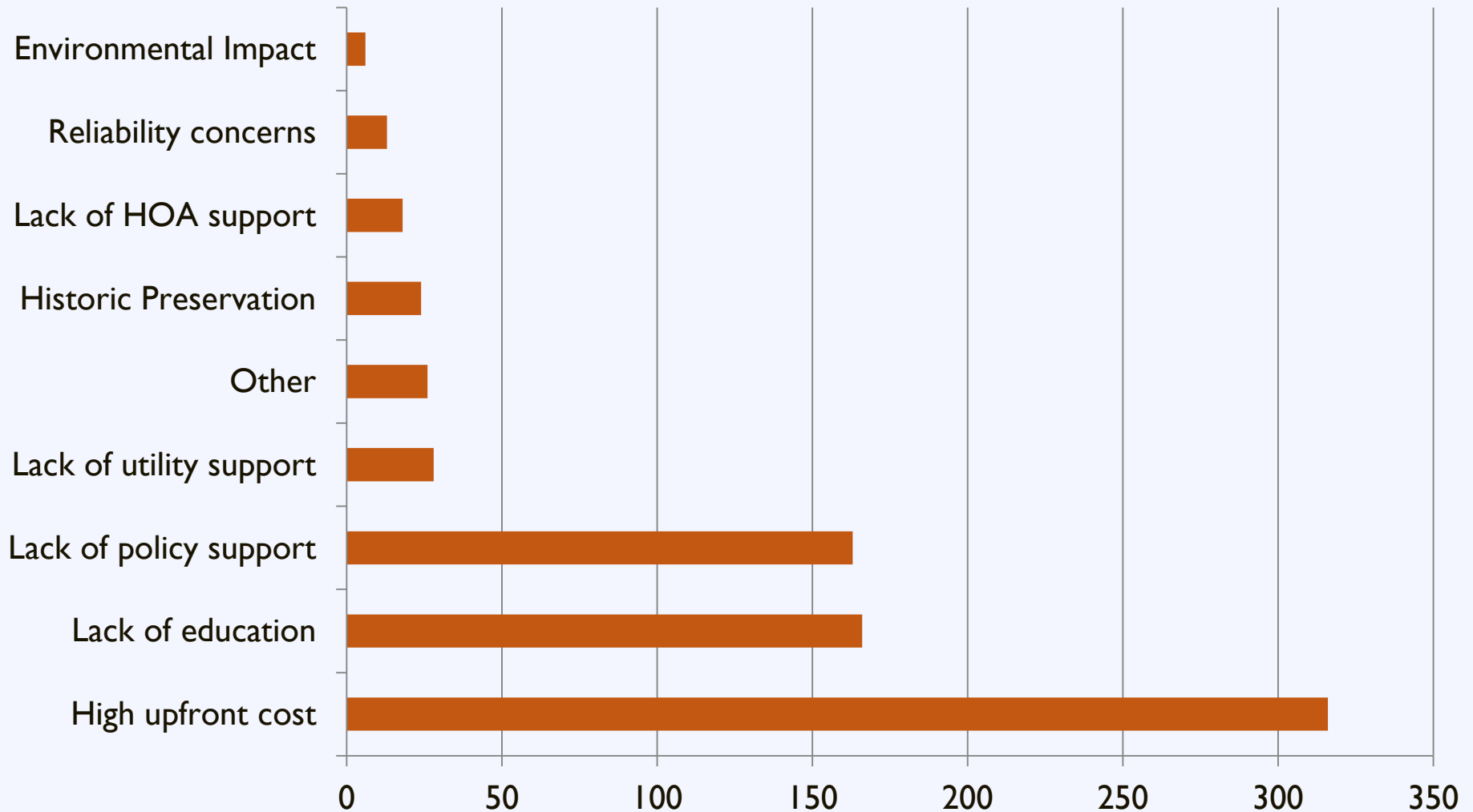


Regional Workshop Surveys

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

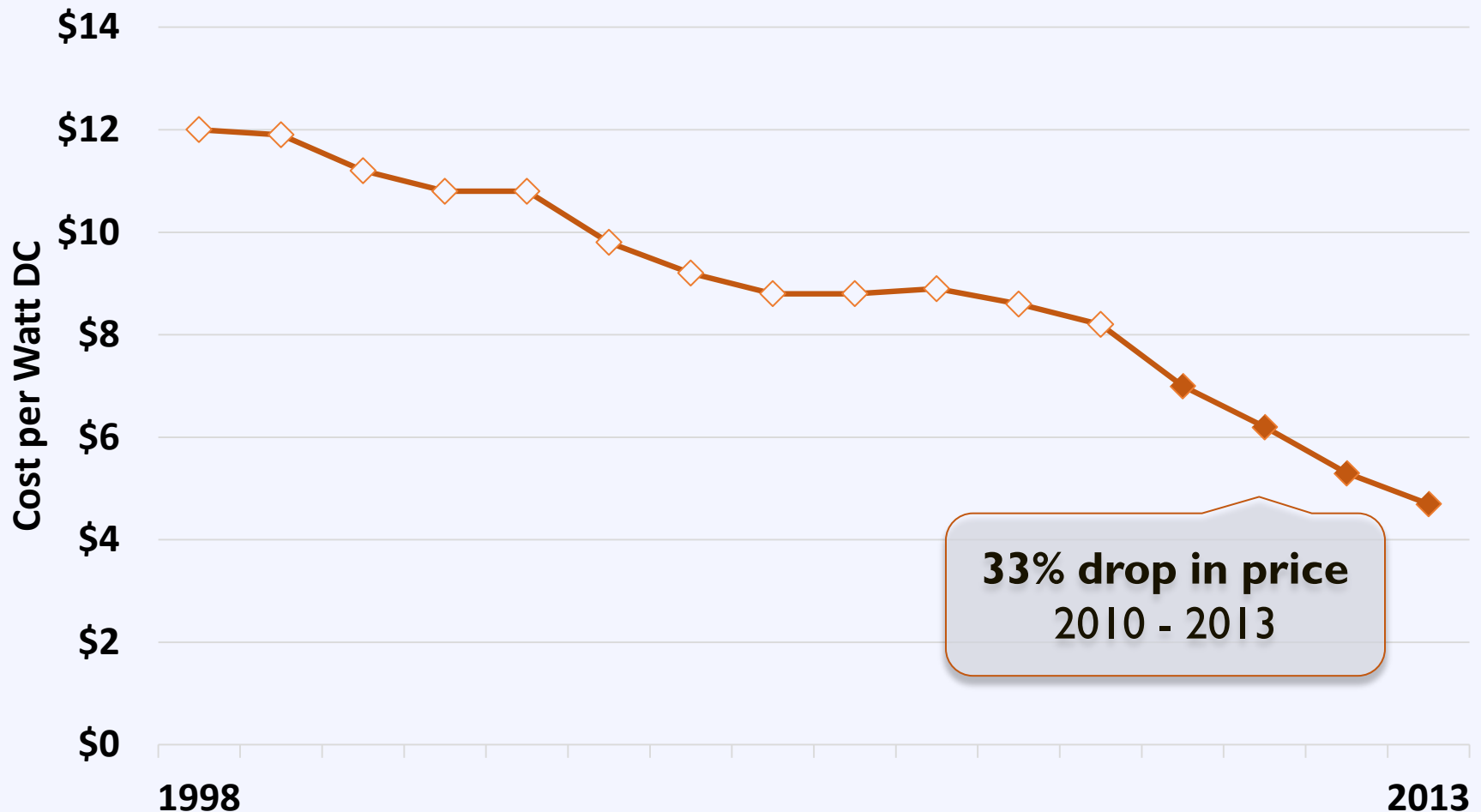


Activity: Addressing Barriers

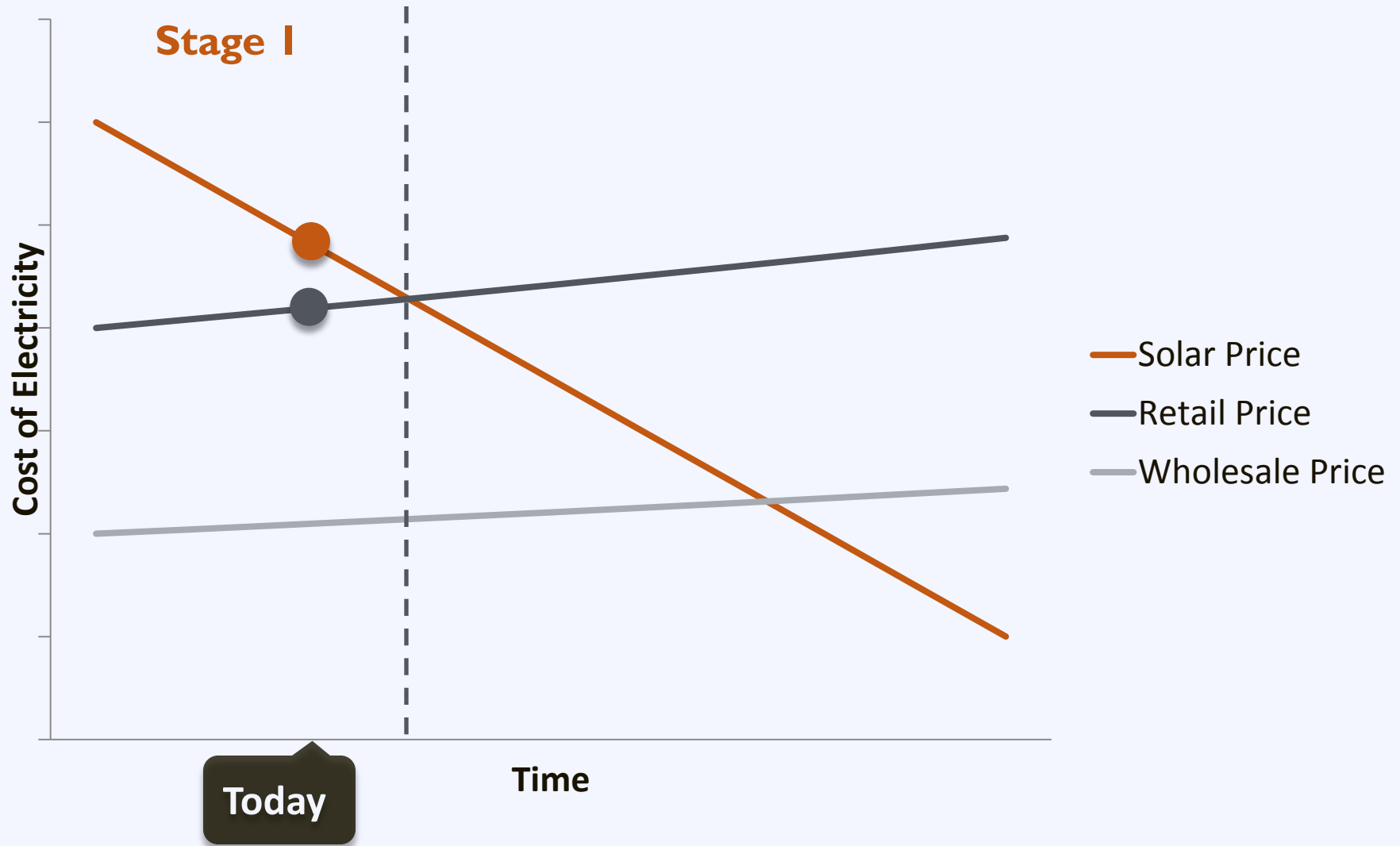


The Cost of Solar PV

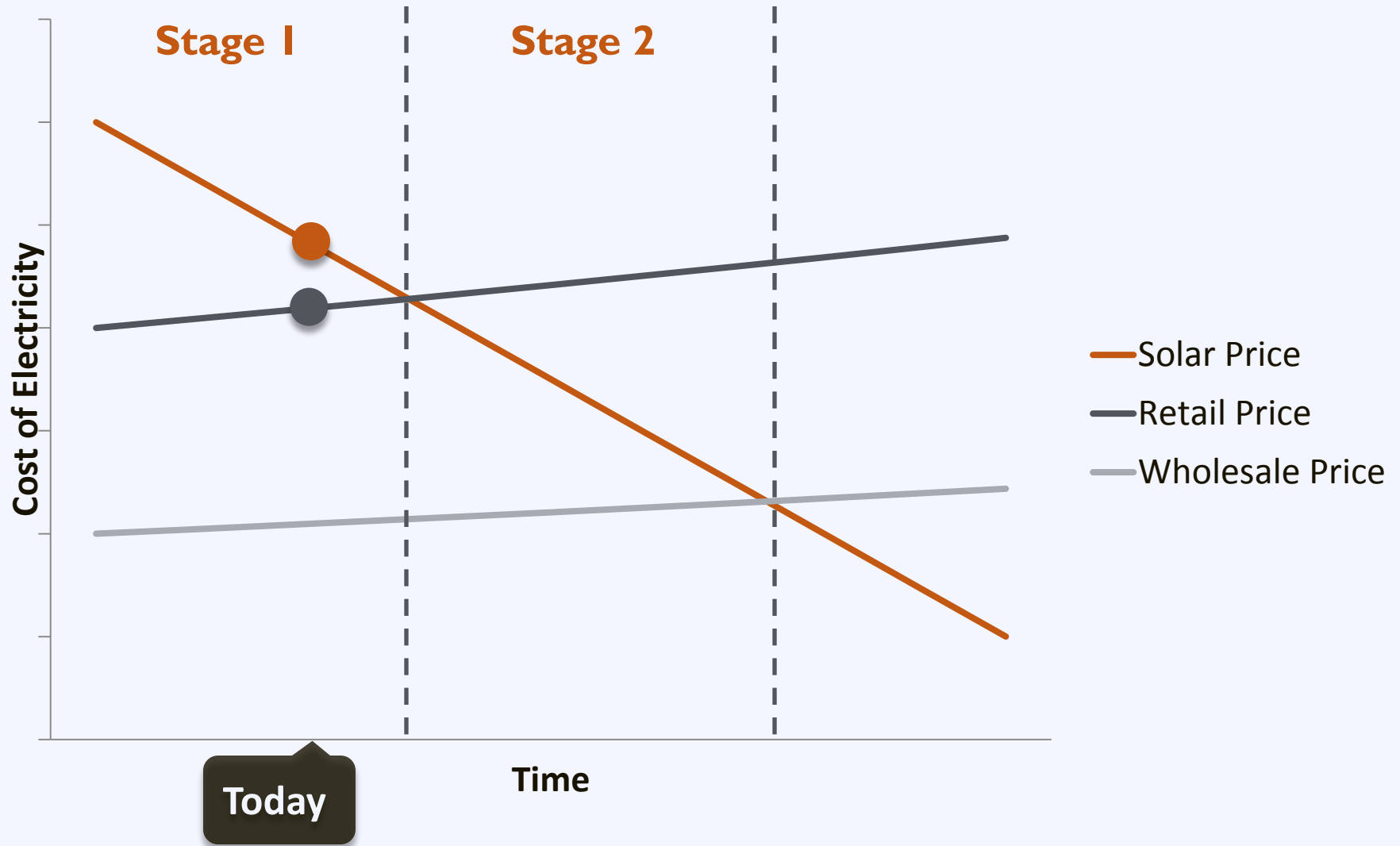
US Average Installed Cost for Behind-the-Meter PV



