


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**

About the SunShot Solar Outreach Partnership



One to One
Assistance



Regional
Workshops



Technical
Resources



Peer
Exchange

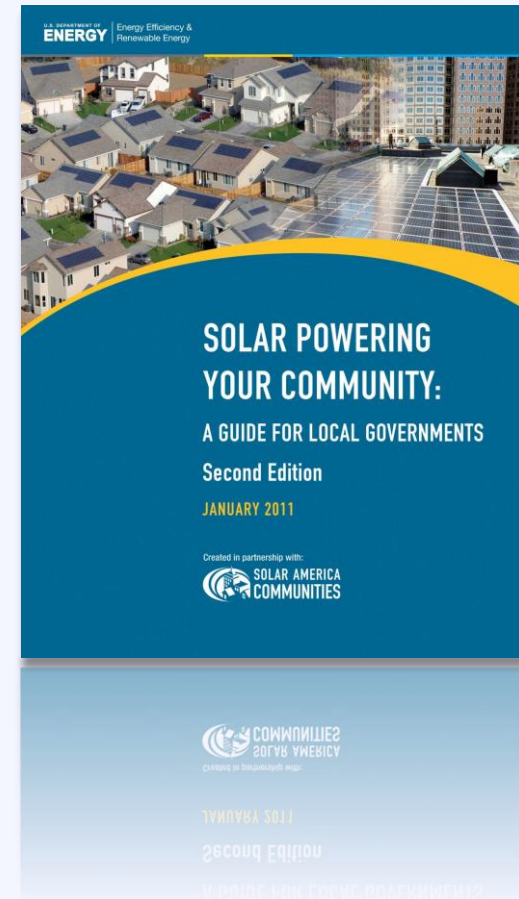
Technical Resources

Resource

Solar Powering Your Community Guide

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

www.energy.gov



Technical Resources

Resource

Becoming a Solar-Ready Community

A guidebook for Michigan communities outlining 10 steps to becoming Solar Ready

www.michigan.gov



Technical Resources

Resource

SunShot Solar Resource Center

- Case Studies
- Fact Sheets
- How-To Guides
- Model Ordinances
- Technical Reports
- Sample Government Docs

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



The screenshot shows the SunShot Solar Resource Center website. The page is titled "Solar Energy Resource Center" and features a search bar, a map of the United States, and a list of resources categorized by topic, audience, resource type, and state. The page also includes a sidebar with a search bar and a list of resources.

One to One Assistance

Technical Support

Solar Outreach Partnership

Our experts can help you implement the best practices we discuss today - apply for **complementary** technical assistance

www.solaroutreach.org

Poll

Who's in the room?

Poll

What is your experience with solar?

Agenda

- 08:45 – 09:10 Solar 101 for Communities
- 09:10 – 09:30 Understanding the Solar Regulatory Landscape
- 09:30 – 10:00 Implementing Local Policies to Enable Solar Adoption
- 10:00 – 10:20 Heather Seyfarth: Becoming a Solar Ready Community
- 10:20 – 10:30 *Break*
- 10:30 – 10:50 Benefits and Barriers Activity
- 10:50 – 11:10 Prasad Gullapalli: Industry Perspective on Local Policy
- 11:10 – 12:00 Group Discussion: Policy Implementation Strategies
- 12:00 – 12:30 Next Steps for Solar in the Region

Agenda

- | | |
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| 12:00 – 12:30 | Next Steps for Solar in the Region |

Solar Technologies



Solar Photovoltaic (PV)



Solar Hot Water



Concentrated Solar Power

Solar Technologies



Solar Photovoltaic (PV)