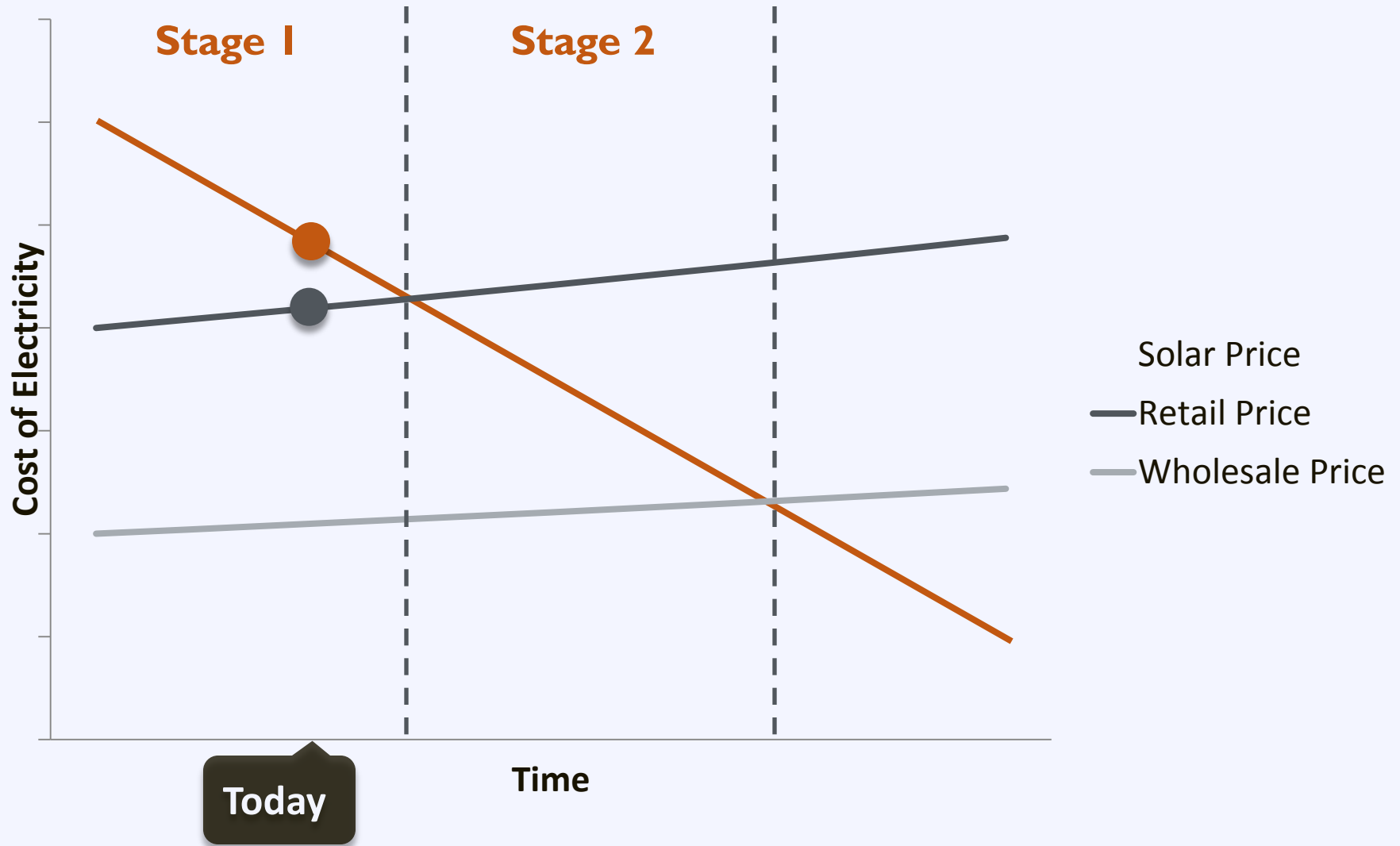
The Cost of Solar PV



The Cost of Solar PV

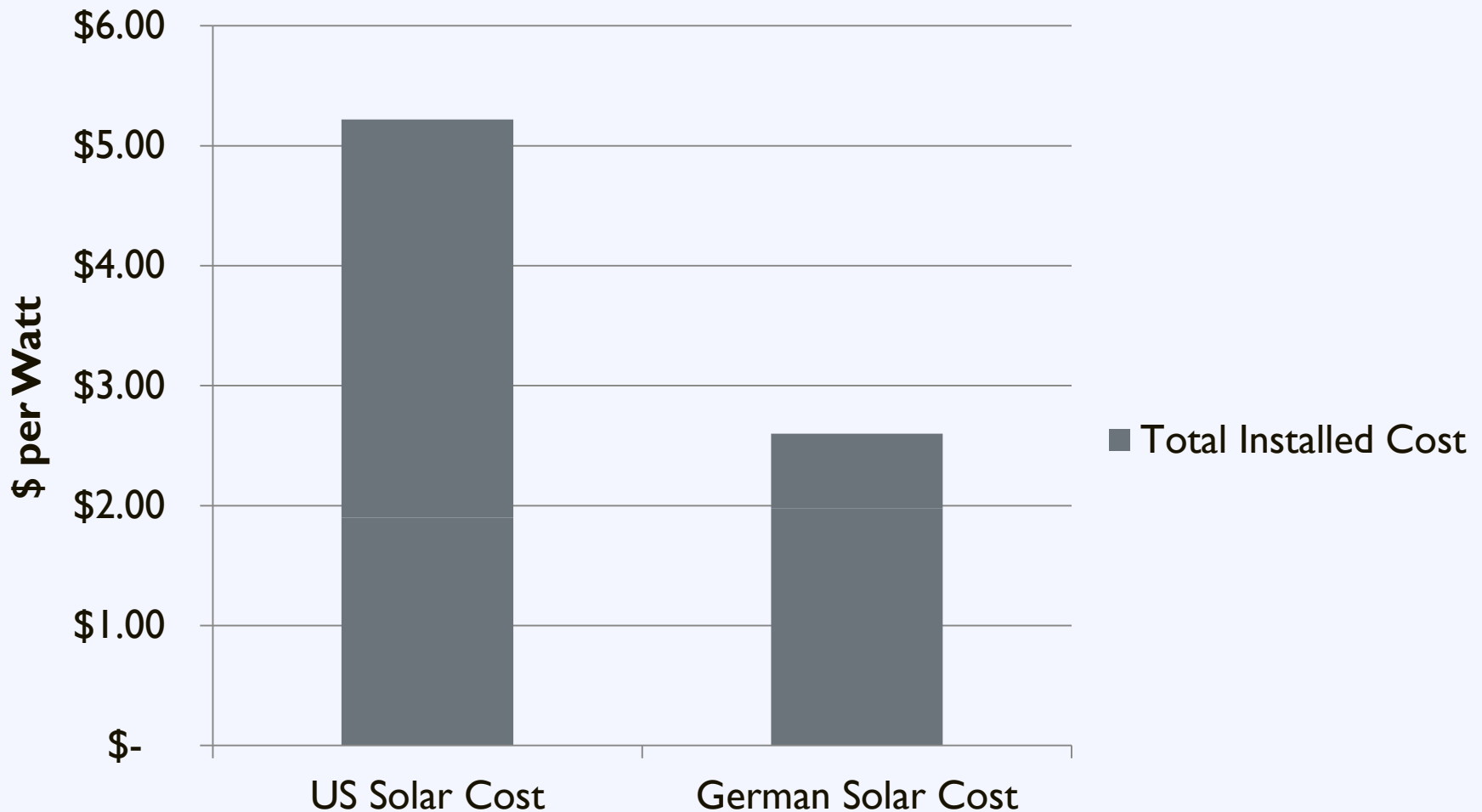


The Cost of Solar PV



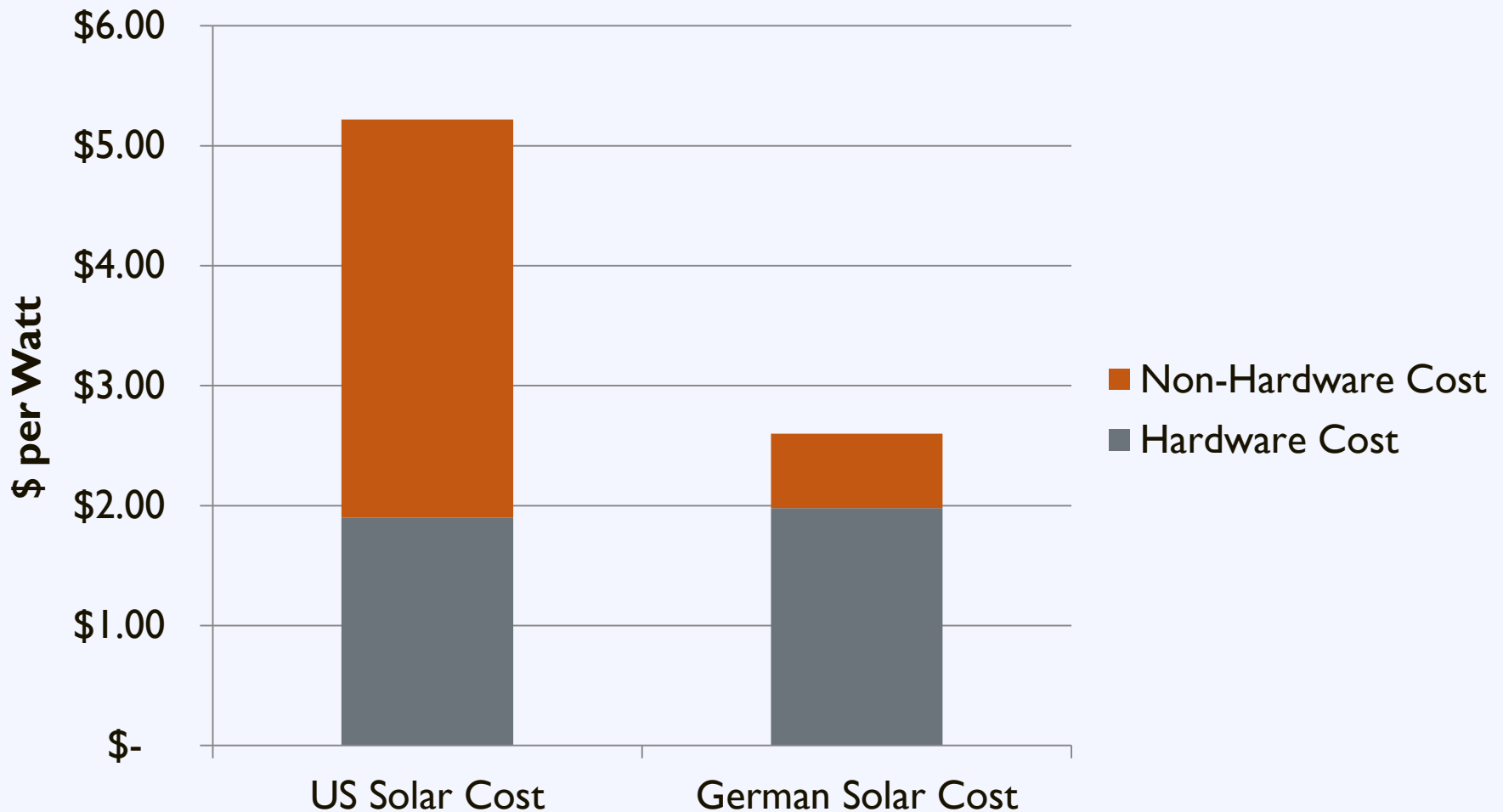
The Cost of Solar in the US

Comparison of US and German Solar Costs



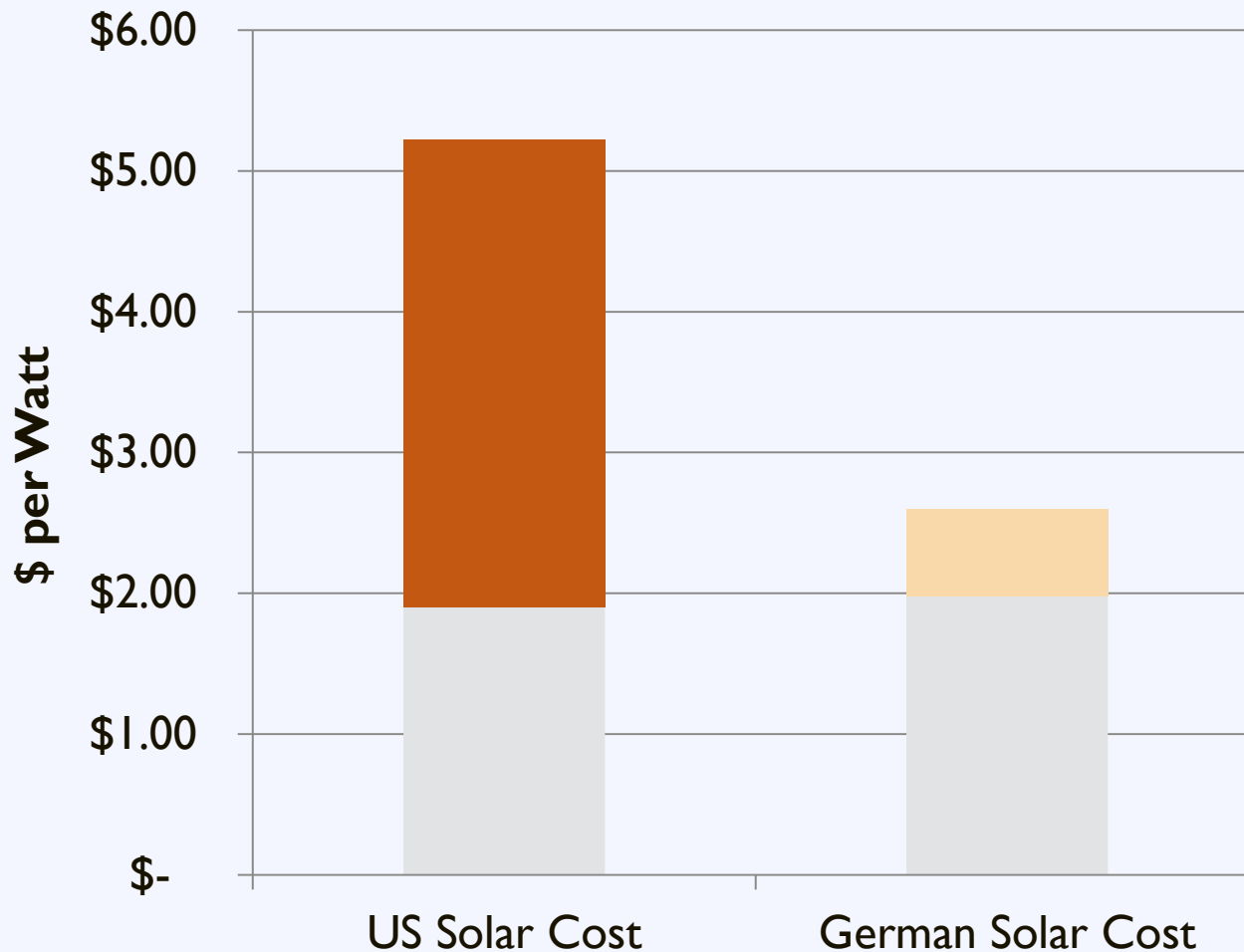
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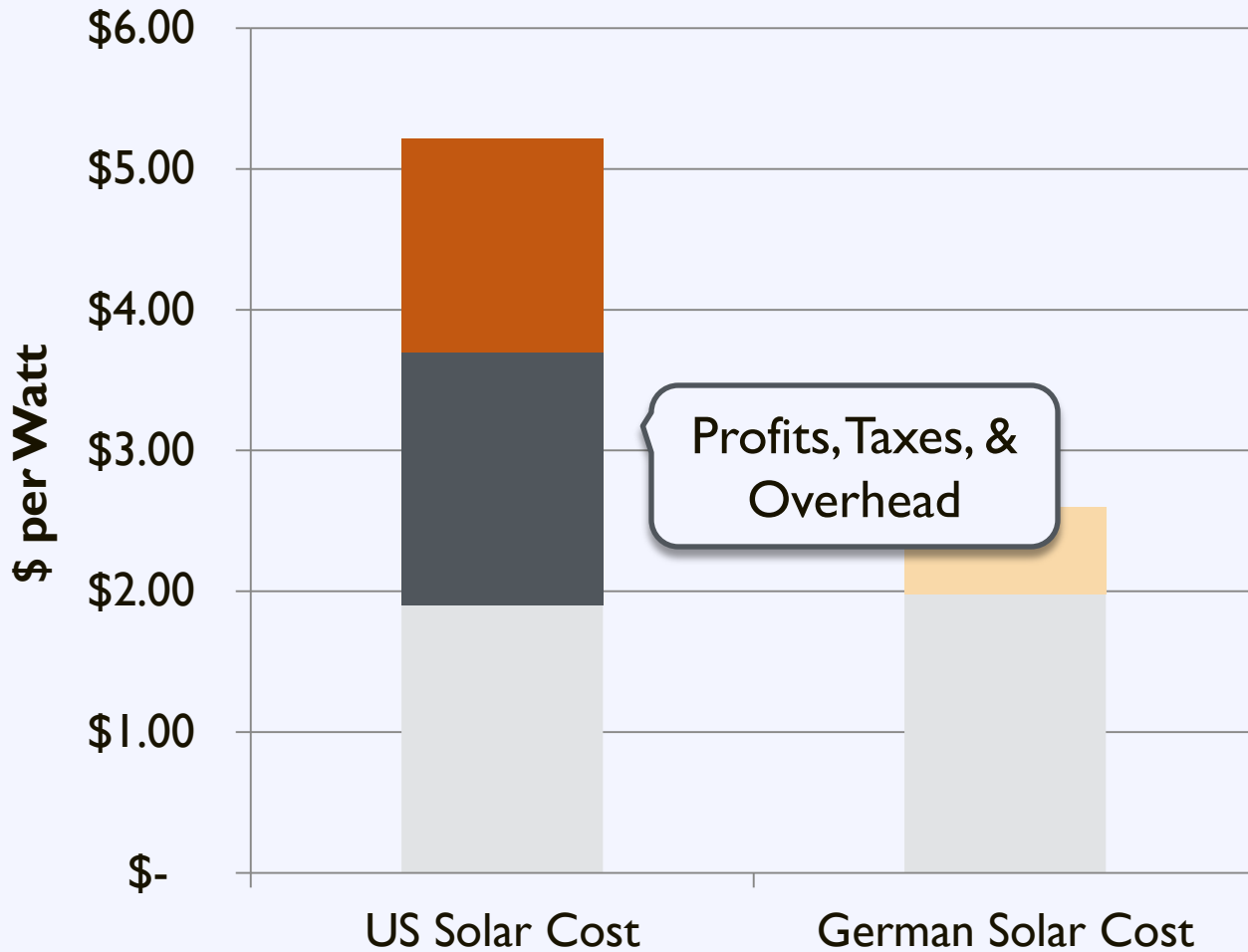
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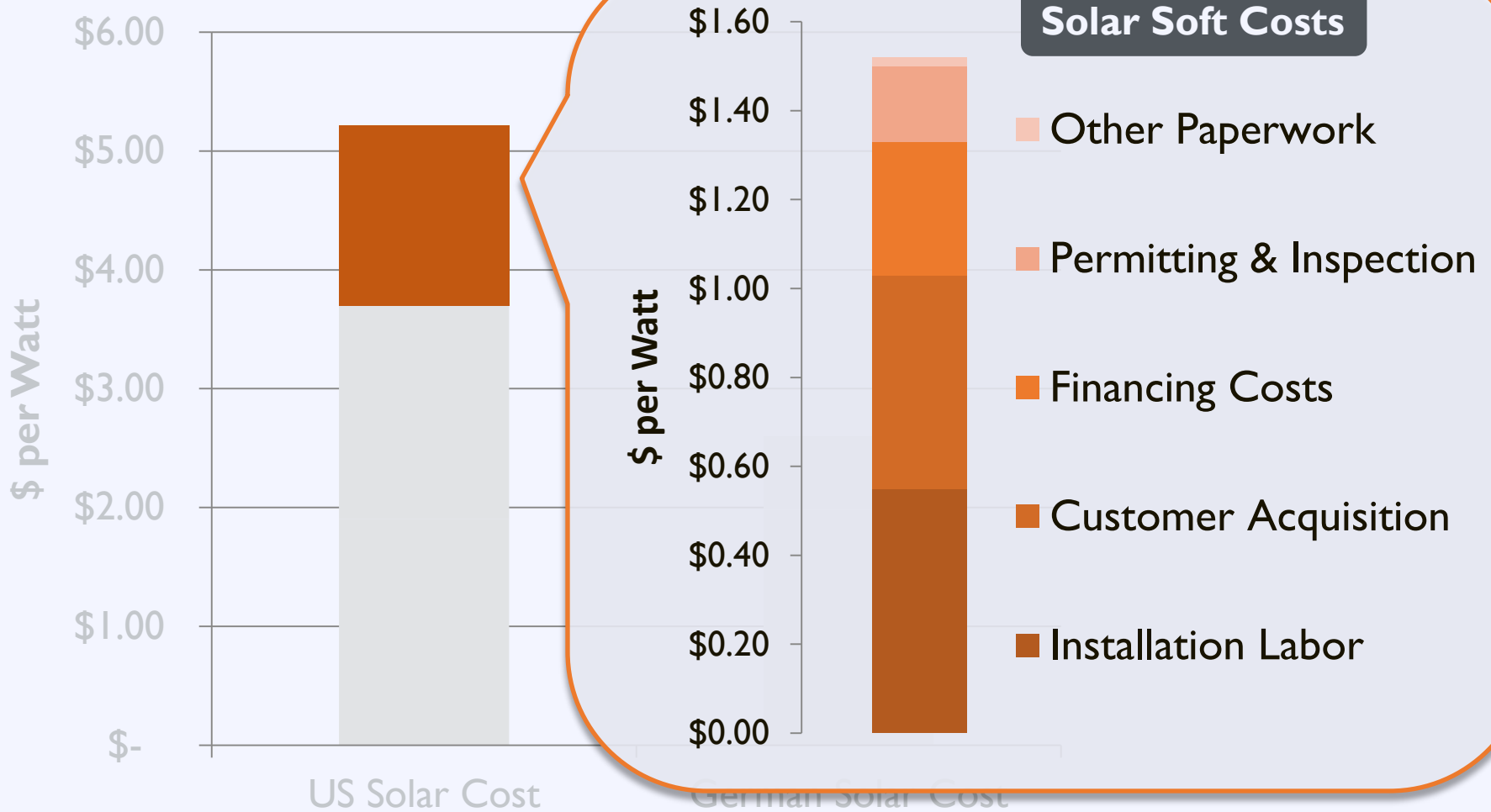
The Cost of Solar in the US

Comparison of US and German Solar Costs



The Cost of Solar in the US

Comparison of US and German Solar Costs



Challenge: Installation Time



**New York City's
Goal**

100 days

from inception to completion



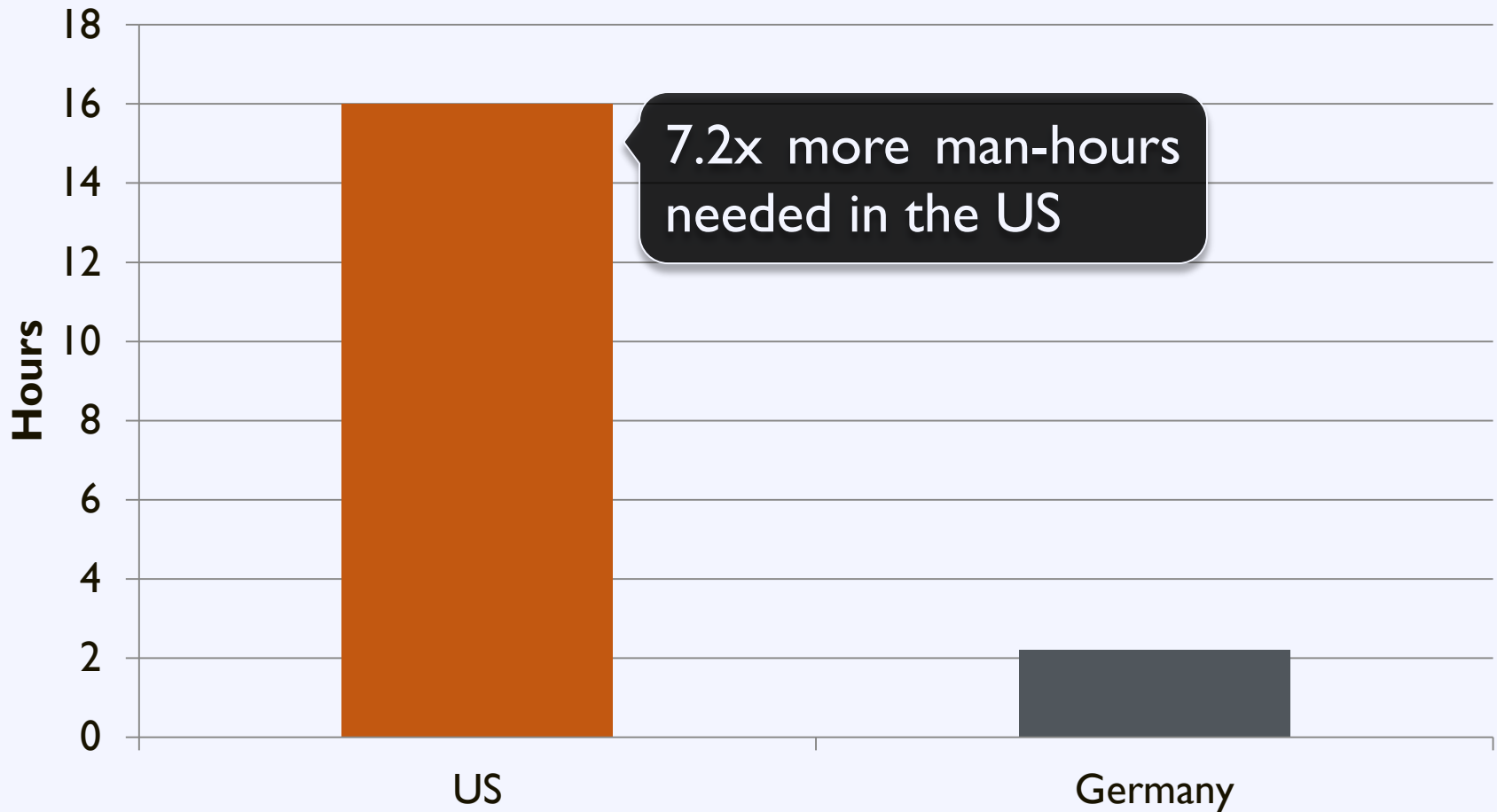
**Germany
Today**

8 days

from inception to completion

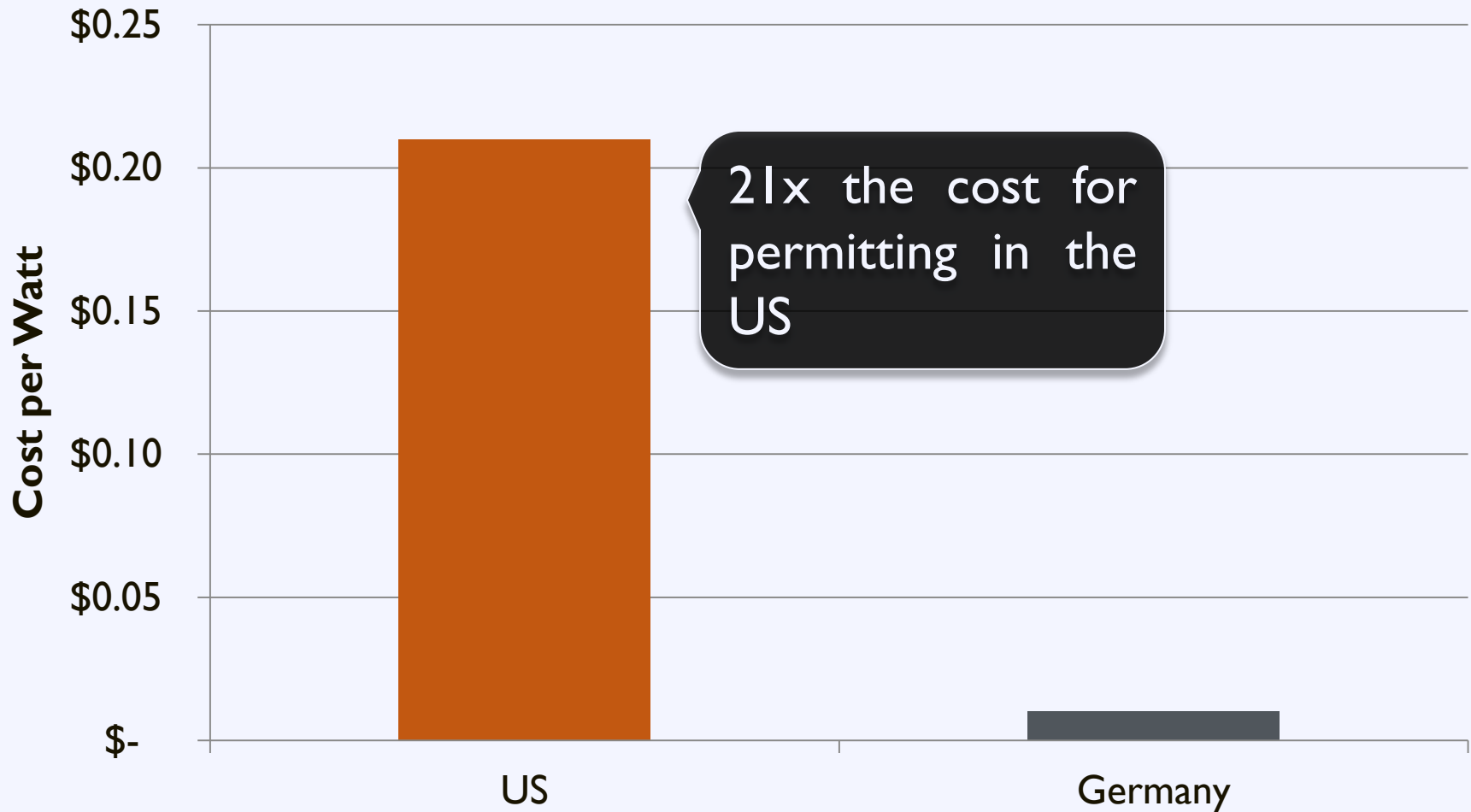
Time to Installation

Average Time to Permit a Solar Installation



Permitting Costs

Average Cost of Permitting in the US and Germany



Germany's Success

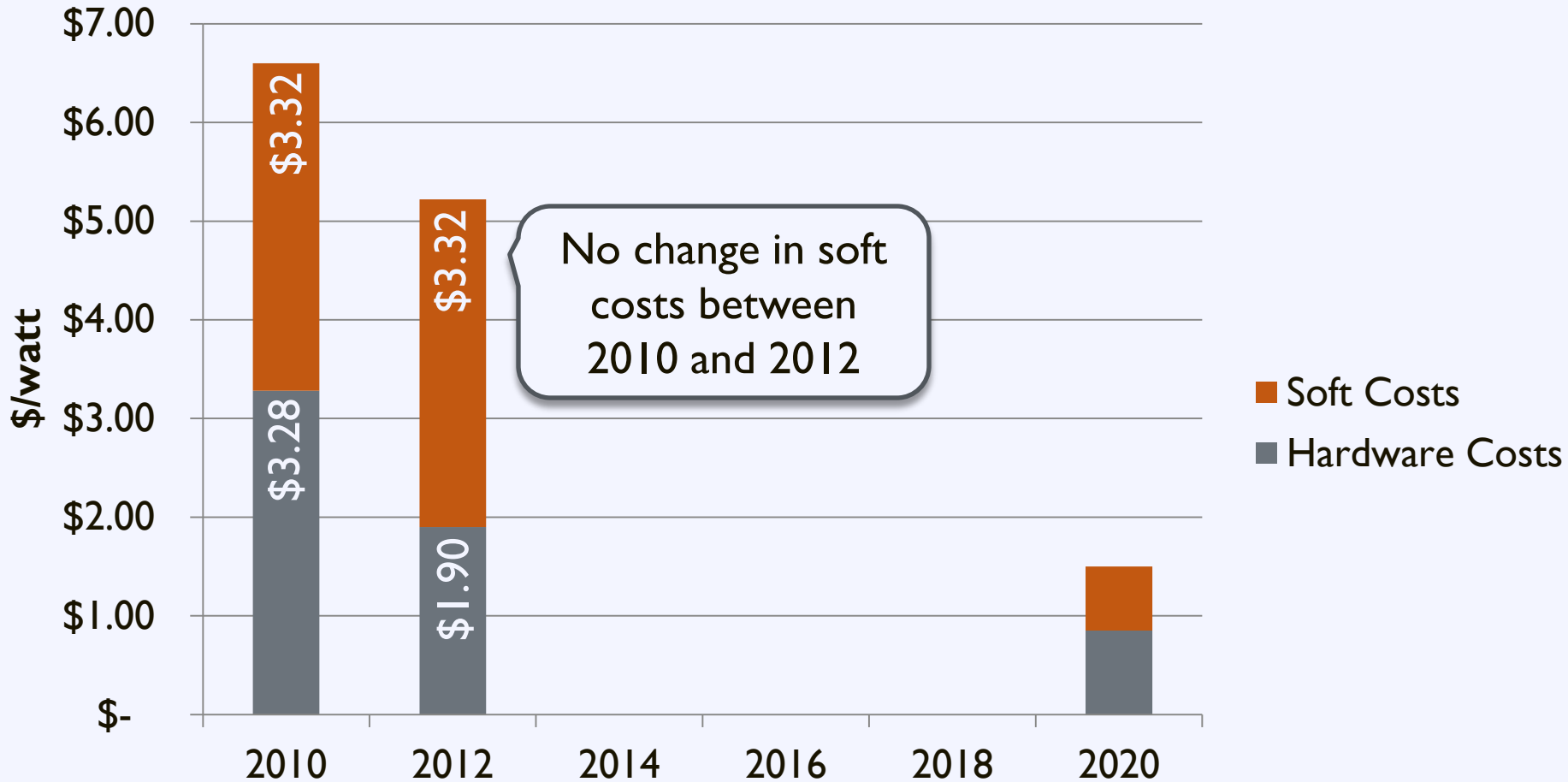
Consistency and Transparency

through

Standardized Processes

The Cost of Solar in the US

Change in Soft Costs and Hardware Costs Over Time



Local Government Impact

What would be the impact of a 25% reduction in local government-addressable soft costs on the value of a 5 kW solar investment?

| | | |
|---|--|-----------------|
| Q4 2014 US Avg. Residential Installed Cost: | | \$3.48/W |
| Net Present Value: | | \$2,924 |
| Payback Period: | | 14.8 years |
| After 25% Reduction in addressable soft costs: | | \$3.26/W |
| Net Present Value: | | \$3,696 |
| Payback Period: | | 13.9 years |
| Difference: | | \$0.22/W |
| Net Present Value: | | + 26% |
| Payback Period: | | - 6% |

Workshop Goal

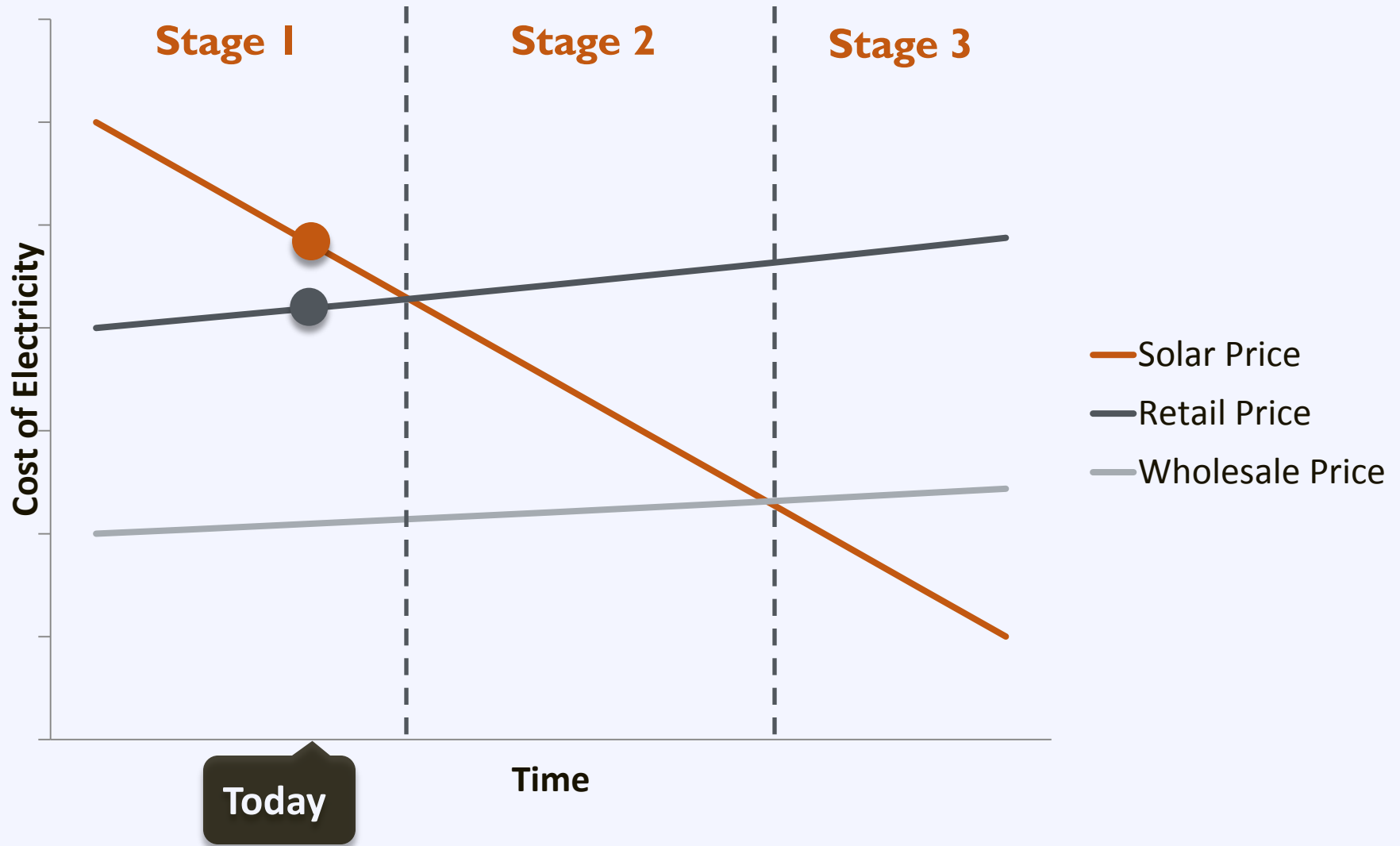
Enable local governments to replicate successful solar practices to **reduce soft costs** and **expand local adoption of solar energy**

Agenda

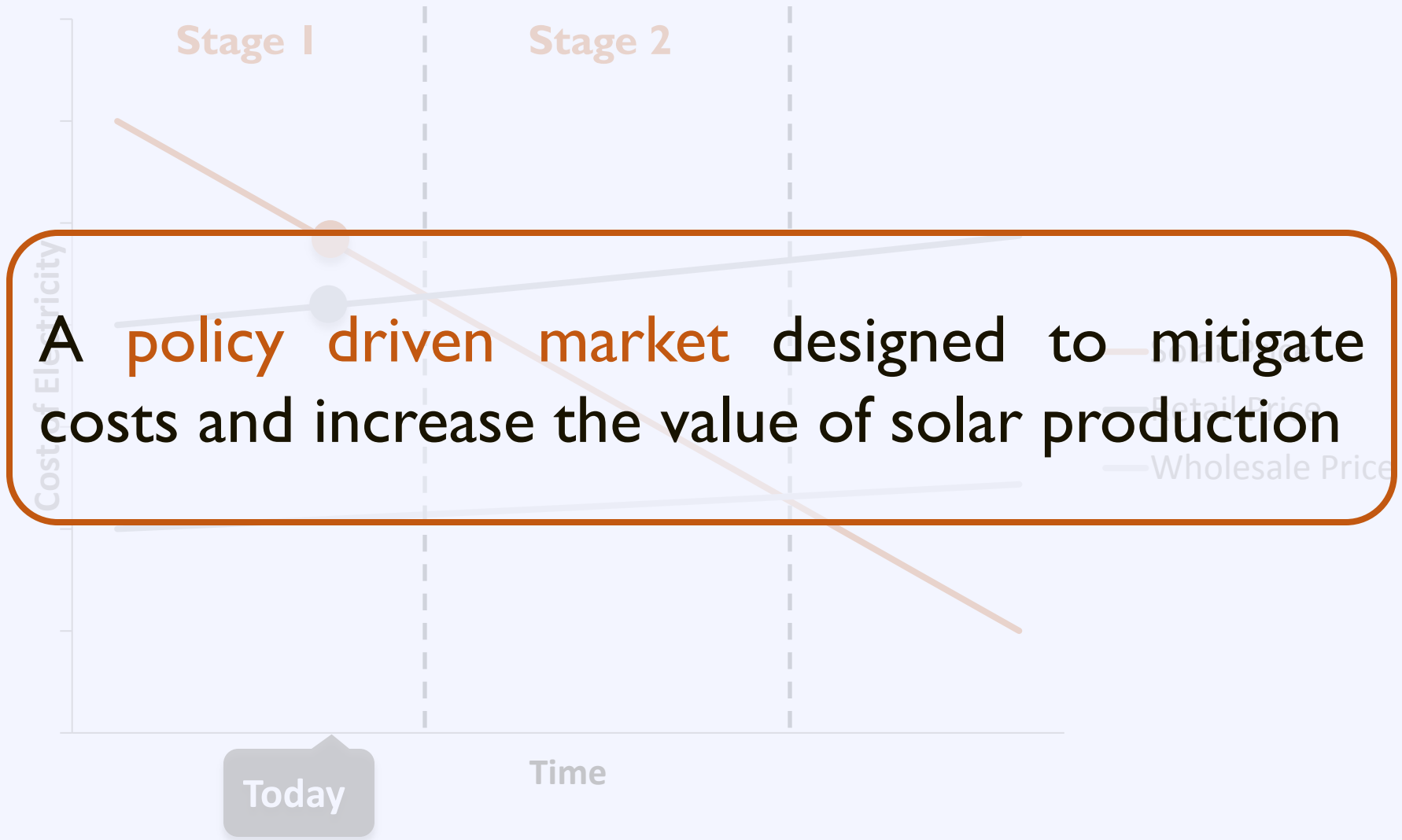
- | | |
|----------------------|---|
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Your Community and Next Steps

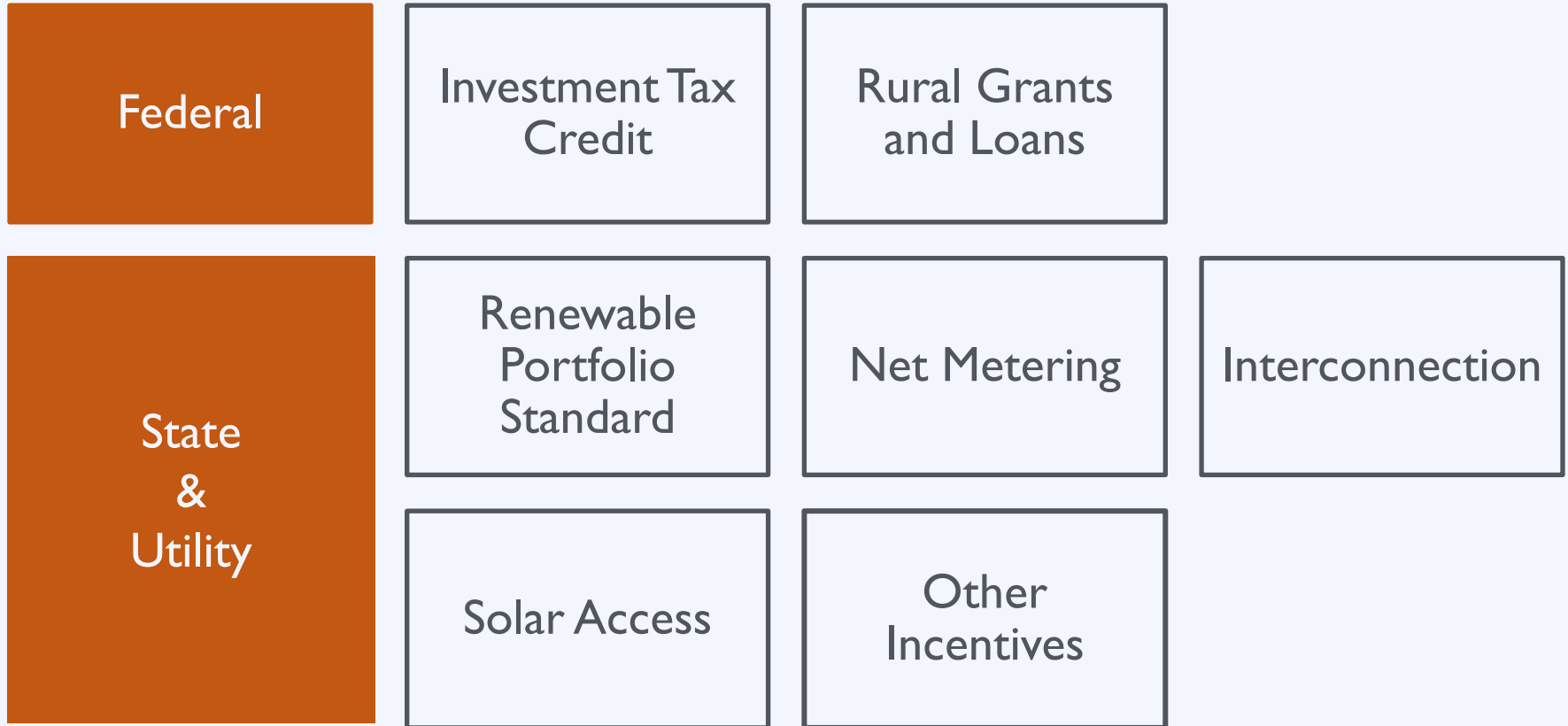
Solar Market: Trends



Solar Market: Trends



A Policy Driven Market



A Policy Driven Market



Investment Tax Credit

Type: Tax Credit

Eligibility: For-Profit Organization

Value: 30% of the installation cost

Availability: Through 2016

USDA Rural Energy for America Program

Type: Federal Grant and Loan Program

Eligibility: Rural small businesses and agricultural producers

Renewable energy grant: 25% of project cost

Energy efficiency grant: 25% of project cost

Loan Guarantees: 75% of project cost up to \$25 million

http://www.rurdev.usda.gov/bcp_reap.html

Rural Utilities Service EECLP

Type: Federal loans

Eligibility: Rural Cooperative and Municipal Utilities

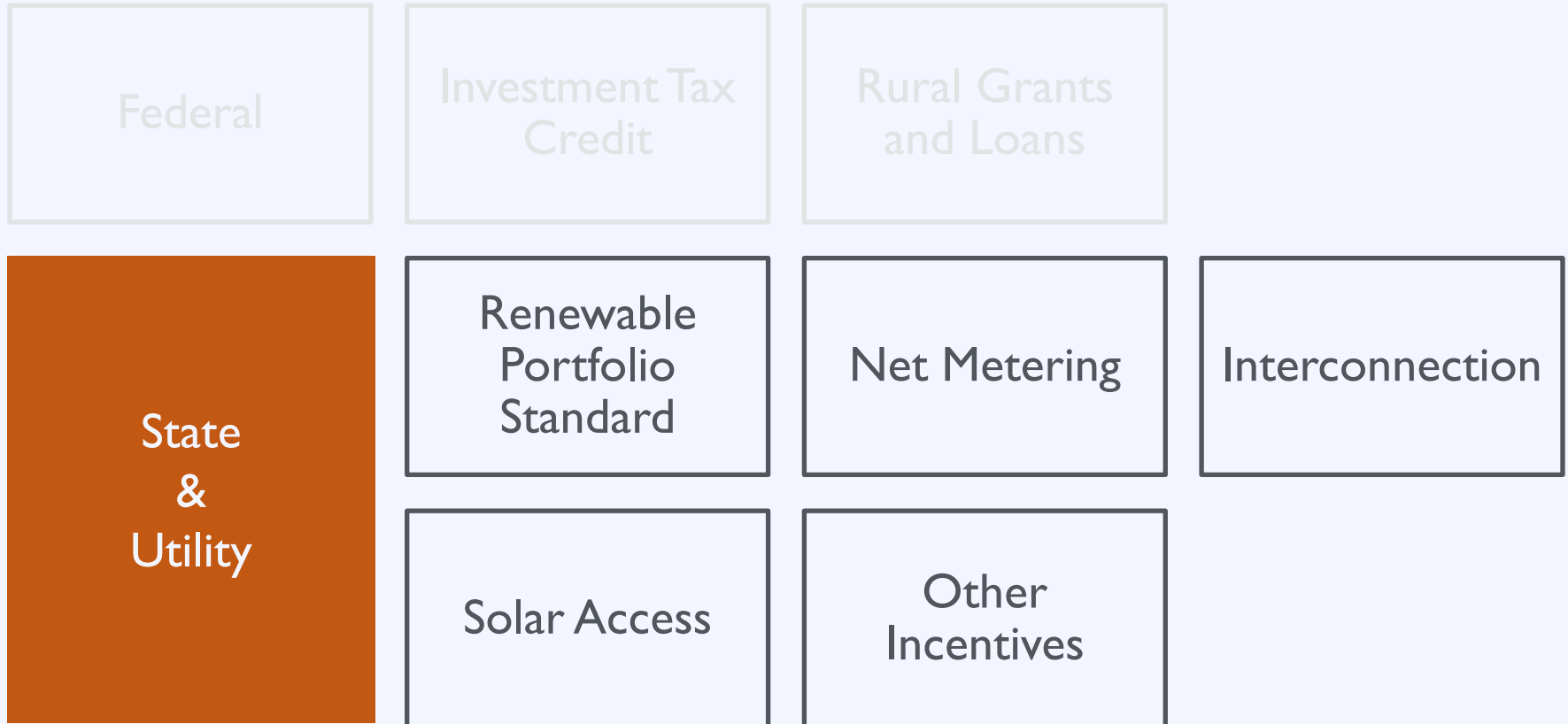
Low-cost lending based on treasury rate

Can be passed on to customers with on-bill repayment

Complex application process for non-RUS borrowers

<http://www.rd.usda.gov/programs-services/energy-efficiency-and-conservation-loan-program>

A Policy Driven Market

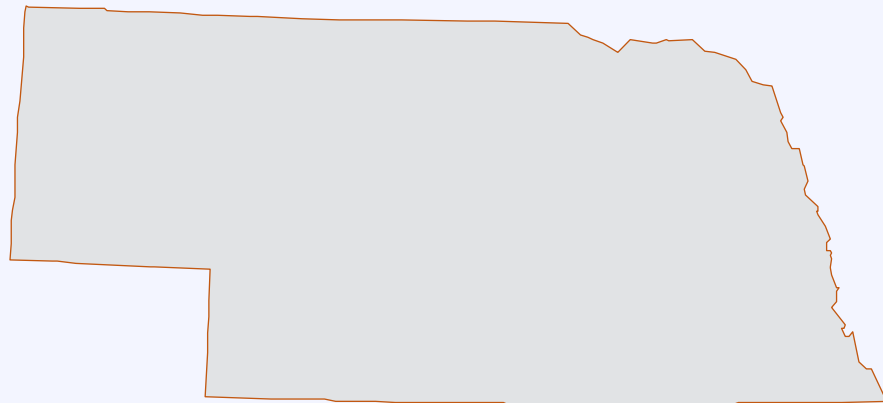


A Public Power State

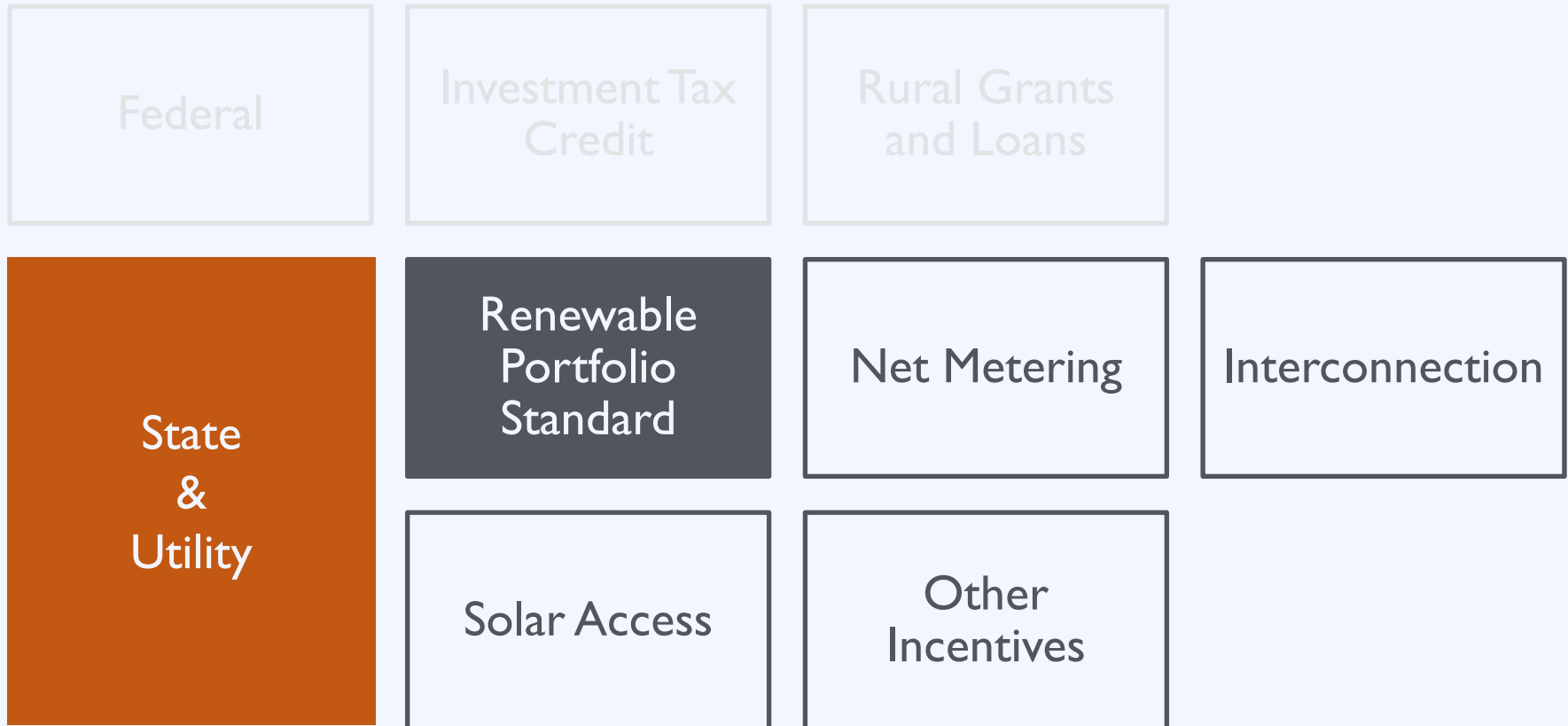
Nebraska is the

only US state

with no commercial utilities

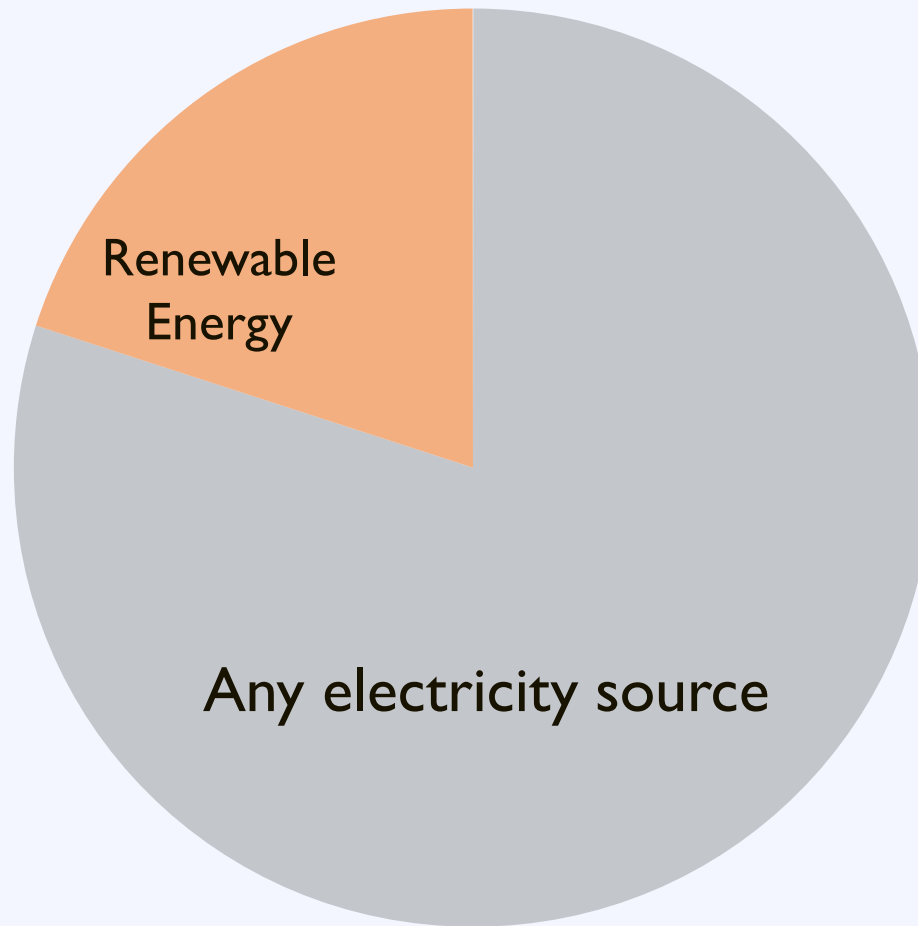


A Policy Driven Market



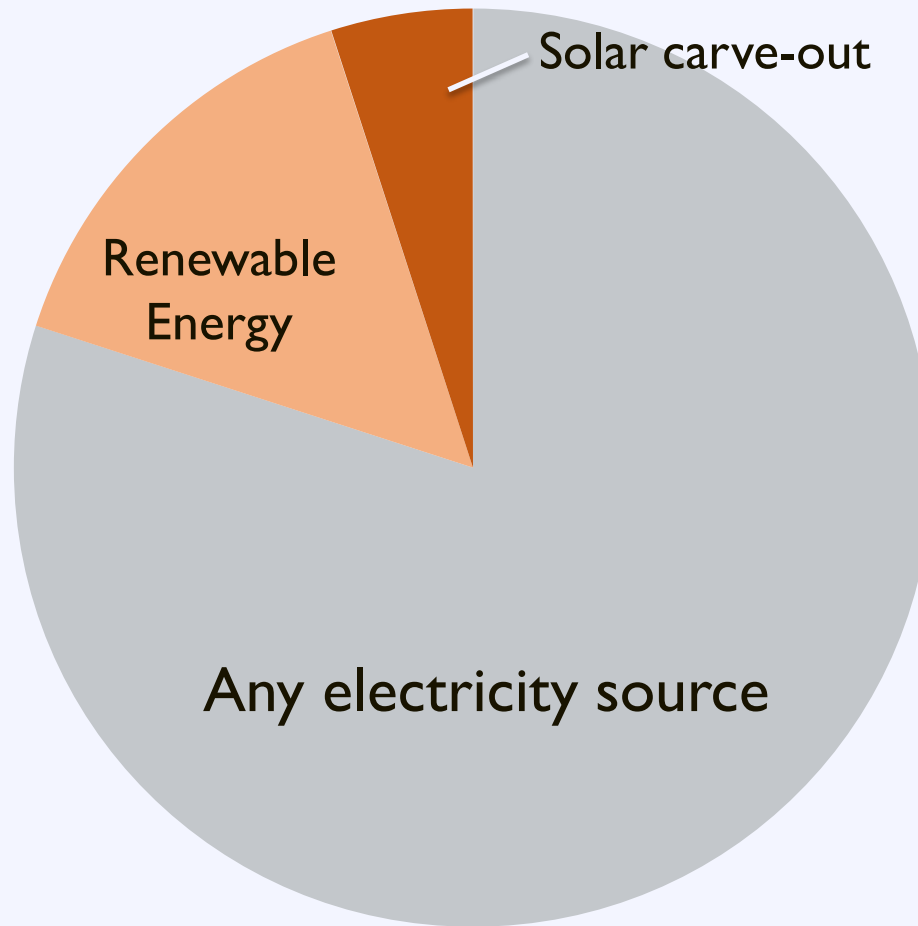
Renewable Portfolio Standard

Retail Electricity Sales



Renewable Portfolio Standard

Retail Electricity Sales



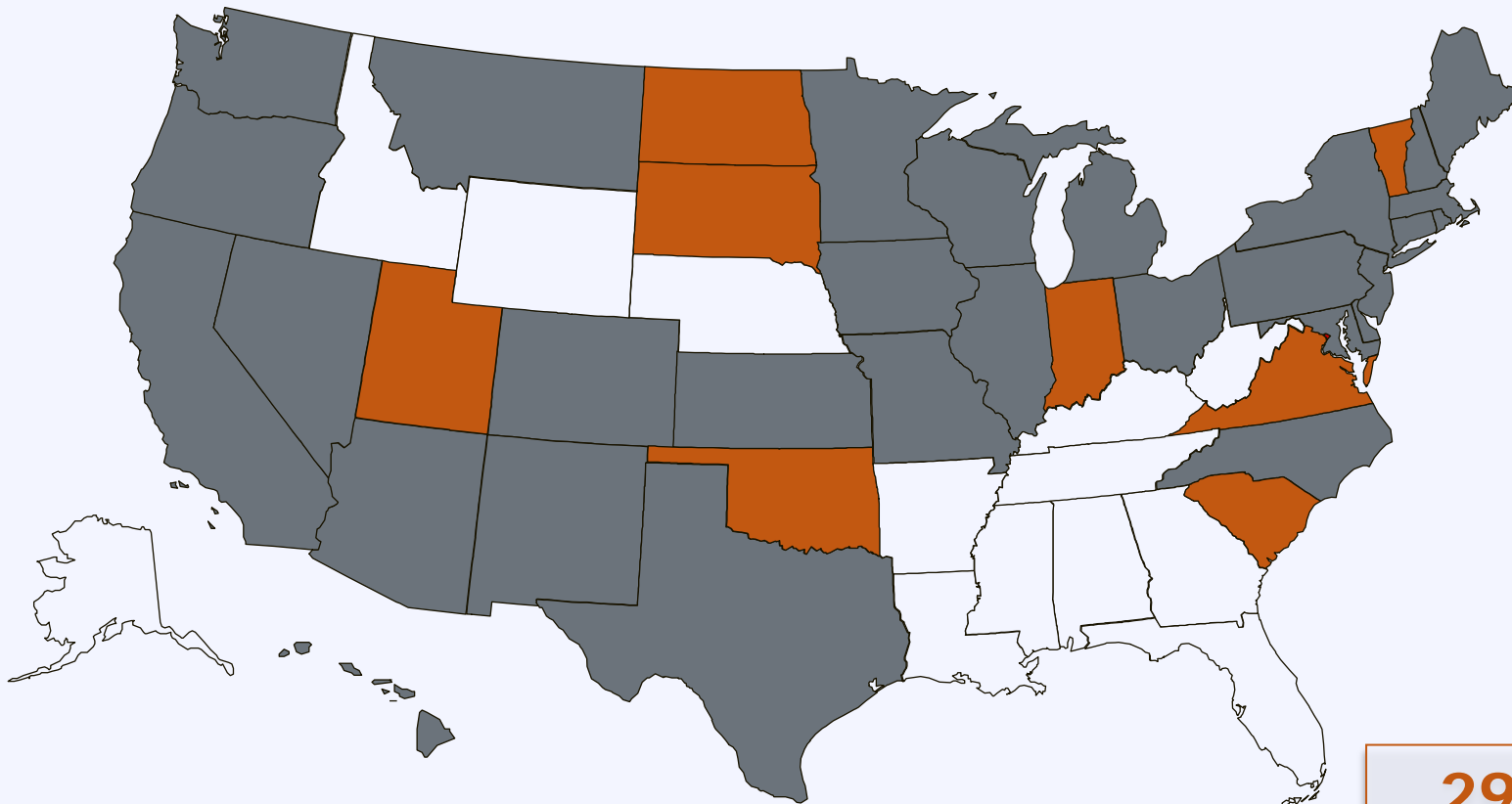
RPS Impacts: Solar Deployment

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

| Rank | State | RPS? | Solar/DG Provision? |
|------|----------------|------|---------------------|
| 1 | California | Y | N |
| 2 | Arizona | Y | Y |
| 3 | New Jersey | Y | Y |
| 4 | North Carolina | Y | Y |
| 5 | Nevada | Y | Y |
| 6 | Massachusetts | Y | Y |
| 7 | Hawaii | Y | N |
| 8 | Colorado | Y | Y |
| 9 | New York | Y | Y |
| 10 | New Mexico | Y | Y |

Renewable Portfolio Standard

www.dsireusa.org / March 2015

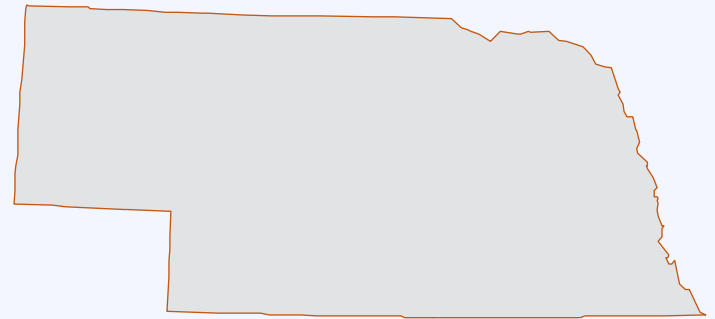


■ Renewable portfolio standard
■ Renewable portfolio goal

29 states +
Washington DC and 2
territories have
renewable portfolio
standards
*(8 states and 2 territories have
renewable portfolio goals)*

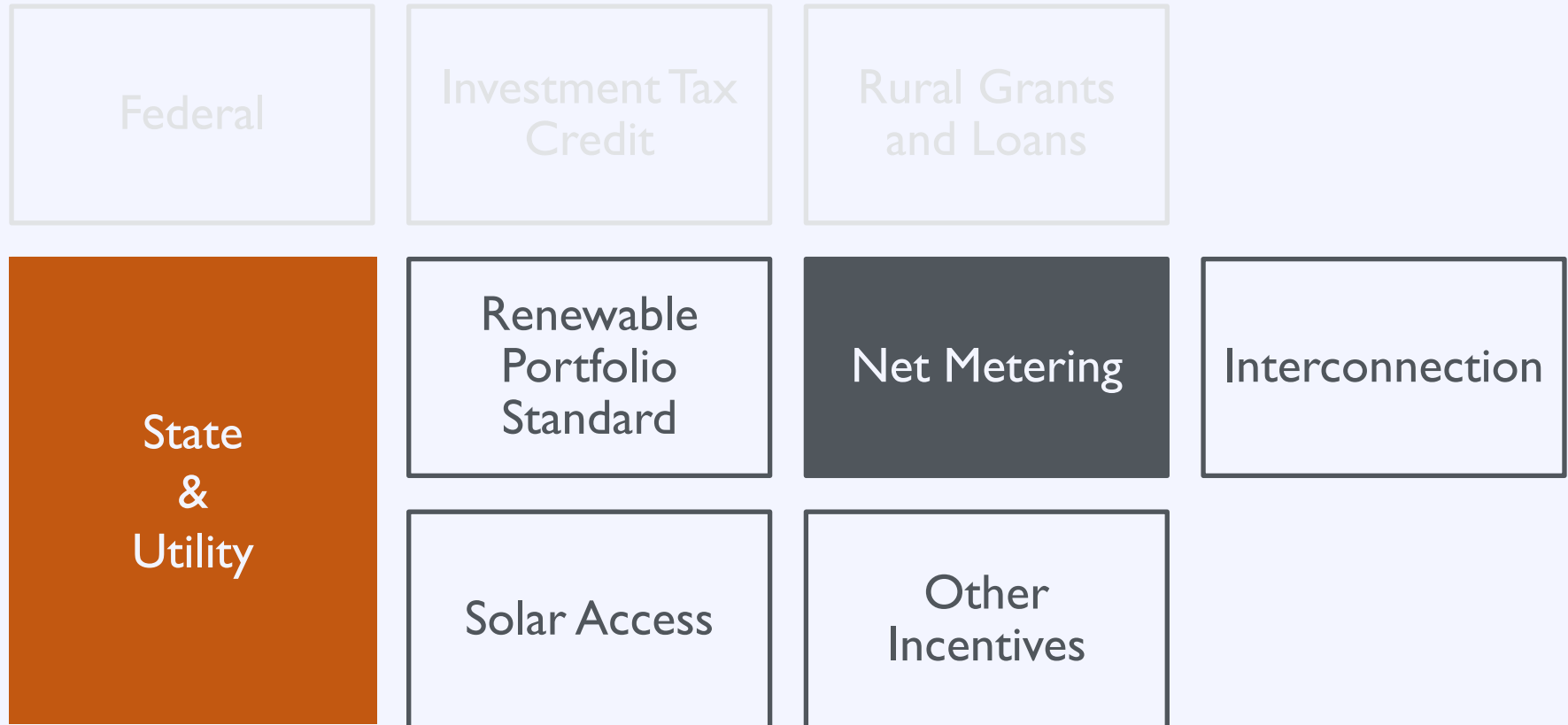
RPS: Nebraska Overview

No state requirement, though some utilities have set individual goals

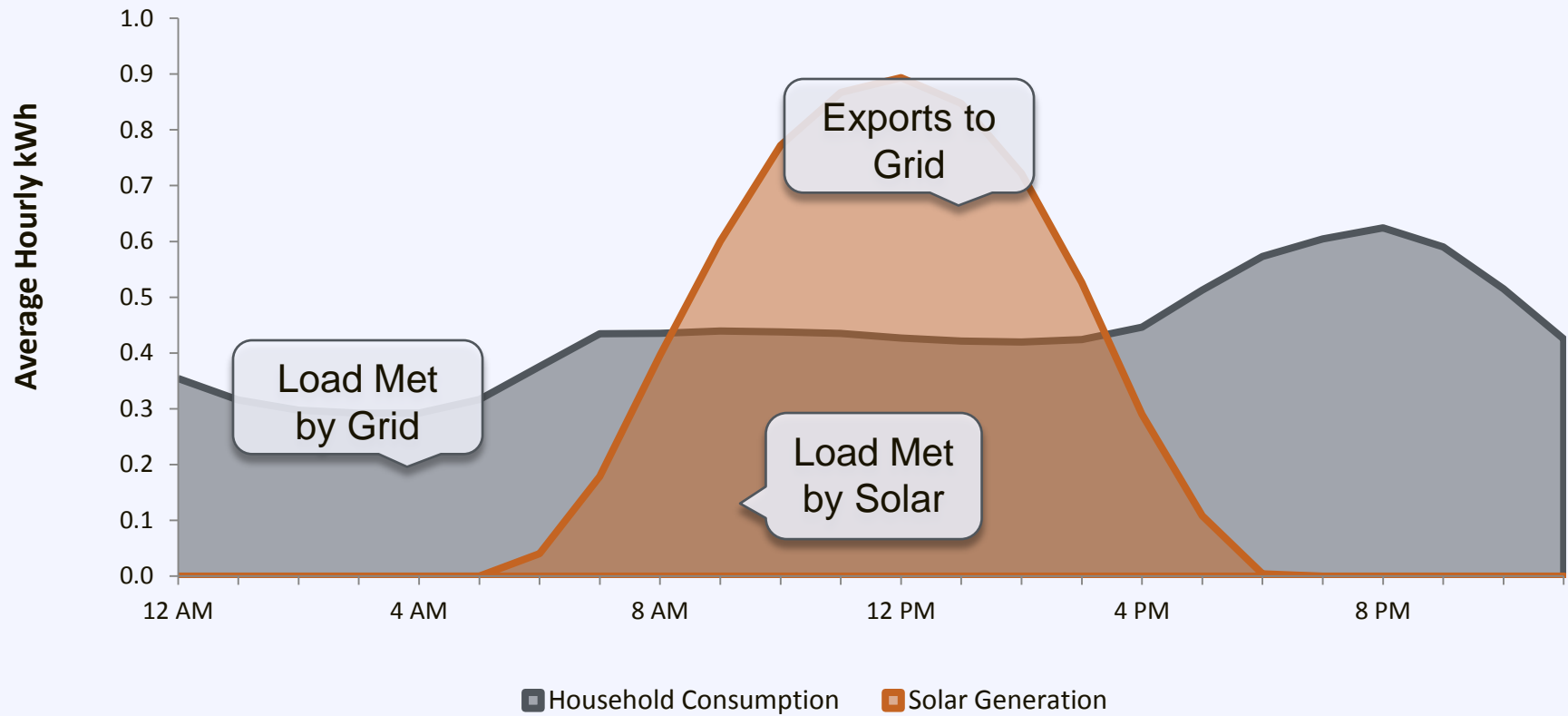


- Omaha Public Power District expects to be 33% renewable by 2018, primarily from wind
- Nebraska Public Power has a goal of 10% renewable energy by 2020

A Policy Driven Market



Net Metering



Net Metering

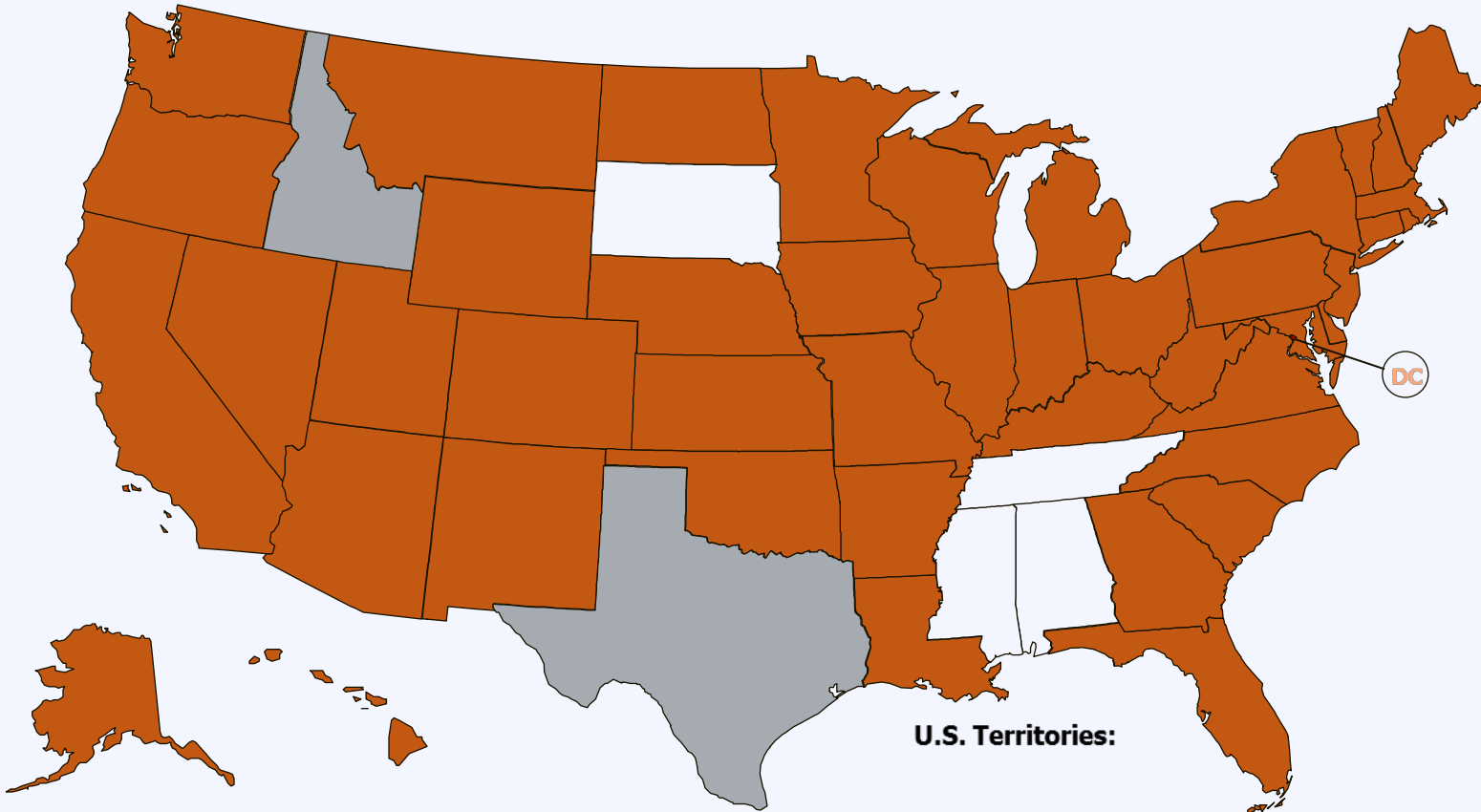
Net metering allows customers to export power to the grid during times of excess generation, and receive credits that can be applied to later electricity usage.

Net Metering: Market Share

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

Net Metering

www.dsireusa.org / March 2015



- State policy
- Voluntary utility program(s) only

U.S. Territories:

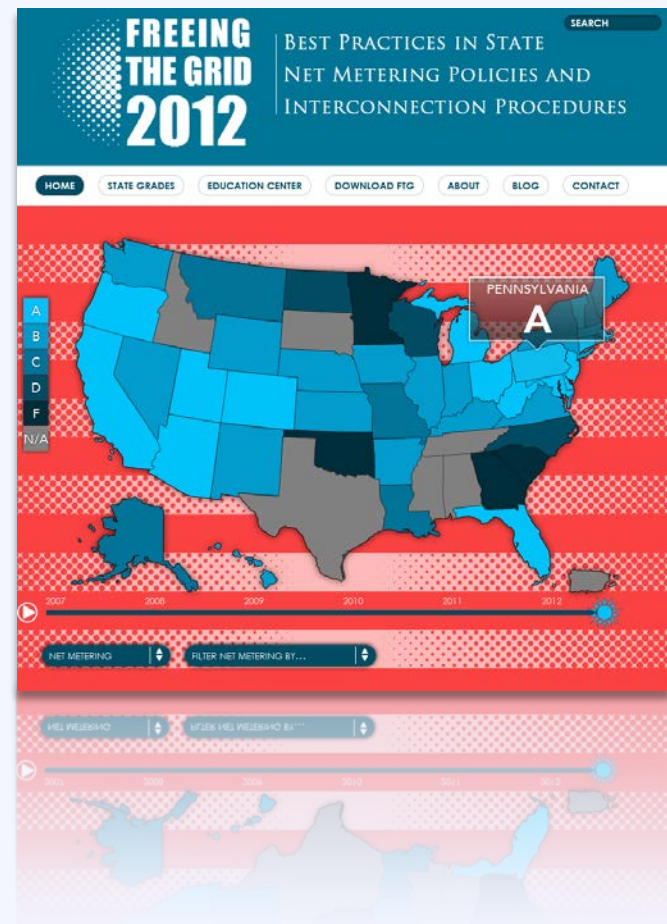
44 states, +
Washington DC and 4
territories have net
metering policies

Net Metering: Resources

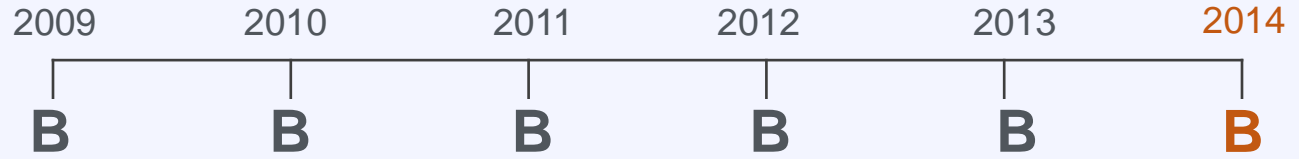
Resource **Freeing the Grid**

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

<http://freeingthegrid.org/>



Net Metering: Nebraska



Applicable Utilities
All Utilities



Credit Rollover
Monthly excess credits
valued at utility avoided cost

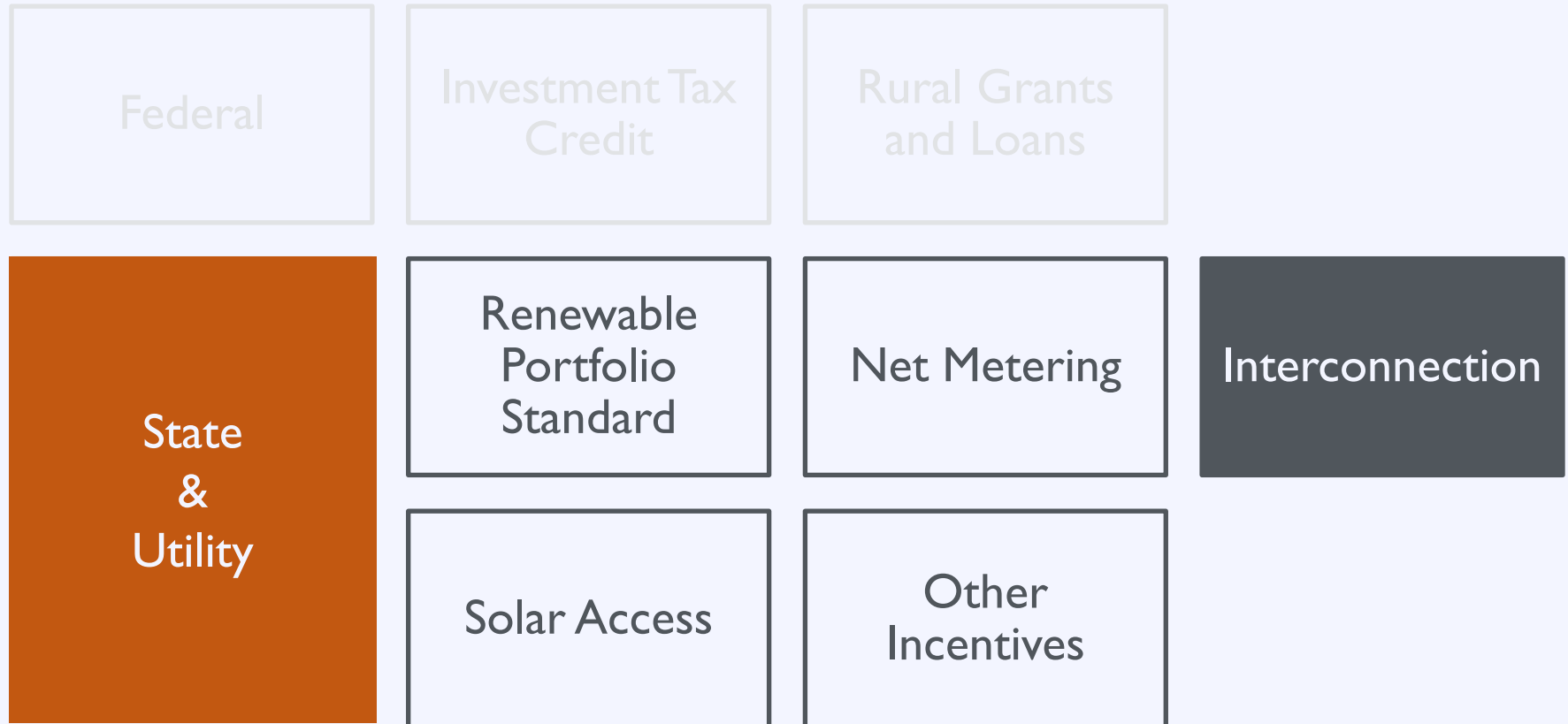


**System Capacity
Limit**
25 kW



Program Capacity
1% of utility's average
monthly peak load

A Policy Driven Market

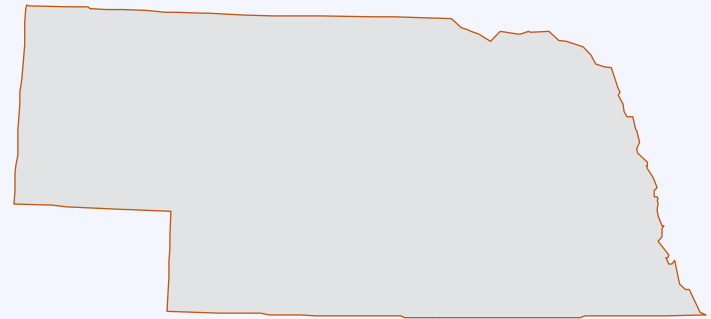


Interconnection

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: Nebraska

Interconnection process varies by utility



- Utilities must allow interconnection of systems under 25 kW, subject to technical requirements
- Customers must pay for any necessary distribution grid upgrades
- Omaha Public Power District offers single-page interconnection application for systems < 10 kW

A Policy Driven Market



Solar Access



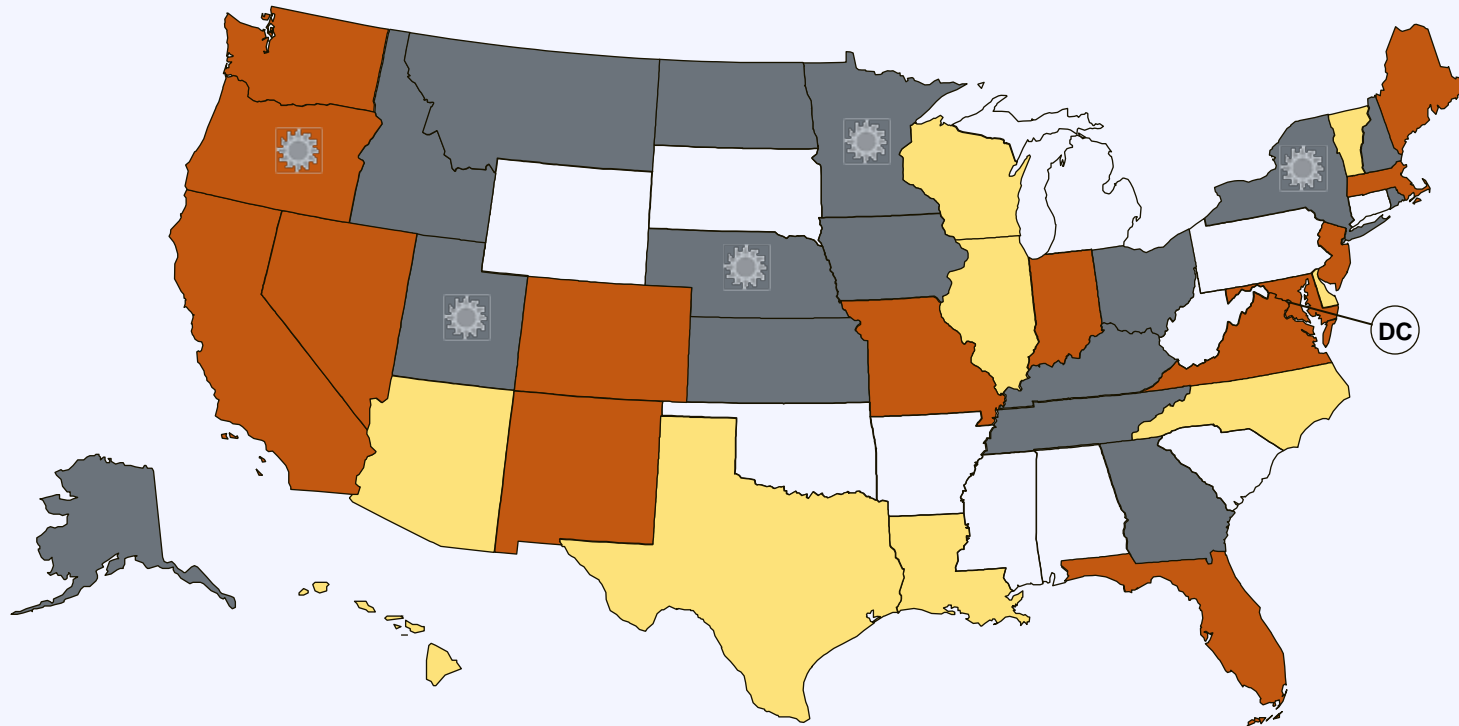
A landowner does not have any legal right to the free flow of light and air across the adjoining land of his neighbor

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



■ Solar Easements Provision

■ Solar Rights Provision

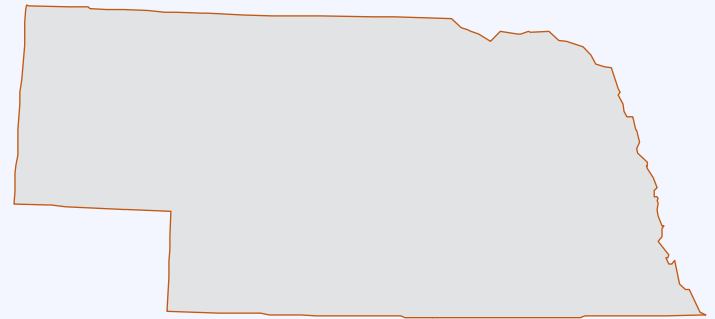
■ Solar Easements and Solar Rights Provisions

● U.S. Virgin Islands

⚙ Local option to create solar rights provision

Interconnection: Nebraska

Solar easements allowed state-wide



Municipalities able to pass solar rights legislation

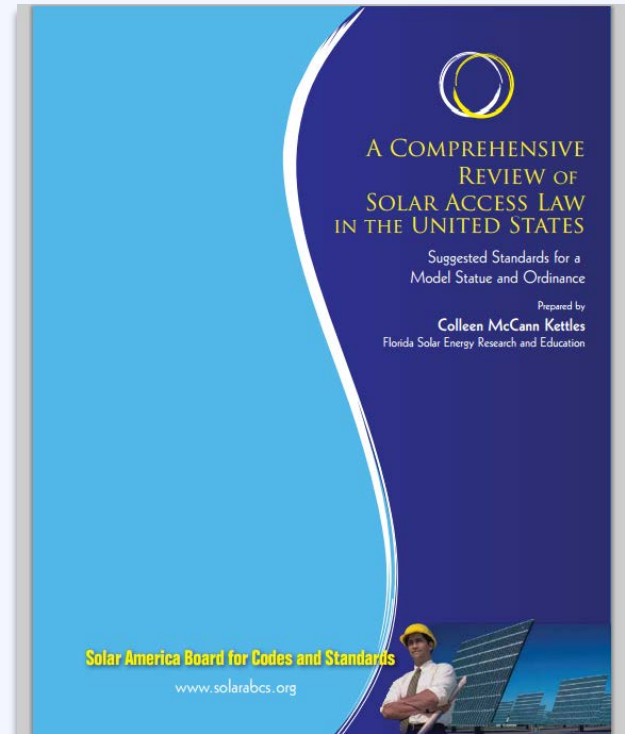
- Permitted to adopt regulations, ordinances, or other plans protecting access to solar
- May grant variances to solar systems that would otherwise be prohibited by existing regulations

Solar Access

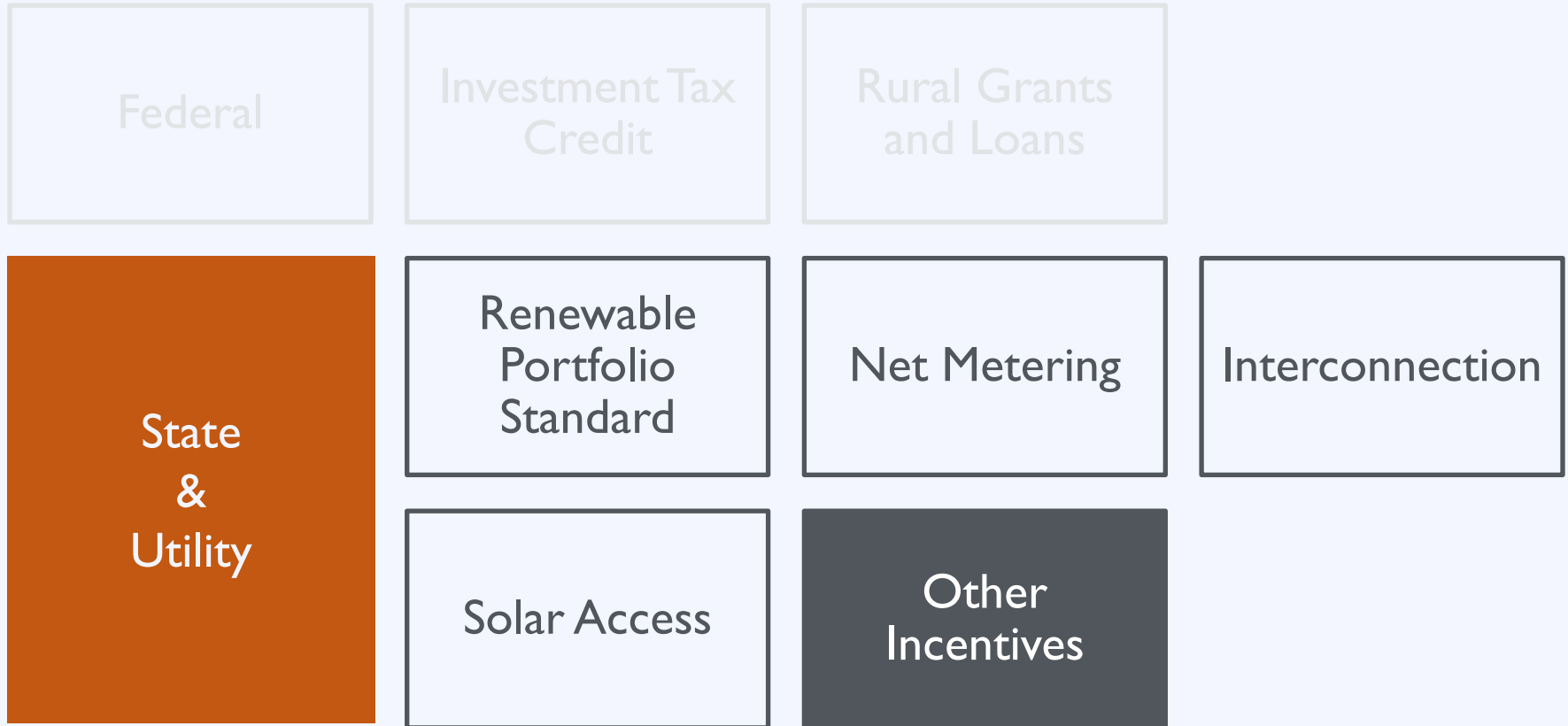
Resource Solar America Board for Codes & Standards

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

www.solarabcs.org



A Policy Driven Market



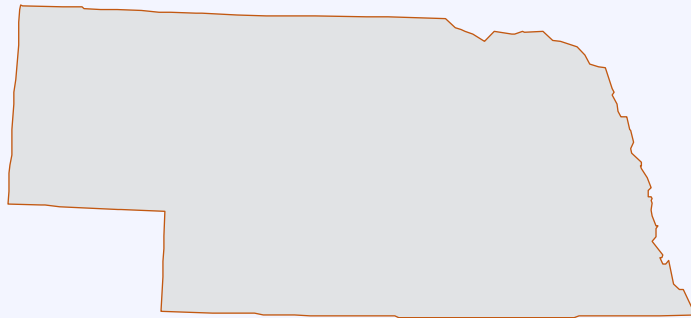
Other Nebraska State Policies

Very small statewide residential tax credit

- Roughly \$35 over life of system

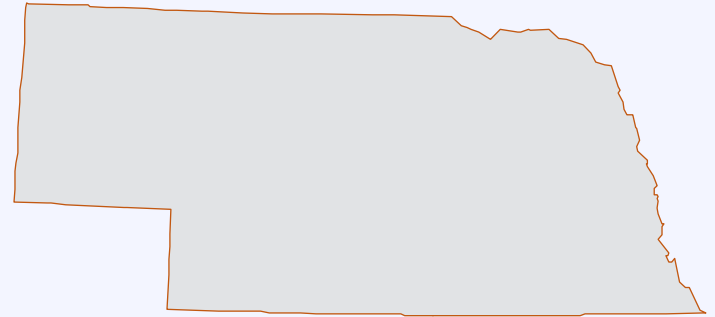
Utilities able to offer larger incentives

- Lincoln Electric offers rebates up to \$0.475/W



A Policy Driven Market

To summarize...



- Main federal incentive expires at end of 2016
- Net metering makes small-scale solar possible in Nebraska
- Very limited policy support beyond NEM
- Opportunities for cooperative and municipal utilities to take the lead

Agenda

- 10:20 – 10:50 Putting Solar Energy on the Local Policy Agenda
- 10:50 – 11:20 State of the Local Solar Market
- 11:20 – 11:50 Federal, State, and Utility Policy Drivers
- 11:50 – 12:15 Break and Grab Lunch**
- 12:15 – 12:50 Planning for Solar: Getting Solar Ready
- 12:50 – 1:30 Solar Market Development Tools
- 1:30 – 1:40 Break
- 1:40 – 2:10 Municipal Procurement
- 2:10 – 2:50 Developing and Solar Policy Implementation Plan for

Your Community and Next Steps

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Your Community and Next Steps

Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Solar in Development Regulation

Effective Solar Permitting Process

Solar Market Development Tools

Effective Local Solar Policy

Local Solar
Policy

Planning for
Solar

Visioning &
goal setting

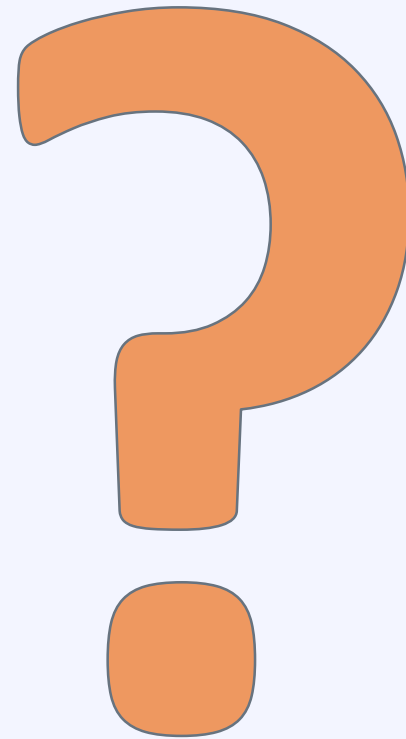
Effective Solar
Permitting
Process

Solar Market
Development
Tools

How much do you agree that...

Solar advances your energy goals?

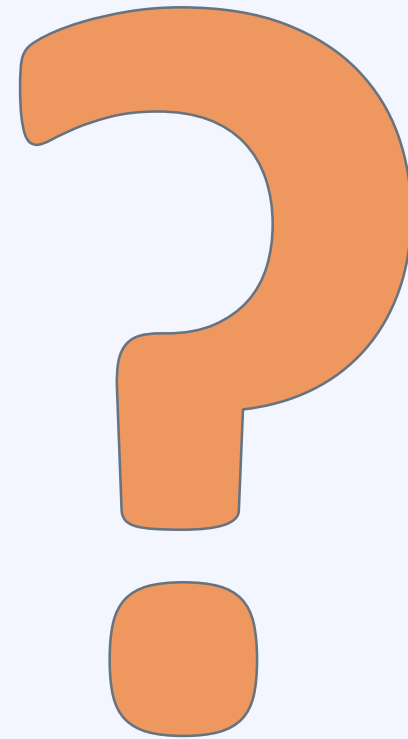
- A. Strongly Agree
- B. Agree
- C. Neutral
- D. Disagree
- E. Strongly Disagree



How much do you agree that...

Solar advances your economic development goals?

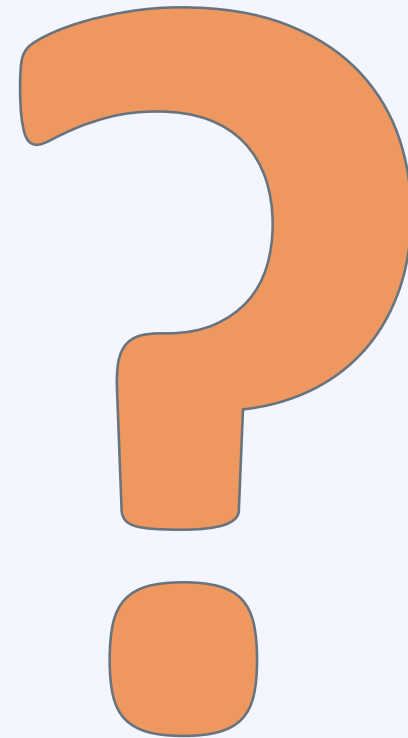
- A. Strongly Agree
- B. Agree
- C. Neutral
- D. Disagree
- E. Strongly Disagree



How much do you agree that...

Solar advances your environment & health goals?

- A. Strongly Agree
- B. Agree
- C. Neutral
- D. Disagree
- E. Strongly Disagree



Visioning: Scales & Contexts

Poll

Is solar on residential rooftops appropriate for your community?

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



Visioning: Scales & Contexts

Poll

Is solar on
commercial
rooftops
appropriate for
your community?

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



Visioning: Scales & Contexts

Poll

Is solar on historic structures appropriate for your community?

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



Visioning: Scales & Contexts

Poll

Is solar on
brownfields
appropriate for
your community?

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



Visioning: Scales & Contexts

Poll

Is solar on greenfields appropriate for your community?

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



Visioning: Scales & Contexts

Poll

Is solar on parking lots appropriate for your community?

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



Visioning: Scales & Contexts

Poll

Is building-integrated solar appropriate for your community?

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



Planning for Solar Development

Communitywide Comprehensive Plan

Neighborhood
Plans

Corridor Plans

Special District
Plans

Green
Infrastructure
Plans

Energy Plan

Climate Action
Plan

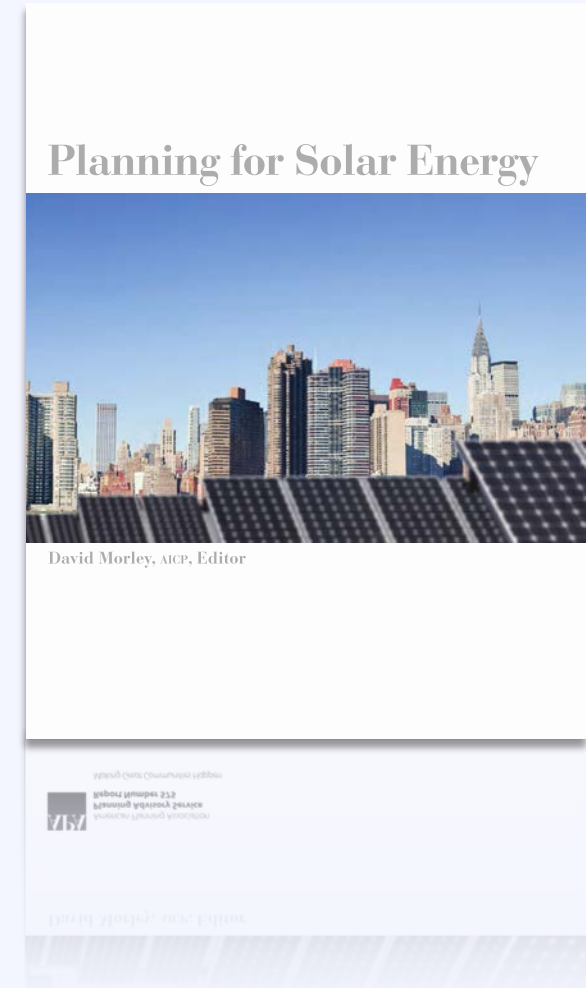
Technical Resources

Resource

Planning for Solar Energy

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

Solar in
Development
Regulation

Effective Solar
Permitting
Process

Solar Market
Development
Tools

Zoning Standards

| Section | Topics to Address |
|------------------------------|--|
| Definitions | Define technologies & terms |
| Applicability | Primary vs. accessory use |
| Dimensional Standards | <ul style="list-style-type: none">• Height• Size• Setbacks• Lot coverage |
| Design Standards | <ul style="list-style-type: none">• Signage• Disconnect• Screening• Fencing |

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

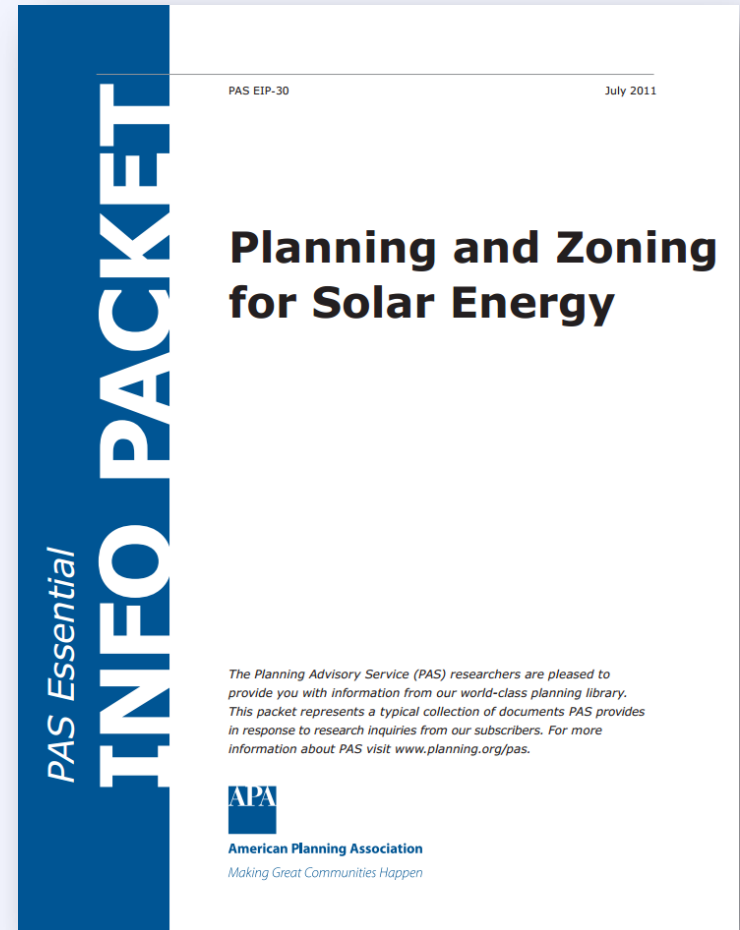


Zoning Standards: Model Ordinances

Resource

American Planning Association

This Essential Info Packet provides example development regulations for solar.



Zoning Standards: Historic

Typical Requirements:

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



Solar installation on rear of building out of sight from public right of way
Heritage Hill Historic District of Grand Rapids, Michigan
(Source: Kimberly Kooles, NC Solar Center)

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.

Installing Solar Panels on Historic Buildings

A Survey of the Regulatory Environment

August 2012

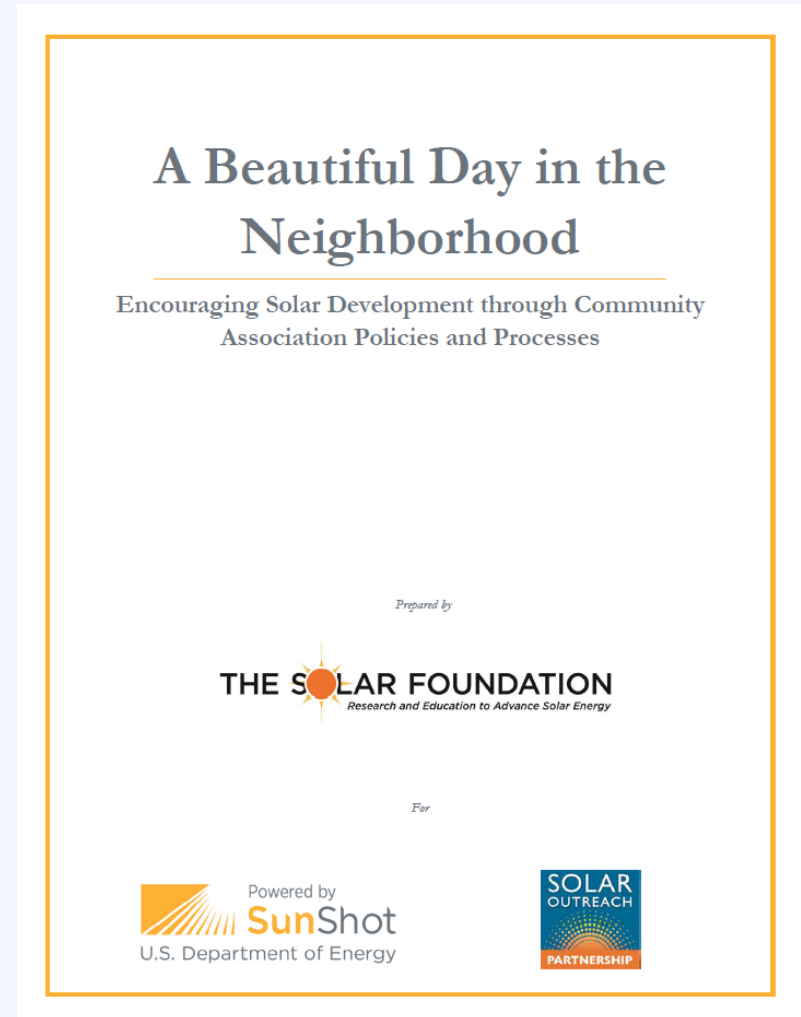
Prepared by



Private Rules on Residential Solar

Resource The Solar Foundation

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



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

Update Building Code

Solar Ready Construction:

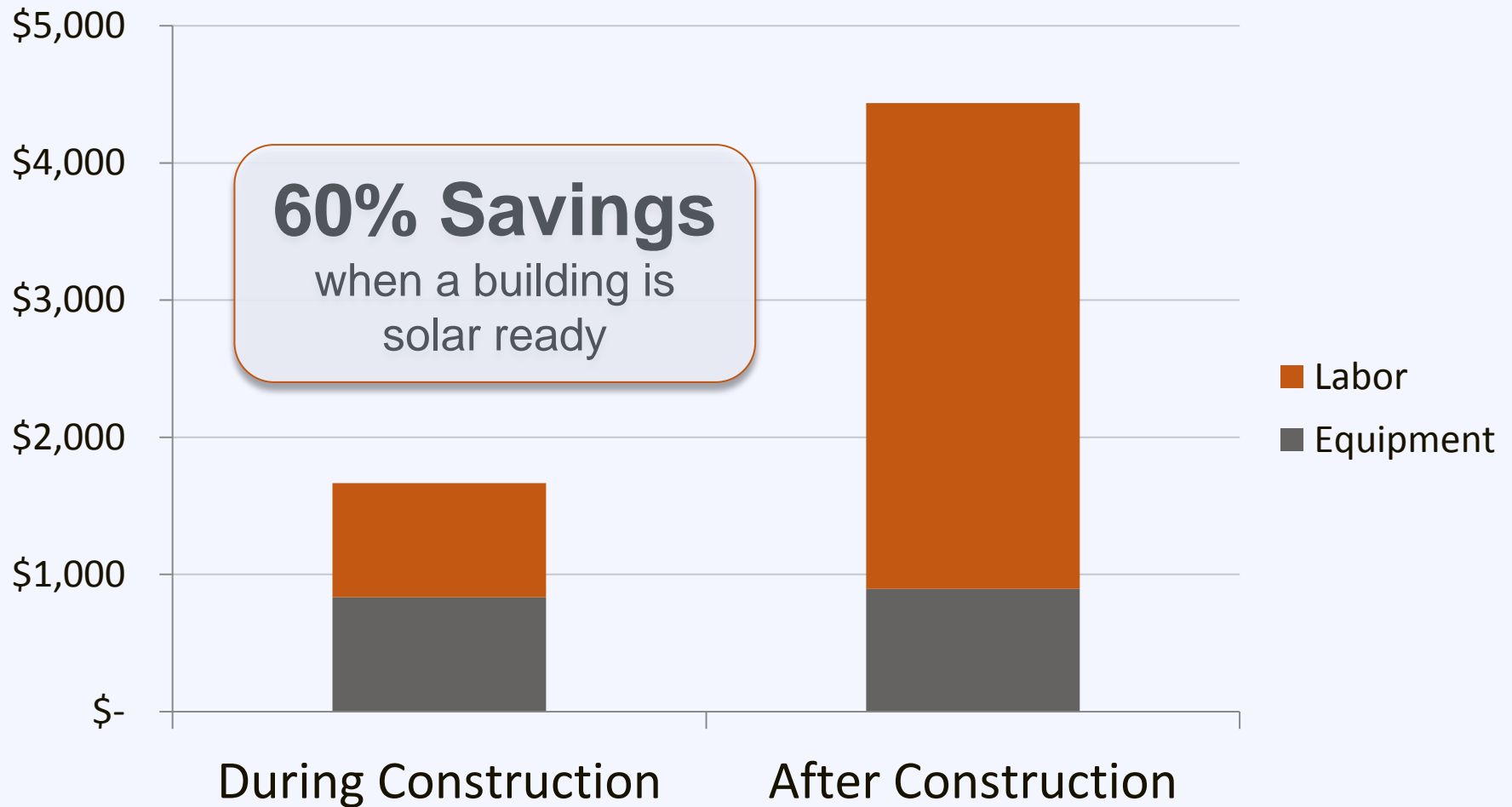
Preparing a building for solar at the outset can help make future solar installations easier and more cost effective.

Update Building Code

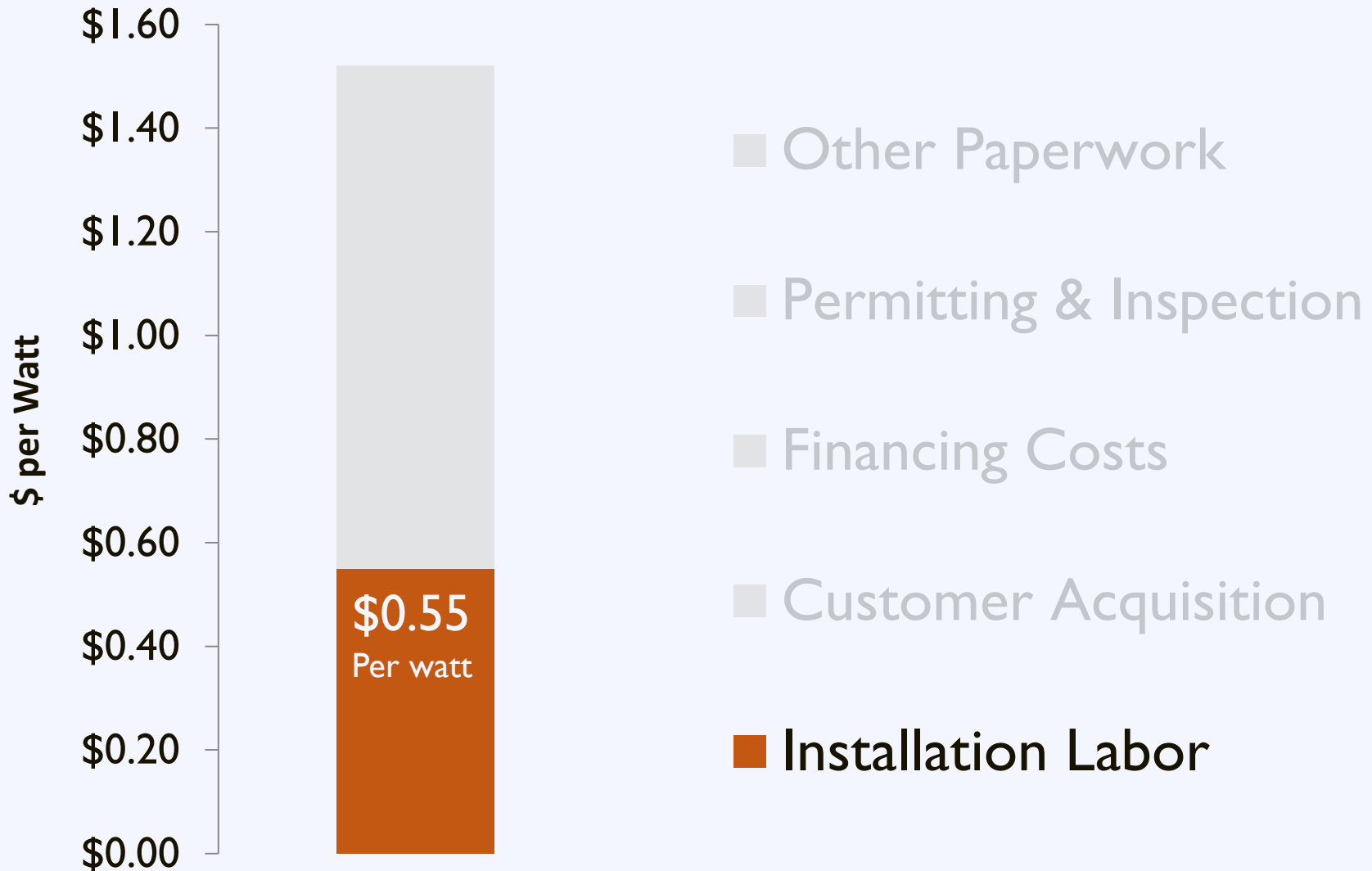
Require builders to:

- ✓ 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

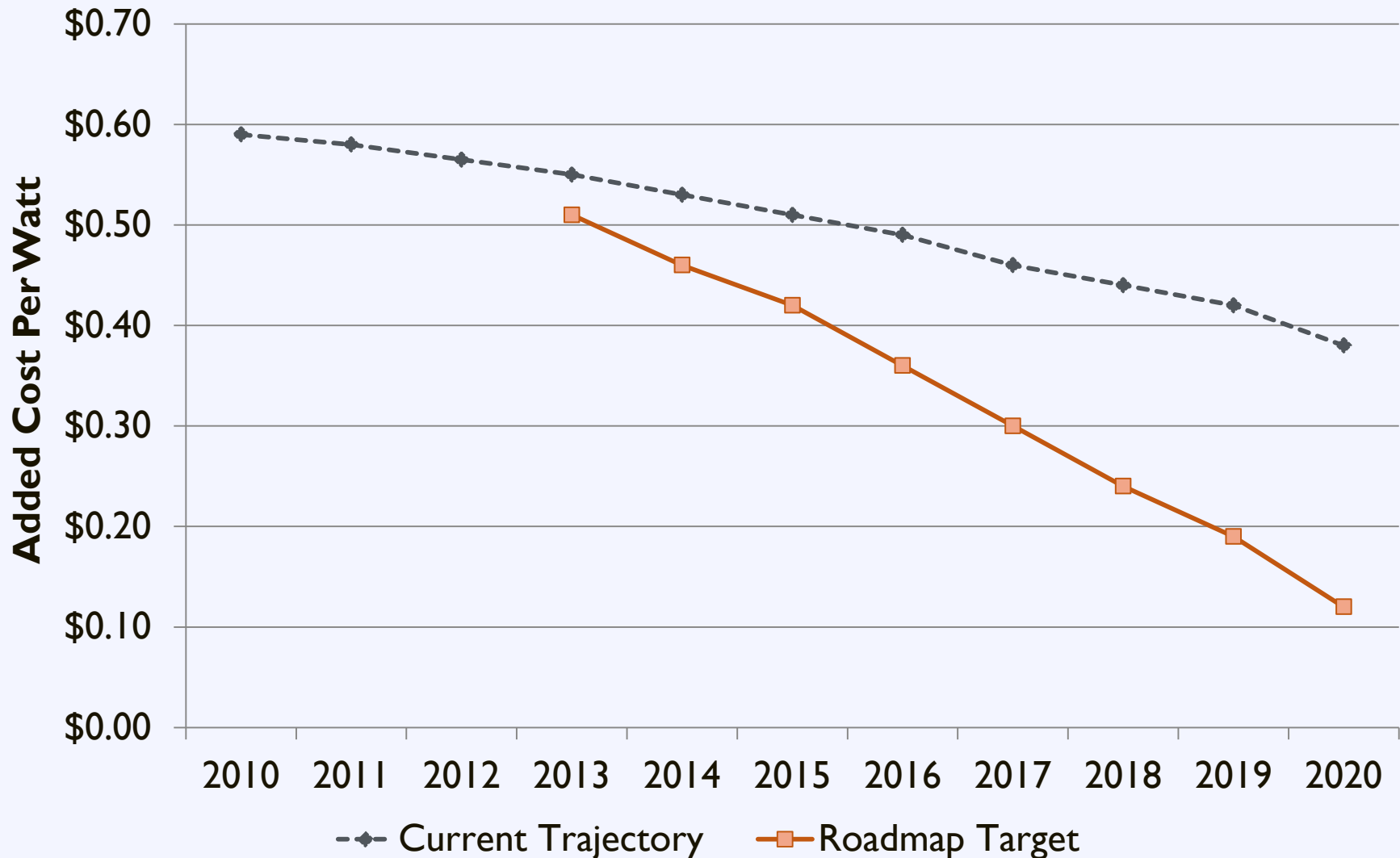
Update Building Code



Installation Soft Costs



Installation Labor Roadmap



Effective Local Solar Policy

Local Solar
Policy

Planning for
Solar

Solar in
Development
Regulation

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Permitting
Process

Solar Market
Development
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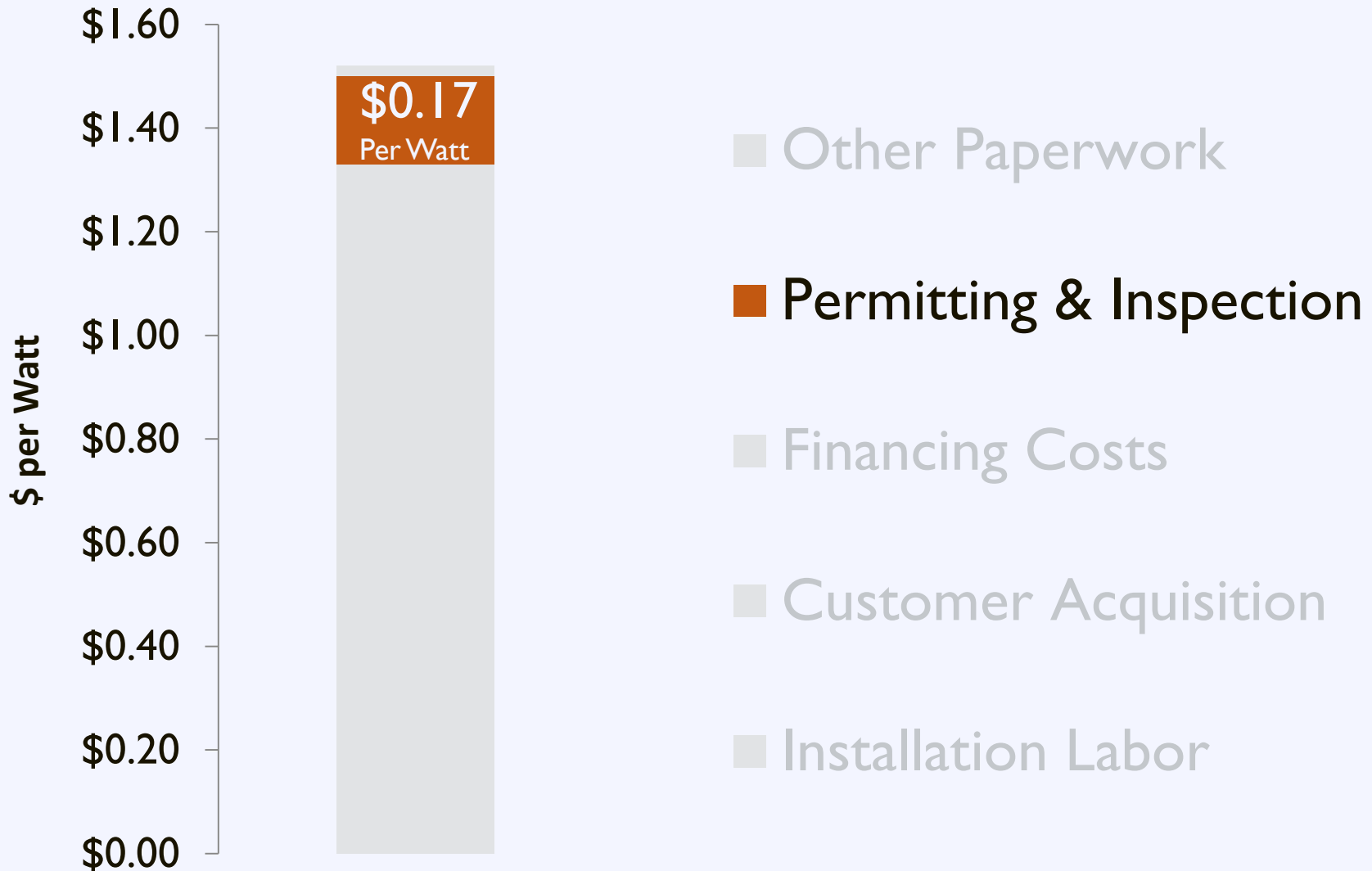
Challenge: Inconsistency

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

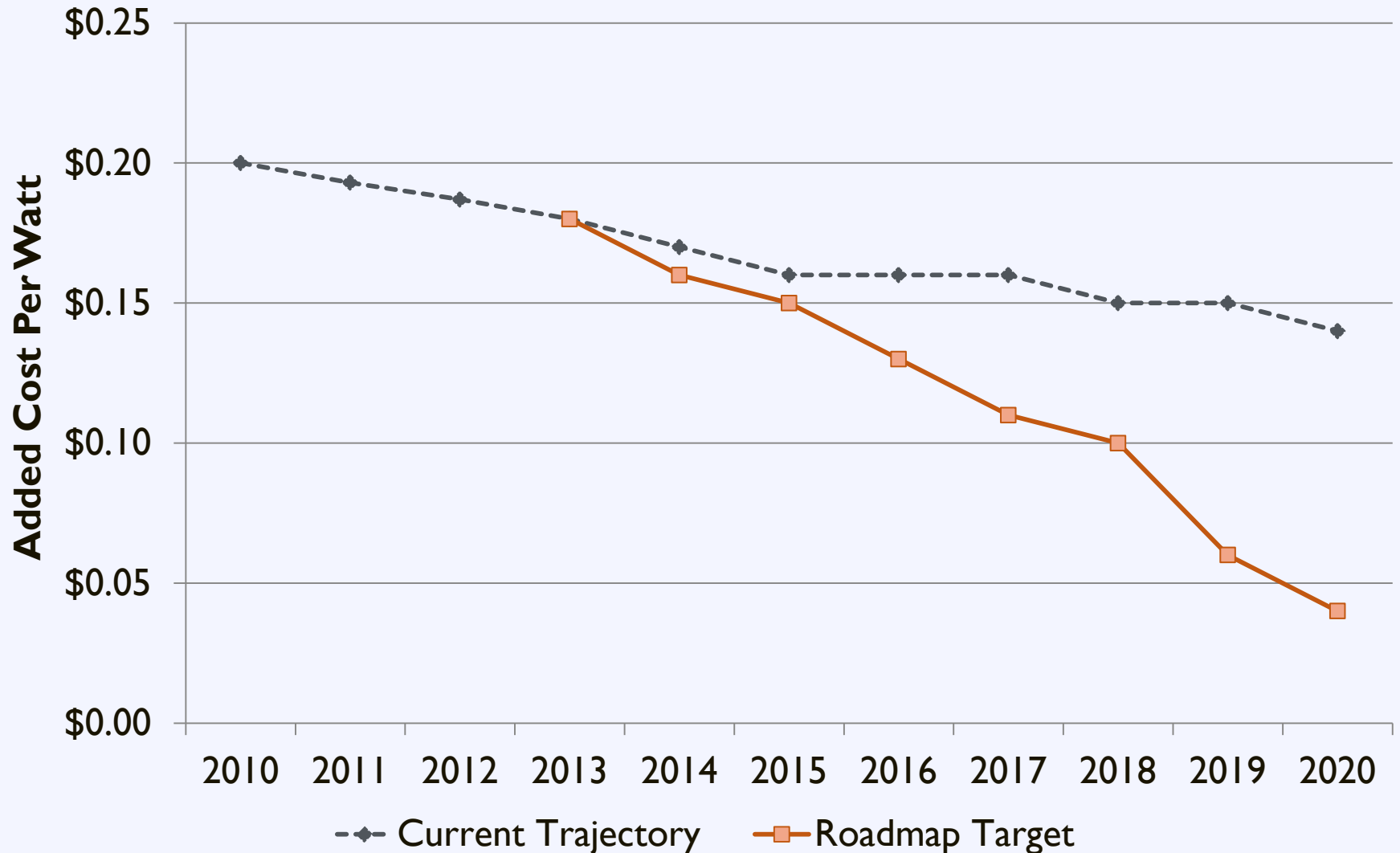
Consumer Challenges



Regulatory Barriers



Planning & Permitting Roadmap



Identifying Challenges

Solar Developer Perspective:

- Unclear or inconsistent requirements
- Lengthy application review process, even for small projects
- High or inconsistent fees
- Multiple inspections and long inspection appointment windows
- Lack of familiarity with solar

Added together, these cost a lot of time and money!

Identifying Challenges

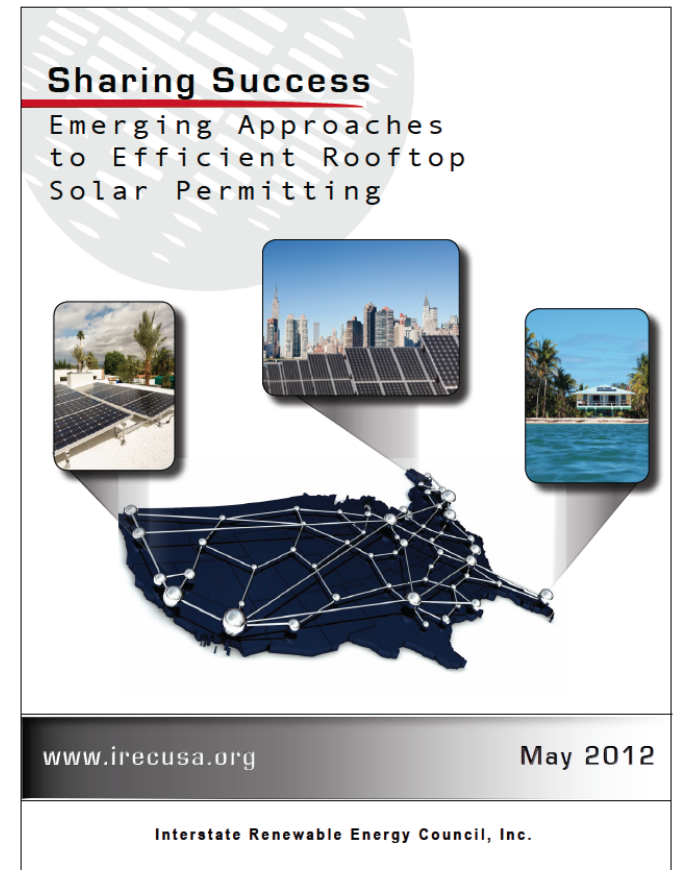
Local Government Perspective:

- Solar permitting is a small portion of everything else local governments do
- Many local governments are resource-constrained
- Inexperienced installers submit incomplete applications
- Installations do not match design drawings

Importance of balancing government needs and demands with encouraging solar energy and economic development

Implementing Improvements

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



Expedited Permitting

Solar Permitting Best Practices:

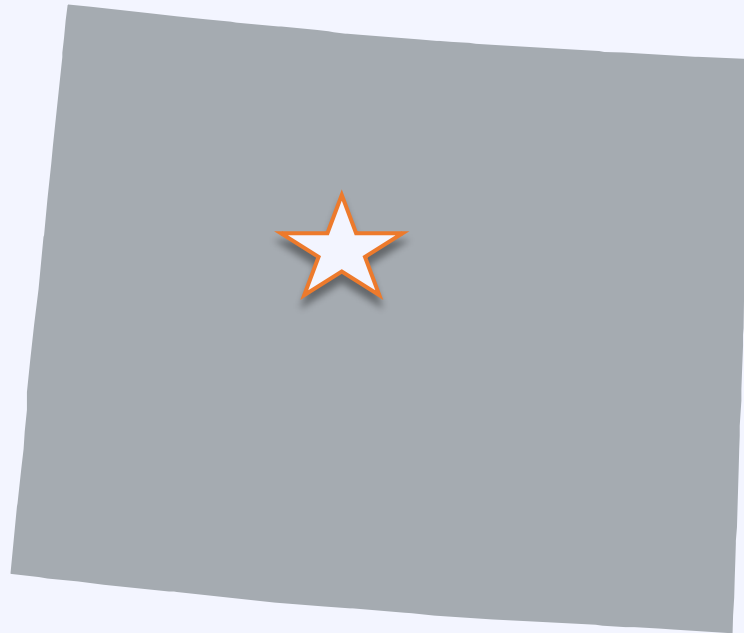
- ✓ Post Requirements Online
- ✓ Implement an Expedited Permit Process
- ✓ Enable Online Permit Processing
- ✓ Ensure a Fast Turn Around Time

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

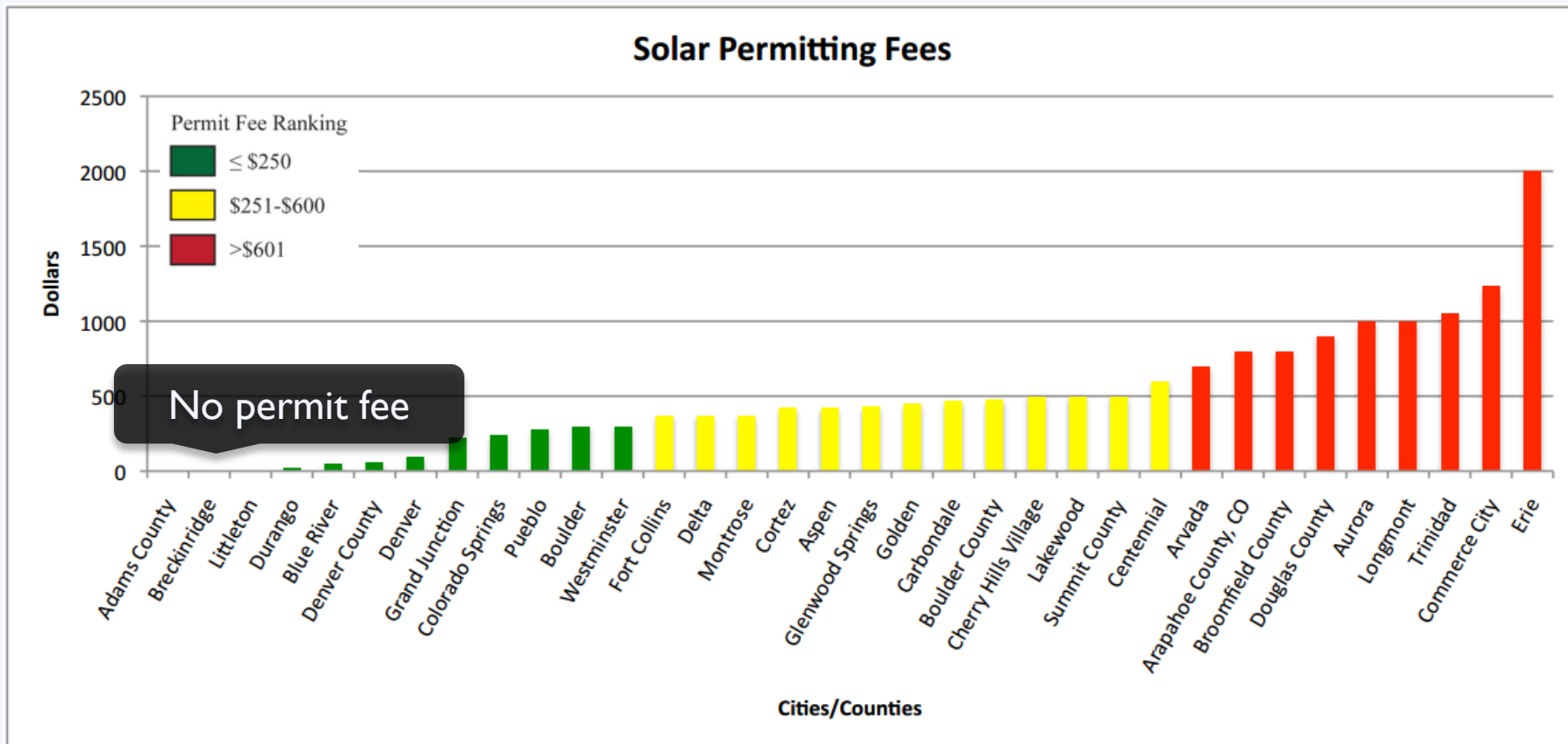
Expedited Permitting: Case Study



Breckenridge, Colorado
Population: 4,540

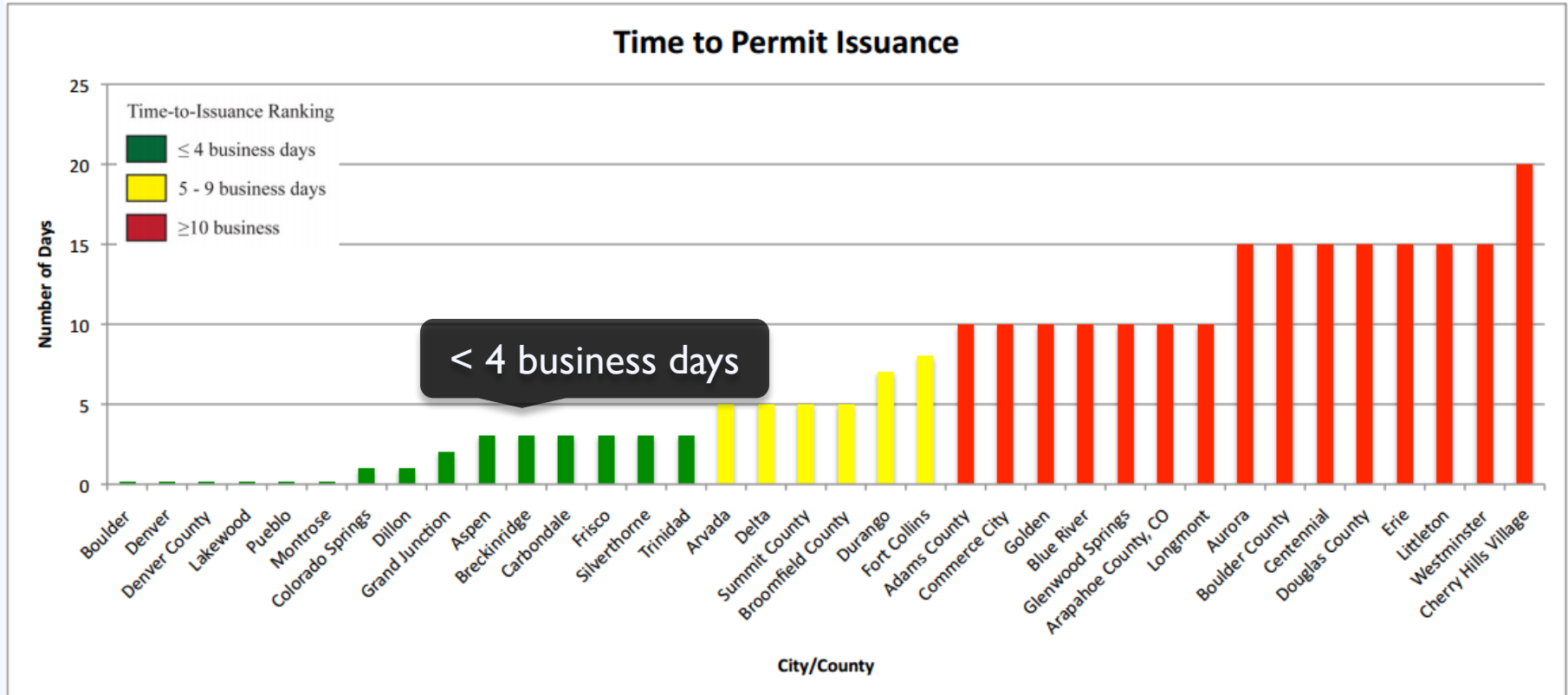
Expedited Permitting: Case Study

Breckenridge charges no fees to file for a solar permit



Expedited Permitting: Case Study

Breckenridge offers a short turn around time for solar permits



Expedited Permitting: Case Study

Jobs | FREE RIDE | Forms & Documents | Town Calendar | Contact Us | Water Bill Access | Text Size + -

TOWN OF BRECKENRIDGE

BRECKENRIDGE COLORADO

Quick Links Search... GO

HOME ABOUT BRECKENRIDGE GOVERNMENT DEPARTMENTS & SERVICES ARTS RECREATION WHAT'S NEW I WANT TO...

Electronic materials

▼ Building Department

- Adopted Building Codes and Amendments
- Climactic and Geographical Design Criteria 2006 IRC Table R301.2(1)
- Permits and Applications
- Inspections
- Electrical, Mechanical & Plumbing Applications
- Hot Tub Permits
- **Solar Panel Permits**
- Frequently Asked Questions
- Contractor's Licensing

How Much Will My Permit

Solar Panel Permits

E-mail Print

BUILDING & PLANNING DEPARTMENT REQUIREMENTS FOR PHOTOVOLTAIC (SOLAR PANEL) INSTALLATIONS

The solar panel installer is responsible for insuring that all of the code requirements are met and permits issued.

Required permits are: Development, Building and Electrical Permits.

Planning Department / Development Permit Requirements:

- Outside of the Conservation District, [Class D Permit](#)
- Within the Conservation District, [Class C Minor Permit](#)
- Letter of approval from the Homeowners Association (strongly suggested)

Refer to the [Breckenridge Development Code](#), reference [Section 9-1-19, Policy 5 \(Absolute\)](#) regarding solar panel policies

Building Department Permits / Building & Electrical Permit Requirements:

- Meet with a Town of Breckenridge Planner (see above requirements)
- [Building Permit](#) (Submit a completed building permit application, along with two photovoltaic system electrical diagram drawings, stamped by a Colorado licensed engineer)
- [Electrical Permit](#)

Contractor Requirements

- Must be certified by North American Certified Energy Practitioners (www.nabcep.org)
- Must have a current Town of Breckenridge [Business License](#), available through the Town

Standardized permit requirements

Permitting: Best Practices

Resource Interstate Renewable Energy Council

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

Simplifying the Solar Permitting Process Residential Solar Permitting Best Practices Explained

To aid communities in designing effective and efficient solar permitting processes, the Interstate Renewable Energy Council, Inc. (IREC) and The Vote Solar Initiative have identified nine [Residential Solar Permitting Best Practices](#). This document provides additional context for these Best Practices and relevant resources to help communities implement them. For more detail on the examples of where the Best Practices listed below have been implemented as well as additional resources see [Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting](#).

1. Post Requirements Online

What does this mean? The municipality should have a website that offers a one-stop location for residents, businesses and installers to get all necessary information on obtaining a solar permit in that municipality or region. In particular, the website should include a clear description of the requirements and process for getting a solar permit, including any necessary forms, and information on fees and inspections. The website could also contain checklists for the application and inspection requirements for solar.

Who is already doing it?

Solar One Stop (Pima County and City of Tucson, Arizona), solaronestopaz.org

San Jose, CA, www.sanjoseca.gov/index.aspx?nid=1505

Berkeley, CA, www.cityofberkeley.info/solarpermitguide

Why do it? Making these resources easily accessible to solar installers can reduce the number of questions that municipal staff have to answer and can improve the efficiency of the permitting process for all involved. In addition, it can help to increase the quality of applications submitted, which in turn decreases the time required for review. It also decreases the frustrating back-and-forth that installers and municipal staff may otherwise experience. Providing these resources can be particularly helpful for new installers or those that are new to that specific municipality. If a municipality has unique or unusual requirements, or has recently modified their process or requirements, the website is a good way for the municipality to identify these differences clearly to installers and residents.

Additional Resources

IREC Solar Permitting Checklists and Guidance Documents, www.irecausa.org/wp-content/uploads/permitting-handout6-1.pdf

IREC Inspection Checklist (coming soon)

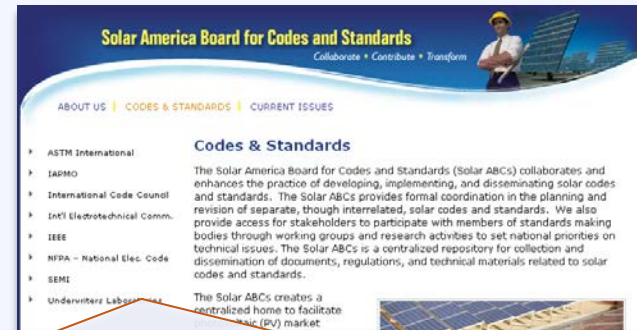


Model Permitting Process

Resource Solar America Board for Codes & Standards

Expedited Permitting:

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



I-1. Example Design Criteria:

- Size < 10-15 kW
- Code compliant
- Weight < 5 lb / sqft
- 4 strings or less

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Your Community and Next Steps

Effective Local Solar Policy

Local Solar Policy

Planning
Solar

Understanding solar financing
Expanding financing options
Addressing customer acquisition

Effective Solar
Permitting
Process

Solar Market
Development
Tools

Third Party Ownership



The Solar Equation

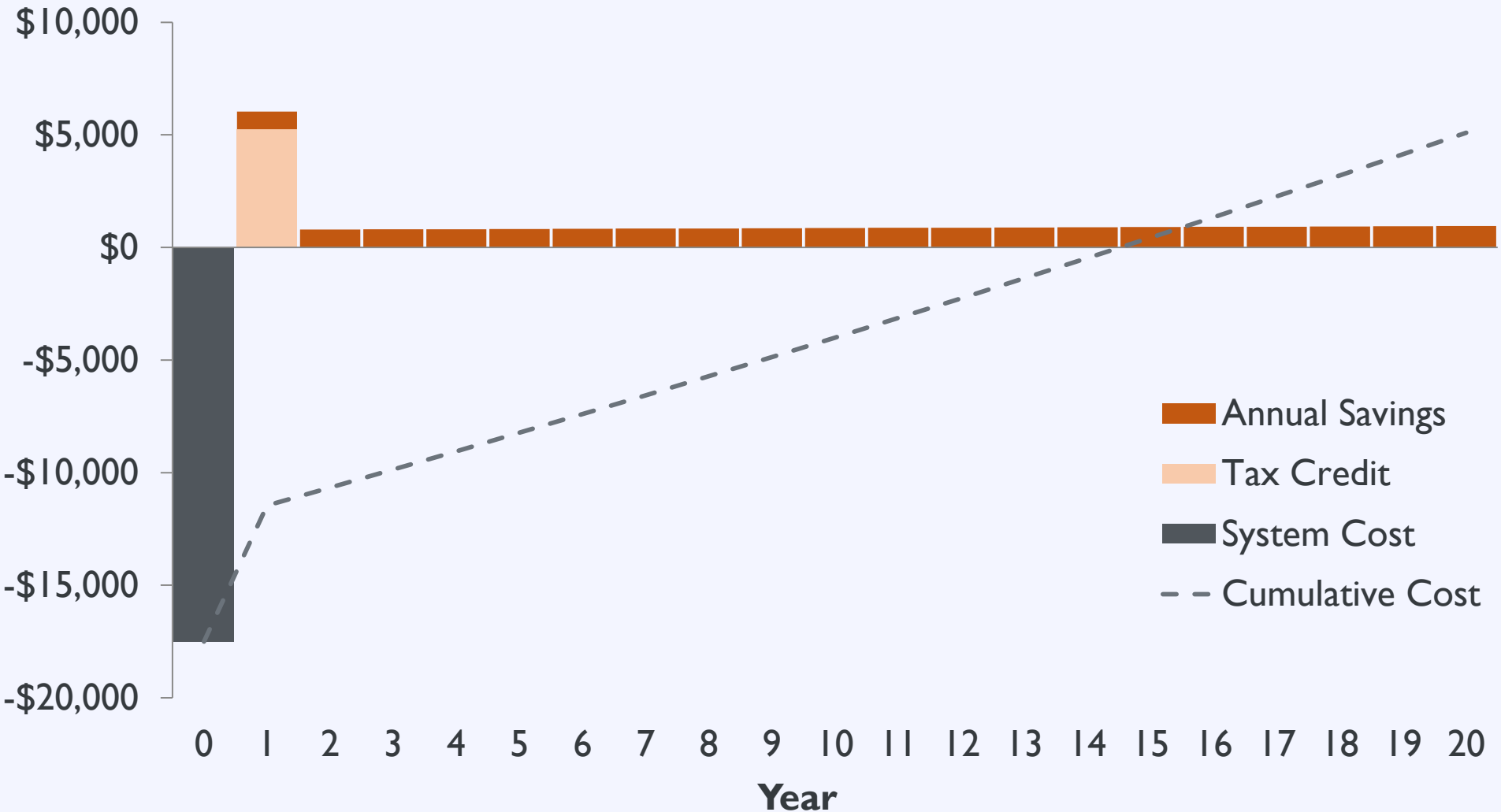
Cost

- + Installed Cost
- + Maintenance
- Direct Incentive

Benefit

- + Avoided Energy Cost
- + Excess Generation
- + Performance Incentive

The Solar Finance Problem



Solar Financing Options

Third Party
Ownership

Traditional
Lending

Utility-
Owned Solar

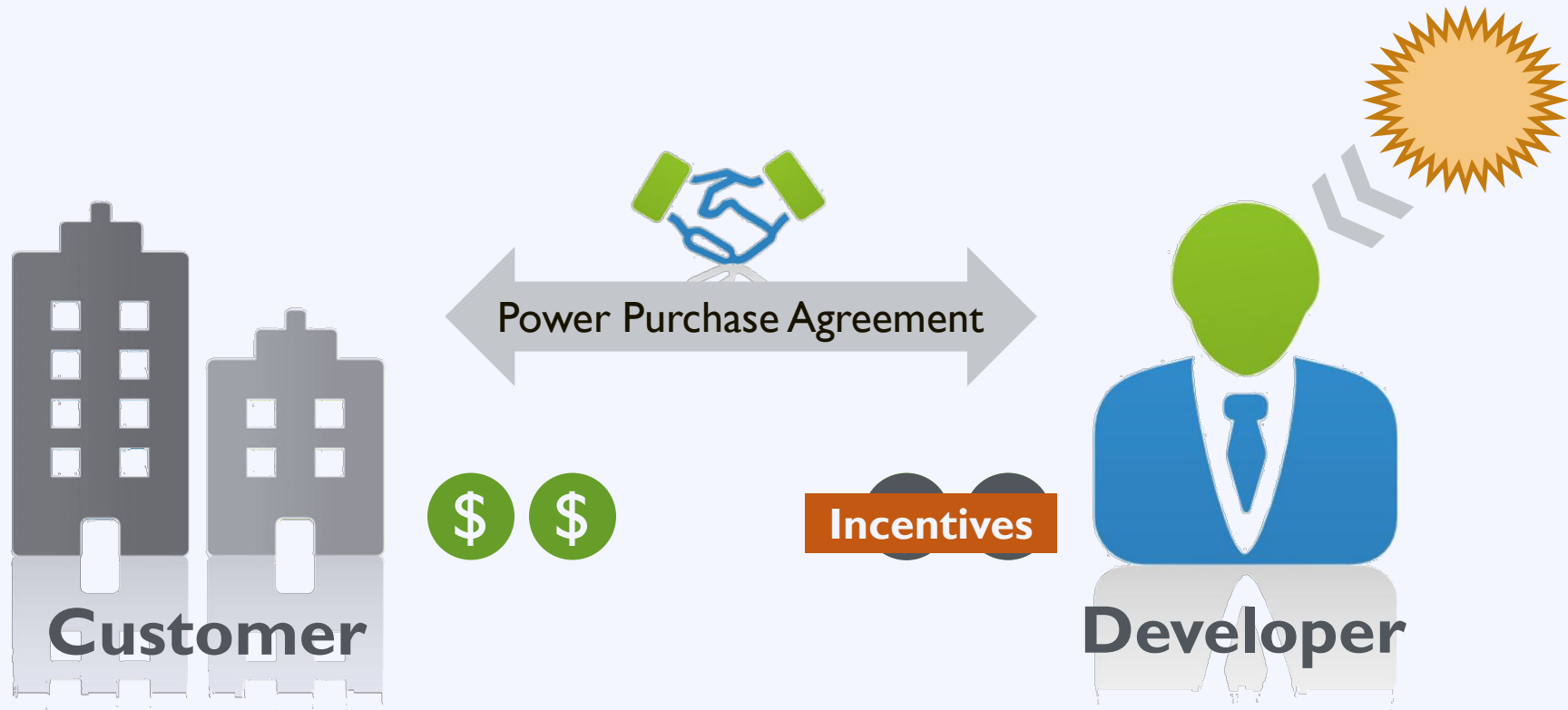
Solar Financing Options

Third Party
Ownership

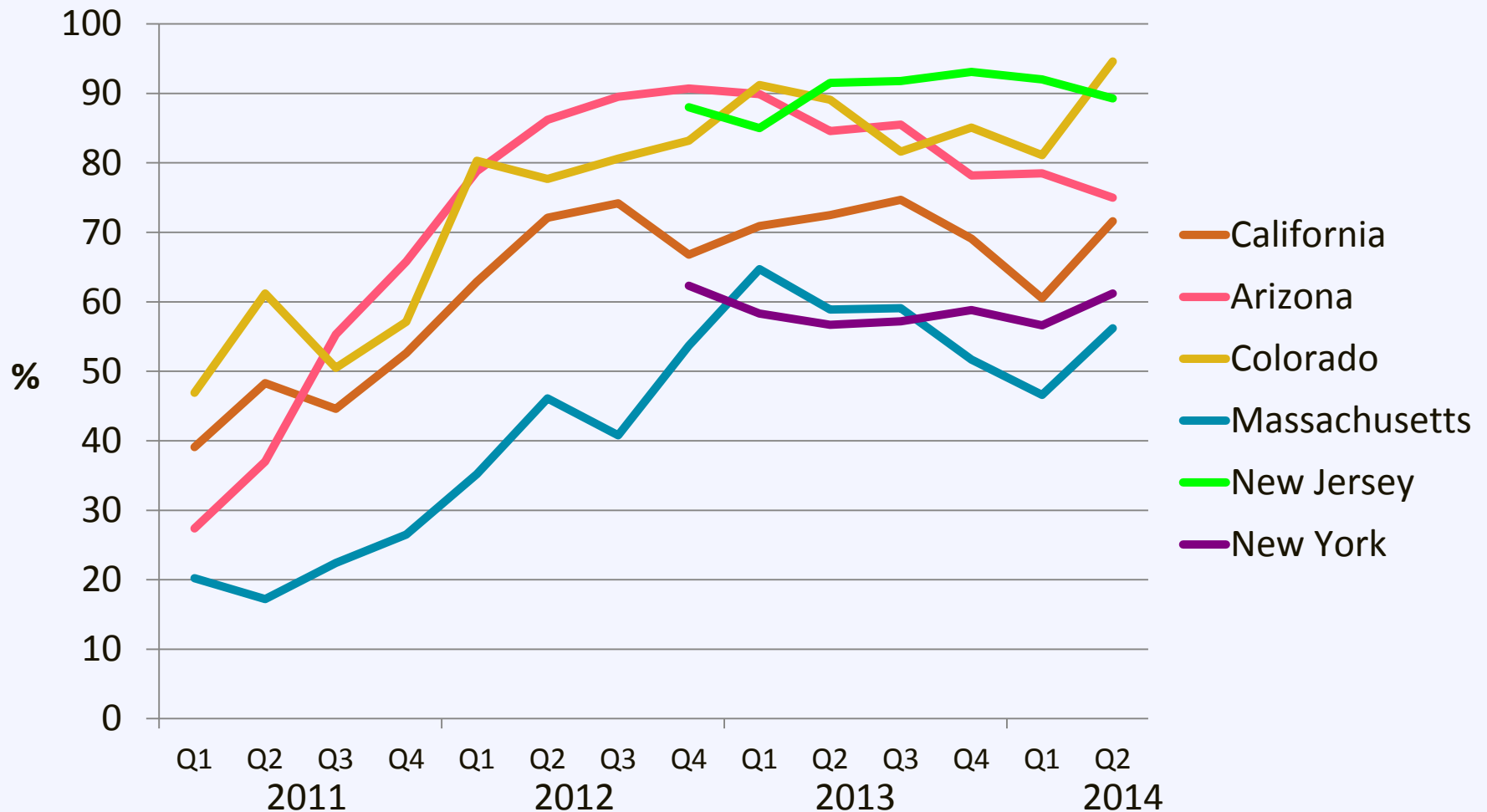
Traditional
Lending

Utility-
Owned Solar

Third Party Ownership



Third Party Ownership



Solar Financing Options

Third Party
Ownership

Traditional
Lending

Utility-
Owned Solar

Engage Local Lenders

Fewer than **5%**

of the

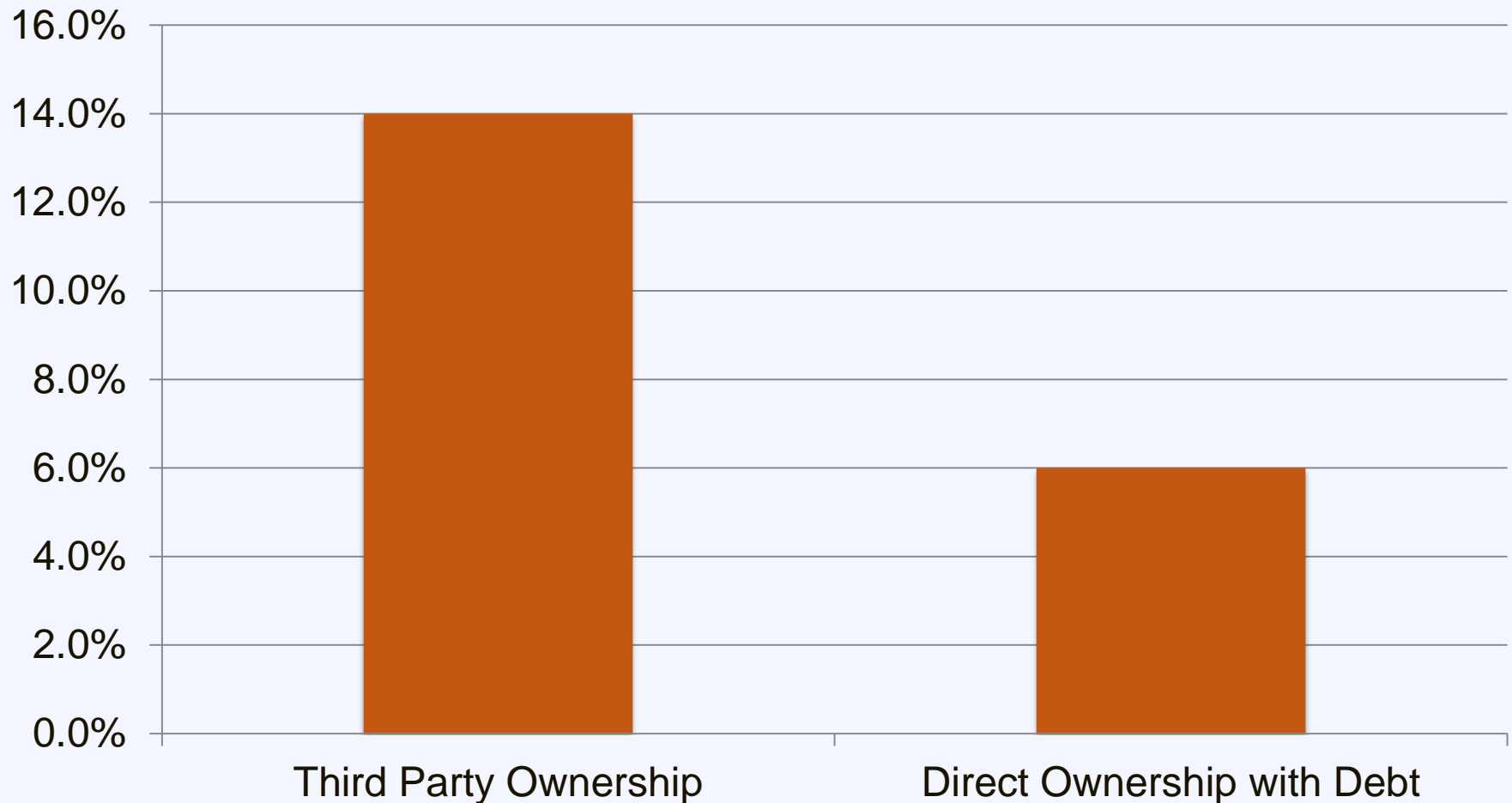
6,500 banks in the US

are

actively financing solar PV projects

Third Party Ownership: Cost

Weighted Average Cost of Capital



Financing Options

- Secured loan
 - Admirals Bank: 4.95% - 9.95%
- Unsecured loan
 - Admirals Bank: 9.99% - 11.99%
- Federal loan
 - HUD PowerSavers: 7.98%
- RUS loans



Municipal – Lender Partnership

Milwaukee SHINES

- Partnership with Summit Credit Union
- 4.5% (5-year) and 5.25% (15-year) options

Austin Energy Power Saver Loans

- Partnership with Velocity Credit Union
- Market-variable rate

Municipal partnerships can beat existing options

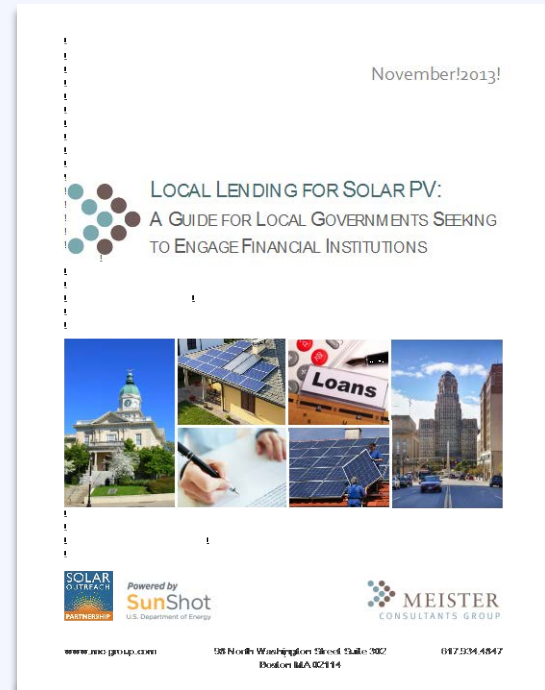
*Opportunities to improve lending options by offering
loan loss reserves or credit enhancements*

Engage Local Lenders: Resources

Resource Local Lending for Solar PV

A guide for local governments seeking to engage financial institutions

www.solaroutreach.org



Solar Financing Options

Third Party
Ownership

Traditional
Lending

Utility-
Owned Solar

Utility-Owned Solar

Utility Options for Distributed Solar

- Centrally owned solar
- Utility-owned rooftop solar
- Customer-owned with On-Bill Financing
- Community Solar

Utility-Owned Rooftop Solar

Utility pays for and owns rooftop system

Customer either:

1. Purchases energy from the system at a special rate
2. Purchases energy from the grid but receives a monthly payment for hosting

Examples:

- Arizona Public Service
- Tucson Electric Power
- CPS Energy (San Antonio)



Utility On-Bill Financing

Utility pays for customer-owned rooftop system

1. Customer repays cost of system through added charge on electric bill
2. Proven Concept for Electric Coops for energy efficiency program

Examples:

- Roanoke Electric Coop
(North Carolina)
- How\$martKY
(coalition of five Kentucky Cooperatives)

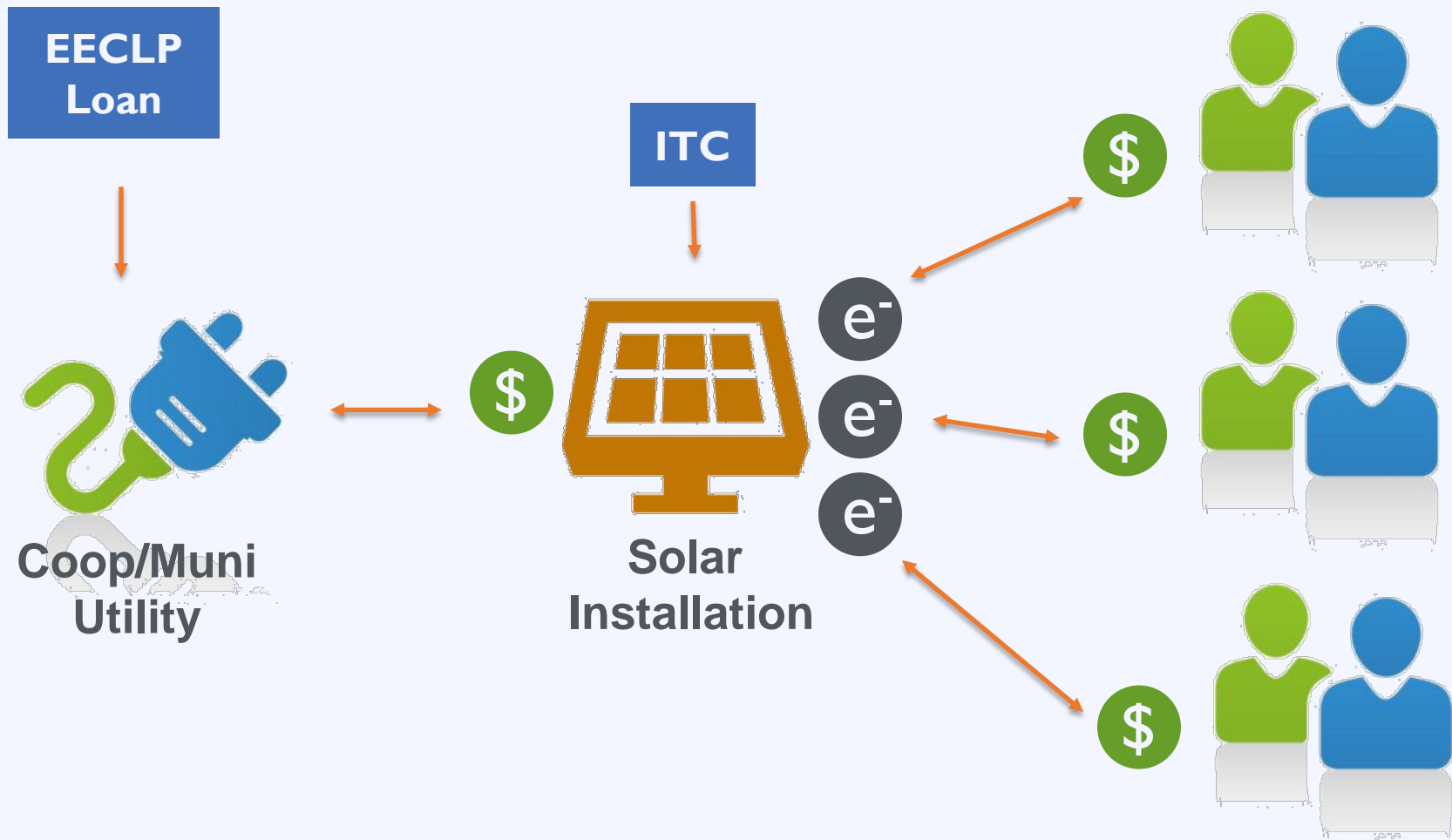


Utility-Run Community Solar

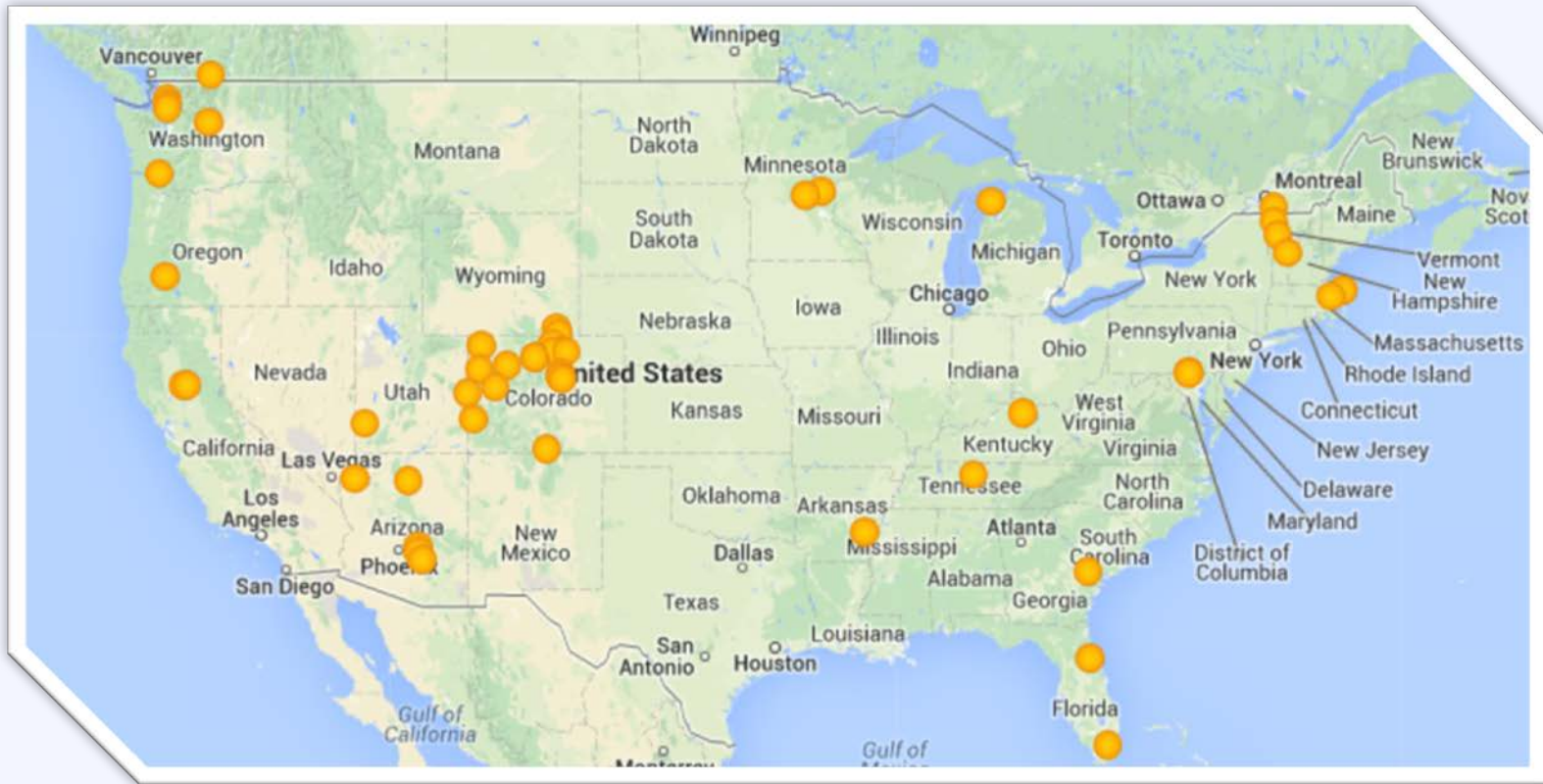
Utility lends money to solar developer

1. Developer constructs large system and claims tax credit
2. Utility allows customers to purchase portion of system
3. Utility credits customer bills for the solar they own
4. Upfront cost repaid by customer purchases

Community Solar: Utility Model

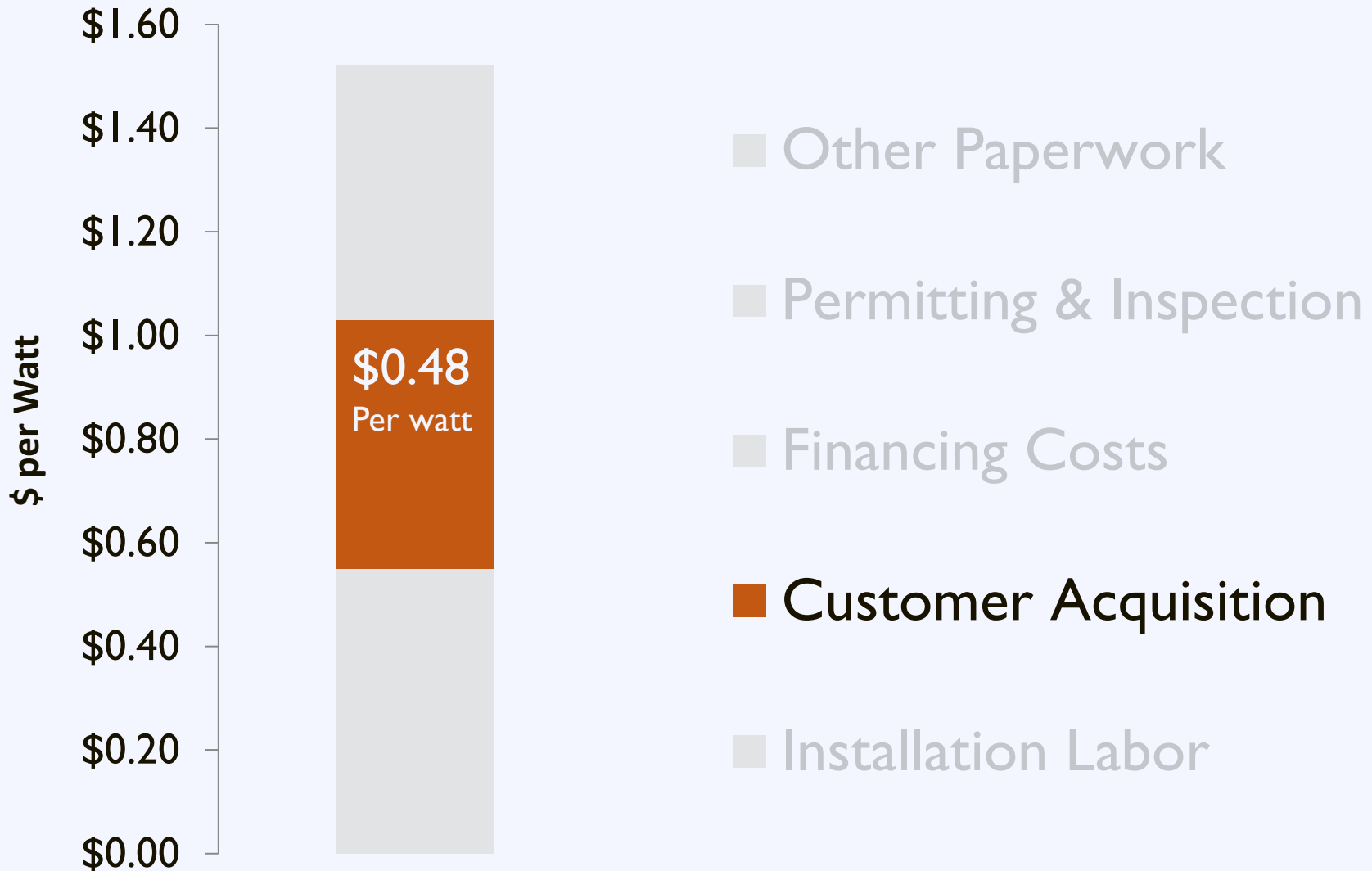


Community Solar in the U.S.



57 Community Solar programs to date, all but 5 are utility-led

Customer Acquisition



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



The Solarize Program

Barriers

High upfront cost →

Complexity →

Customer inertia →

Solutions

Group purchase

Vetted offer

Limited-time offer

Solarize: Partnership

**Program
Sponsor**

Community ties
Technical knowledge

**Solar
Contractor**

Solar installations
Volume discounts

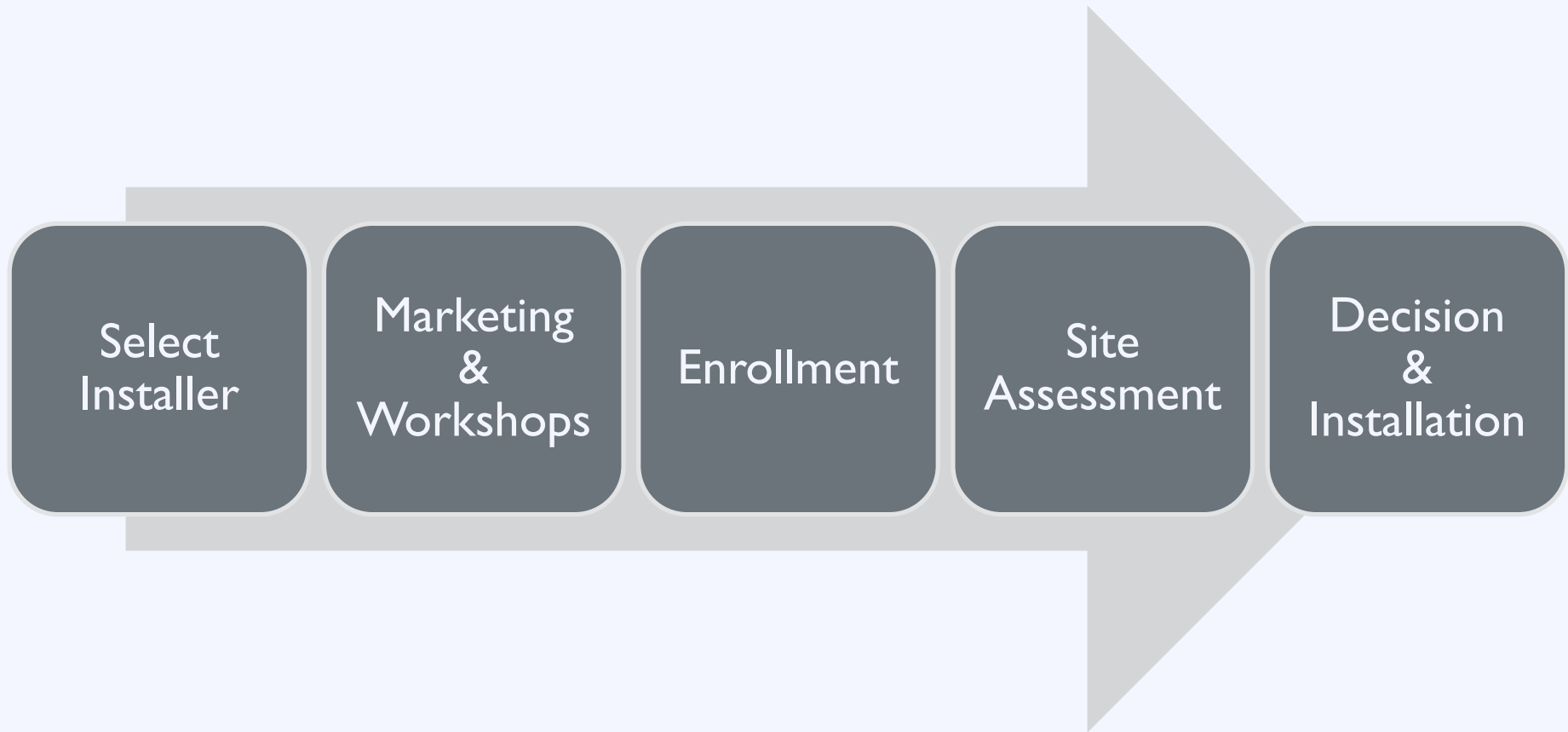
**Citizen
Volunteers**

Campaign support
Neighborhood outreach

**Community
Residents**

Program participation
Word of mouth

Solarize: Process

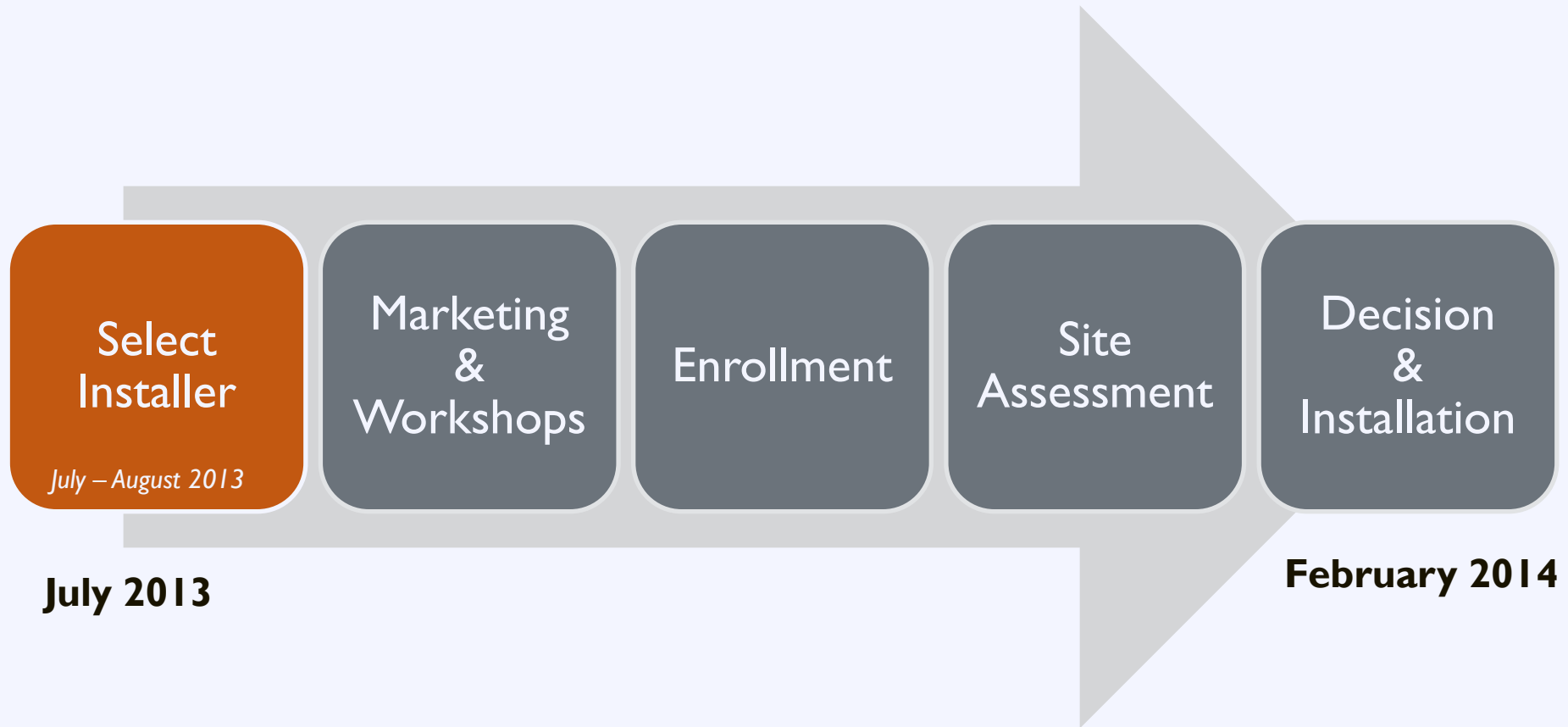


Solarize Plano: Case Study



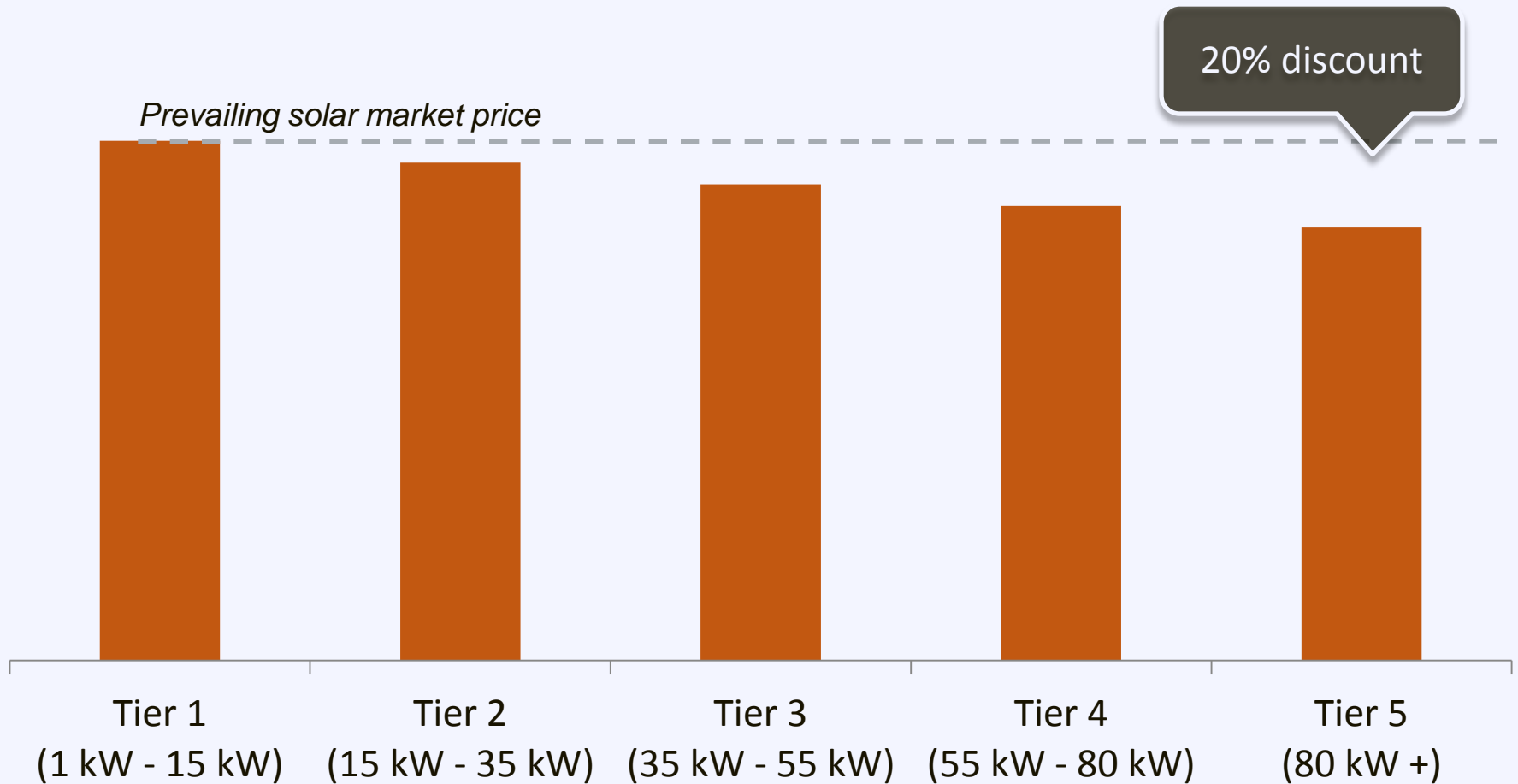
Plano, Texas
Population: 272,000

Solarize Plano: Case Study

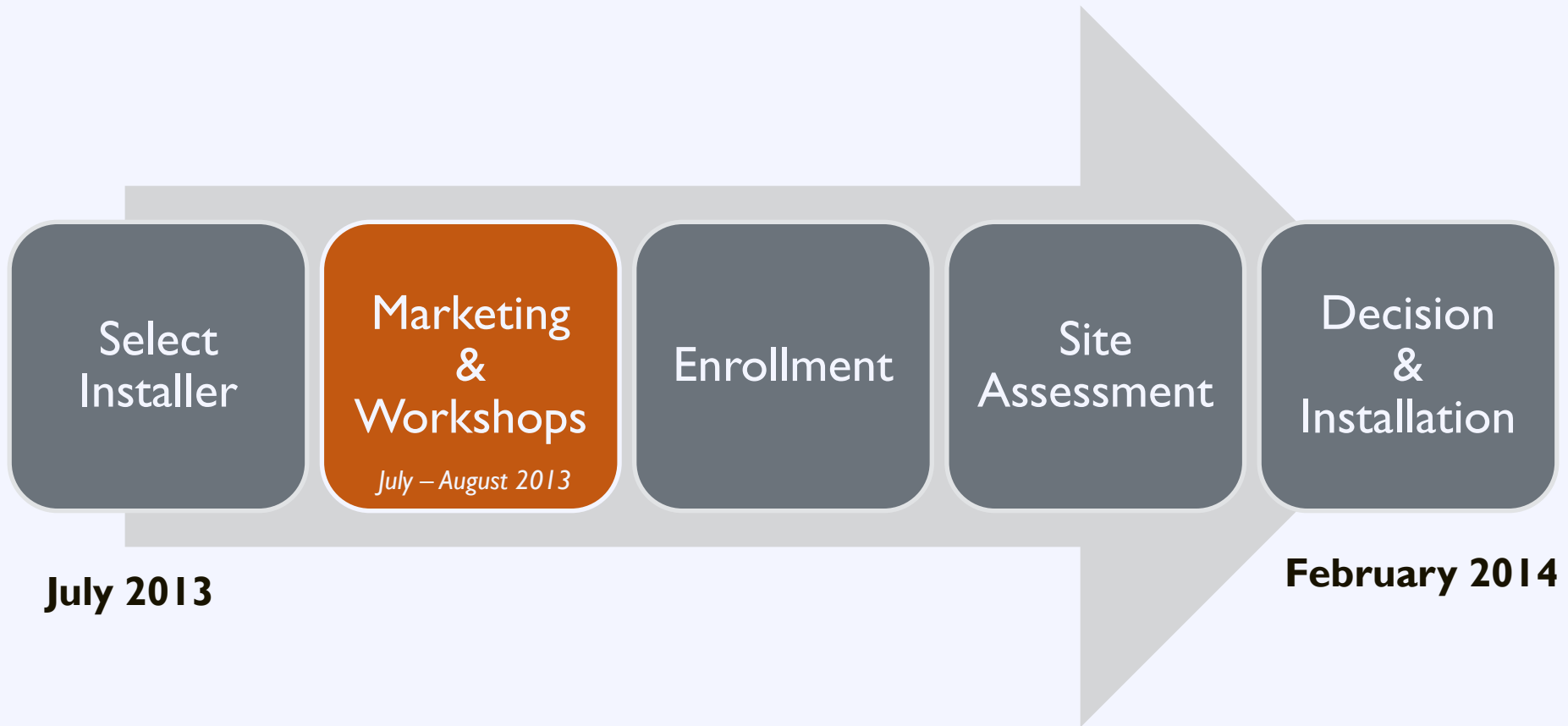


Solarize Plano: Case Study

Pricing Tiers



Solarize Plano: Case Study

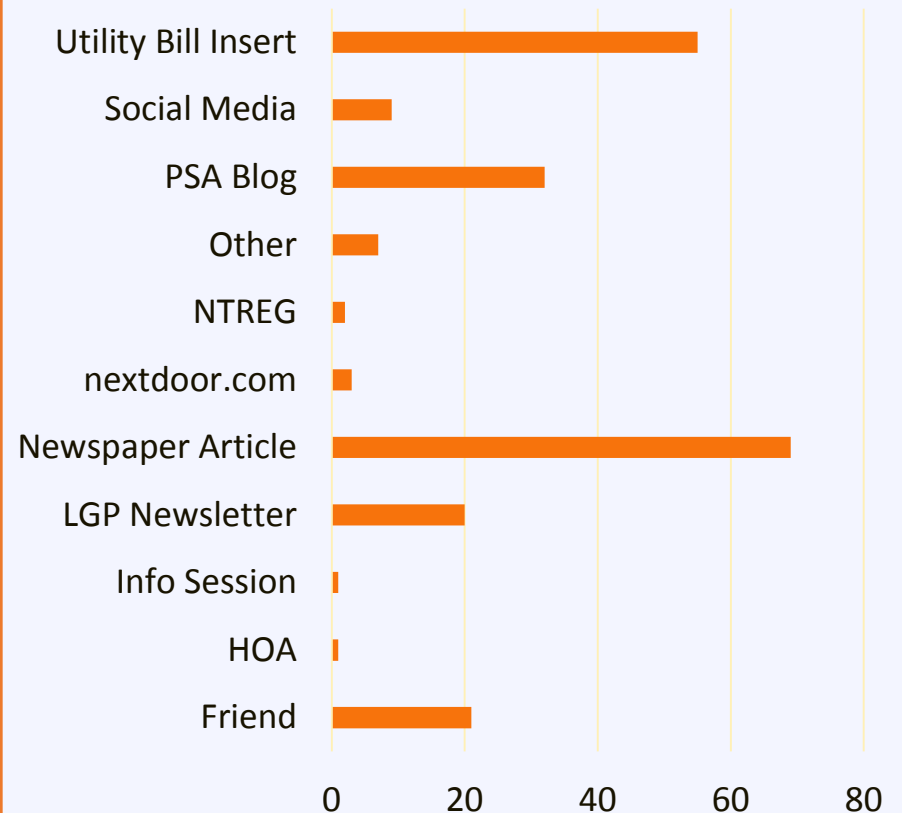


Solarize Plano: Case Study

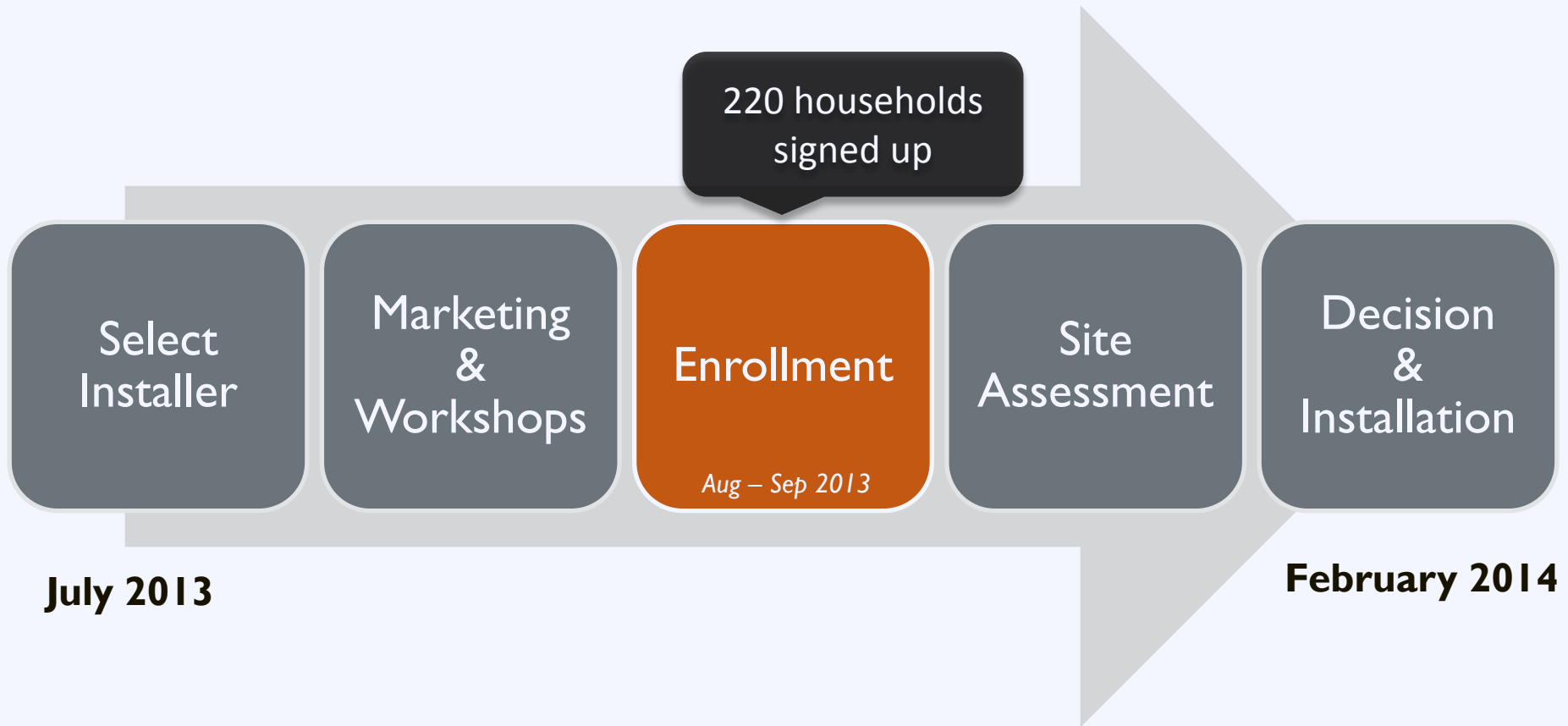
Marketing Strategy:

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

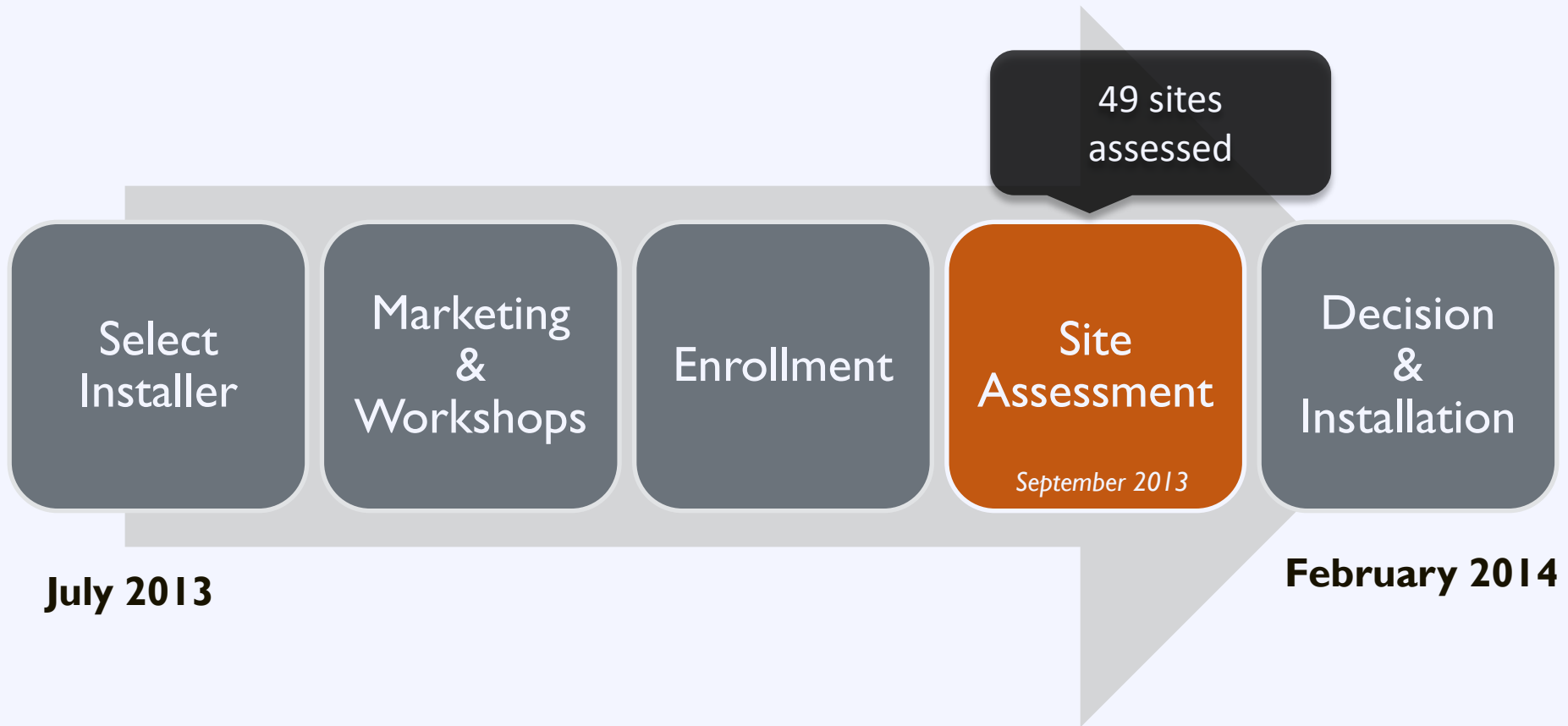
How did you learn about Solarize Plano?



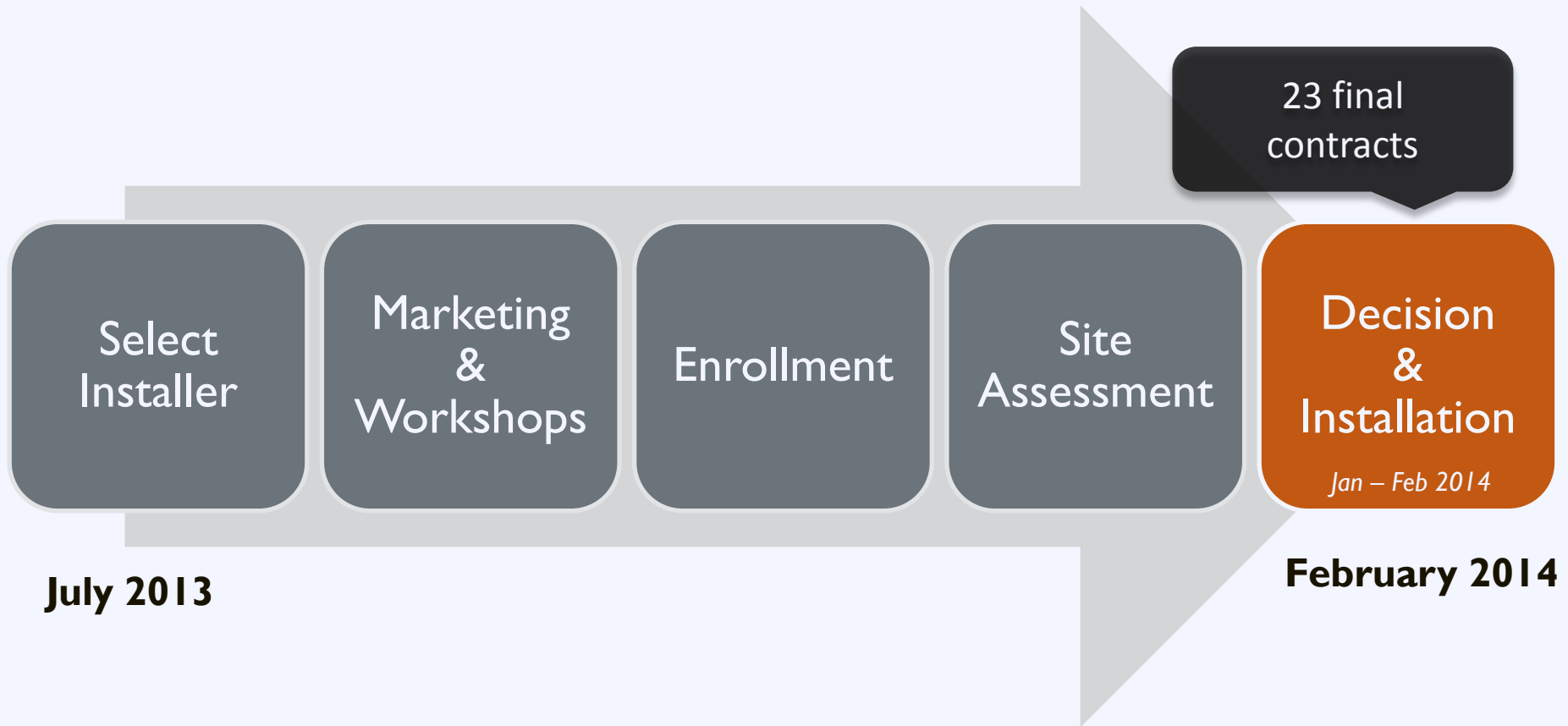
Solarize Plano: Case Study



Solarize Plano: Case Study



Solarize Plano: Case Study



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

Solarize: Lasting Impact

A household is

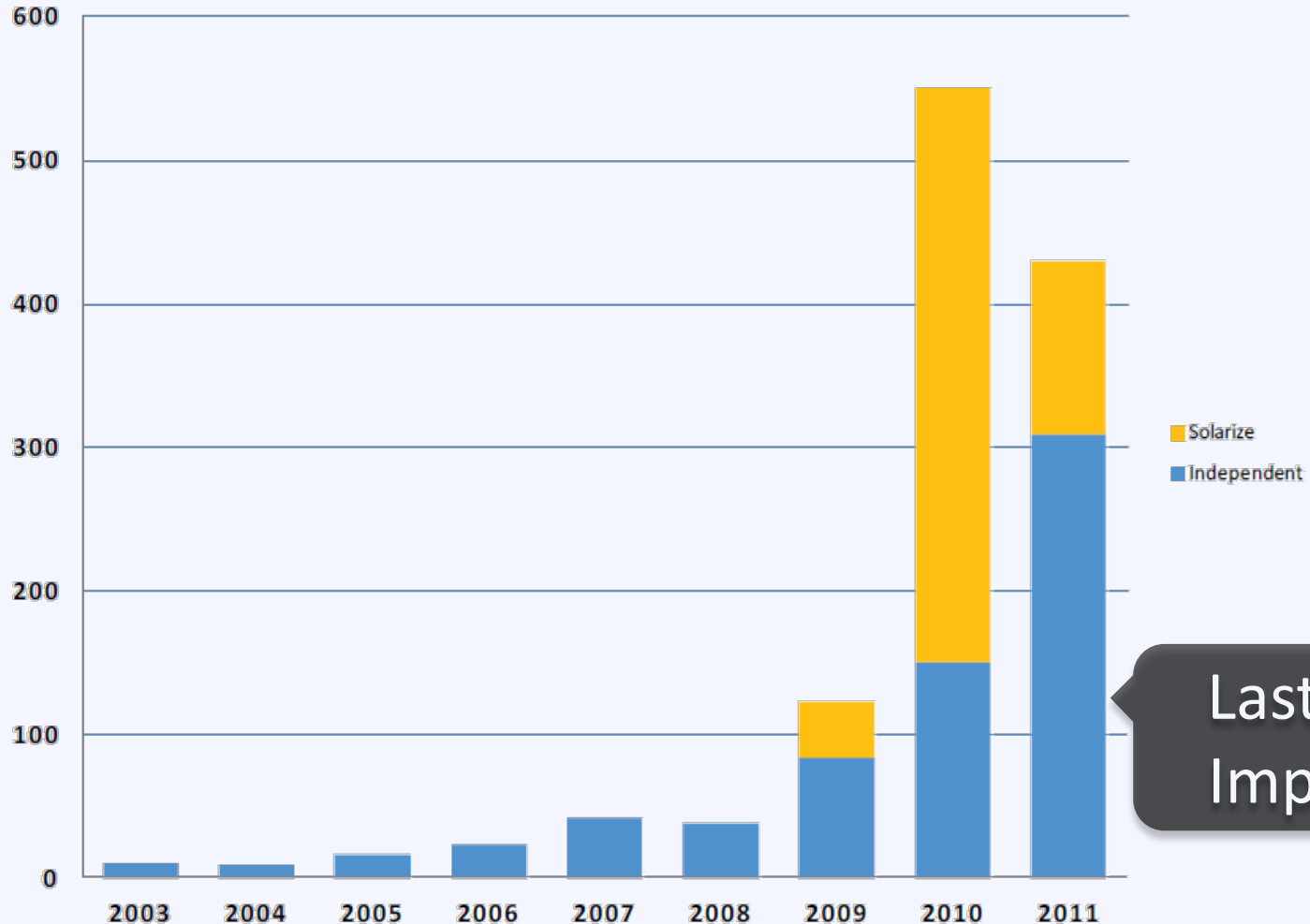
0.78% more likely to adopt solar

for

each additional installation in their zip code

Solarize: Lasting Impact

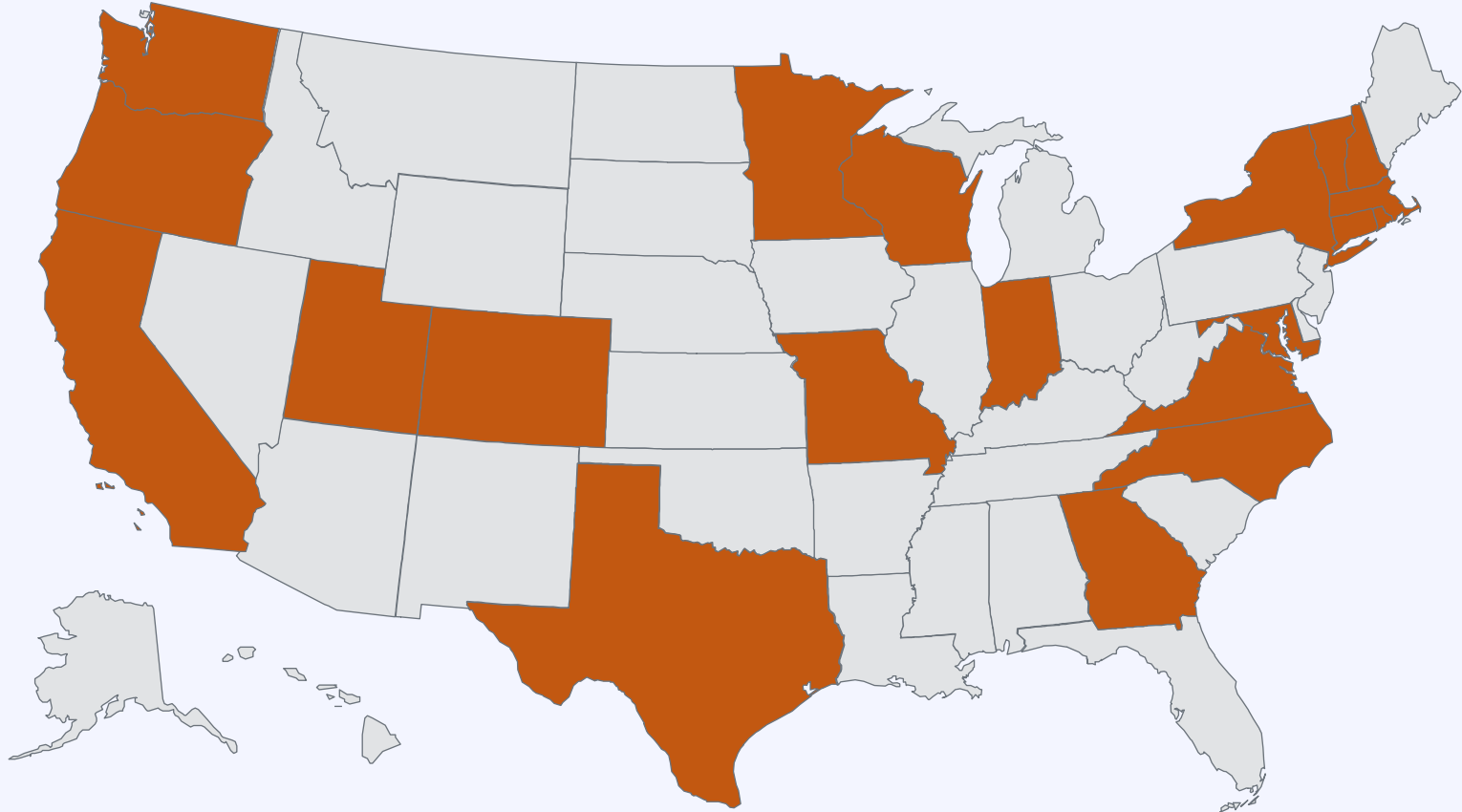
Annual Portland Residential PV Installations



Lasting Impact

Solarize: National Growth

Over 200 Campaigns in 20 States



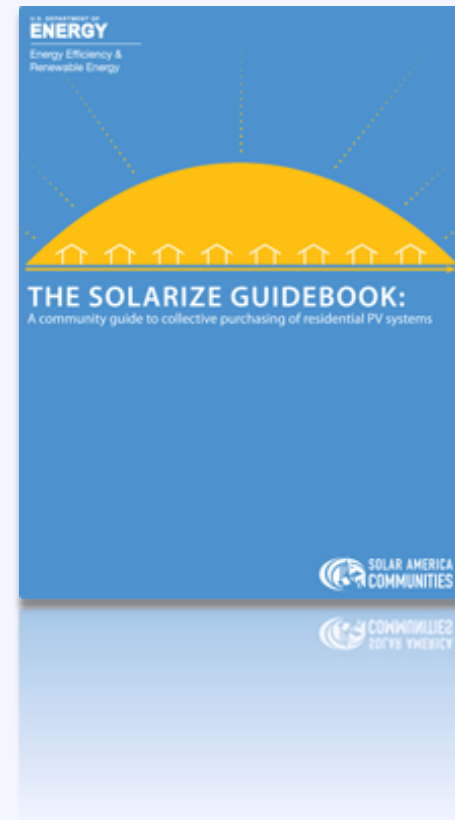
Thousands of homes Solarized!

Solarize: Resources

Resource **The Solarize Guidebook**

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

www.nrel.gov



Agenda

- 10:20 – 10:50 Putting Solar Energy on the Local Policy Agenda
- 10:50 – 11:20 State of the Local Solar Market
- 11:20 – 11:50 Federal, State, and Utility Policy Drivers
- 11:50 – 12:15 *Break and Grab Lunch*
- 12:15 – 12:50 Planning for Solar: Getting Solar Ready
- 12:50 – 1:30 Solar Market Development Tools
- 1:30 – 1:40** *Break*
- 1:40 – 2:10 Municipal Procurement
- 2:10 – 2:50 Developing and Solar Policy Implementation Plan for

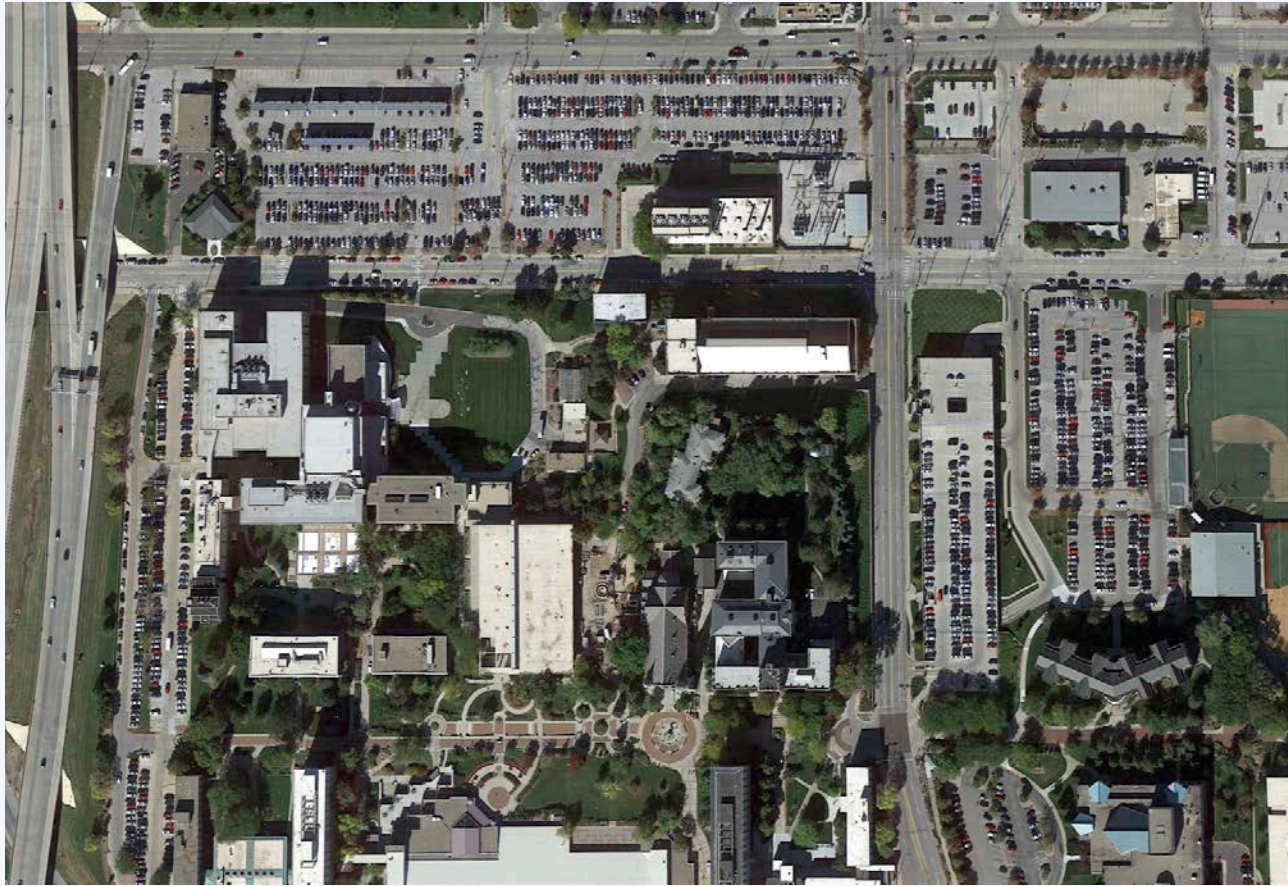
Your Community and Next Steps

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Your Community and Next Steps

Creighton University Solar



Commercial-Scale
Solar Can Work in
Nebraska

Creighton University Solar



Commercial-Scale
Solar Can Work in
Nebraska

Procurement Process

1

Stakeholder Engagement & Goal Setting

2

Data Collection & Site Identification

3

Develop and Publish RFP

4

Review Bids and Select Developer

5

Negotiate Contract

Procurement Process

1

Stakeholder Engagement & Goal Setting

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Project Goals

Does your municipality want a project that...

... maximizes solar production?

... starts small on a pilot basis?

... demonstrates leadership to the private sector?

... puts landfills or brownfields to use?

Processes of Concern

| Process | Municipal Action |
|------------------------|---|
| Utility | Discuss interconnection Deeper partnership needed for large projects |
| Stakeholder Engagement | Engage with community members & local government officials early on |
| Zoning | Review zoning code for solar-related concerns |
| Environmental Review | Establish if environmental approvals are needed |

How to Finance the System?

Direct
Ownership

Third Party
Ownership

How to Finance the System?

Direct
Ownership

Third Party
Ownership

Benefit: Low Cost of Capital

How to Finance the System?

Direct
Ownership

Third Party
Ownership

Benefit: 30% Tax Credit

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How Big to Build?

Determine Annual Energy Use

- Average last three years of utility bills

Calculate Maximum System Size

- 1 kW in NE produces \sim 1250 kWh per year

Identify Possible Sites

- 1 kW \approx 100 SqFt
- 1 MW \approx 6 acres

Consider Your Goals

What Makes a Good Solar Site?

1. **Ground-mounted sites** are flat and accessible
2. **Flat roofs** are unobstructed by rooftop equipment
3. **Pitched roofs** are roughly south-facing
4. Sites should be unshaded by trees or buildings
5. Roofs should be in good condition



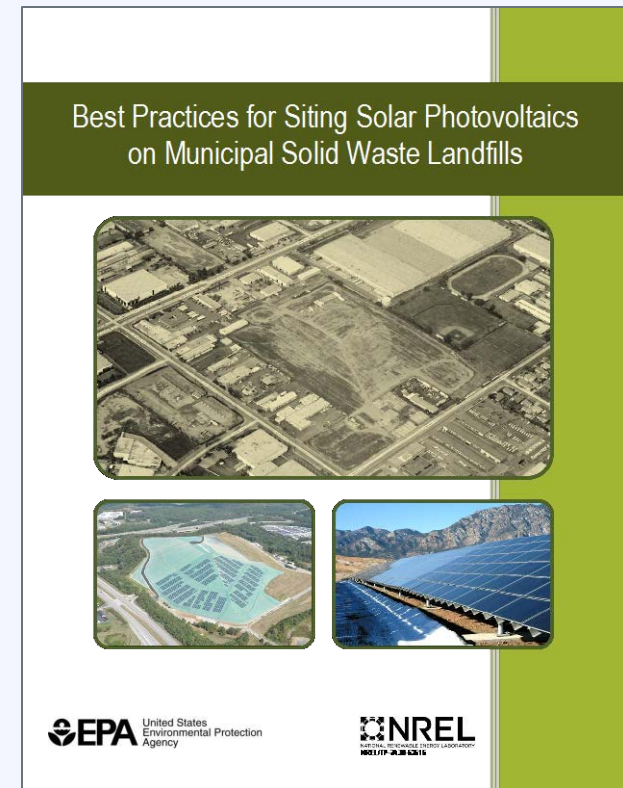
Landfill-Sited Solar

Additional Requirements for Landfill Projects

- Ensure construction does not compromise landfill cap
- Provide additional information to developers
- Likely need additional approvals

EPA Repowering America Initiative

- Landfill Solar Best Practices
- <http://www.epa.gov/renewableenergyland>



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Information to Provide

1. Summary of goals and desired project
2. Detailed description of site
 - Including maps and aerial photography
3. Detailed energy consumption information
 - Both for project site and general municipal load
4. Evaluation Criteria
5. Price proposal template
6. Draft PPA/contract *(suggested)*

Information to Request

1. Qualifications

- Company experience
- Five references
- Team member qualifications
- Decommissioning
- Environmental Permitting

2. Project Details

- Price proposal
- Project timeline
- Equipment to use
- System size and expected generation

3. Comments on Draft FFP/Contract

4. Detailed Plans for

Procurement Process

1

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Evaluation of Bids

Provide clear evaluation criteria and weights in RFP

Should consider:

- Developer experience and project team
- Price
- Approach to project
- Financial resources
- Optional adders (local labor or materials, curriculum tie-in, etc.)

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Potential Project Timeline (Large Projects)

| Step | Days From RFP Issuance |
|---|-------------------------------|
| Stakeholder Discussions and Data Collection | Pre-RFP |
| Release RFP | 0 |
| RFP Submission Deadline | 1-2 months after release |
| Announcement of Selected Bidder | 1-2 weeks after deadline |
| Contractual Documents Signed | 1-6 months after announcement |
| System Design Completed | 2-6 months after contract |
| Project Construction Completed | 6-12 months after design |

Municipal Solar Procurement

Resource IREC Solar PPA Toolkit

Guidance document covering issues related to procurement, including a model PPA

www.irecusa.org



Clarkstown Landfill Solar Project

Clarkstown, NY

Population: 84,000



- 2.3 MW System
- First proposed in 2009
- Completed October 2014
- Provides 10% of municipality's energy

Clarkstown Landfill Solar Project

| Key Steps | Challenges | Takeaways |
|---|--|--|
| Prepared feasibility study with consulting firm | Ensuring that landfill cap stayed intact | Bring utility on board early and manage stakeholders |
| Prepared RFP – 4 responses received | Coordinating multiple stakeholders and approvals | Obtain outside help where needed <i>(outside counsel for PPA negotiation, utility specialist for interconnection and development)</i> |
| Negotiated PPA at \$0.083/kWh, 3% escalator | Developing and negotiating PPA | |

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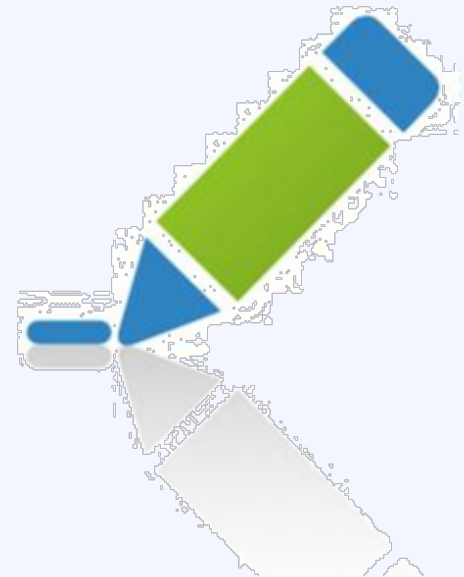
Your Community and Next Steps

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 I: Take 5 minutes to complete the questions in the *Developing Effective Solar Policies in Your Community* handout.



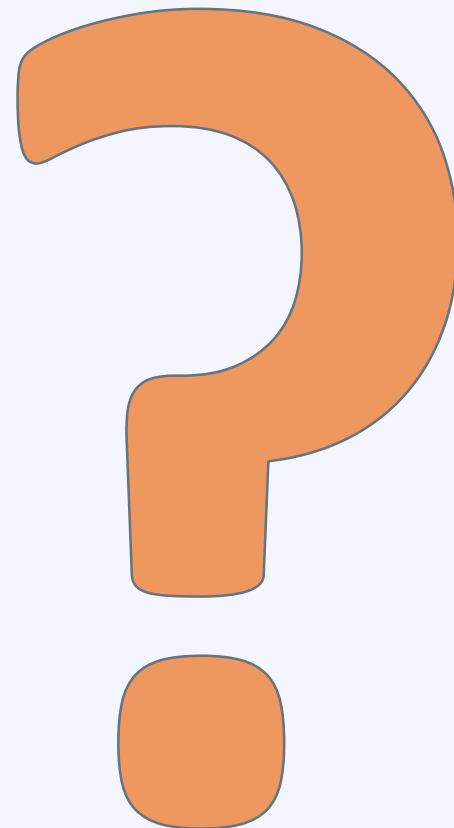
Activity: Solar in Your Community

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.



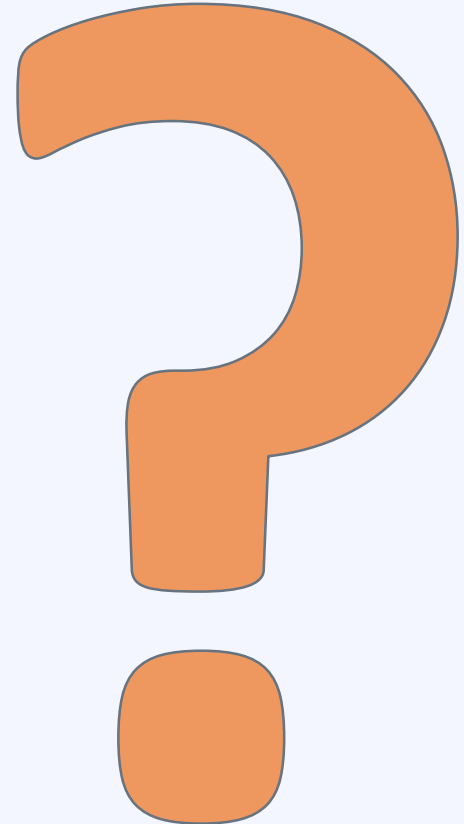
Which “best practice” did you select to pursue first?

- 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]



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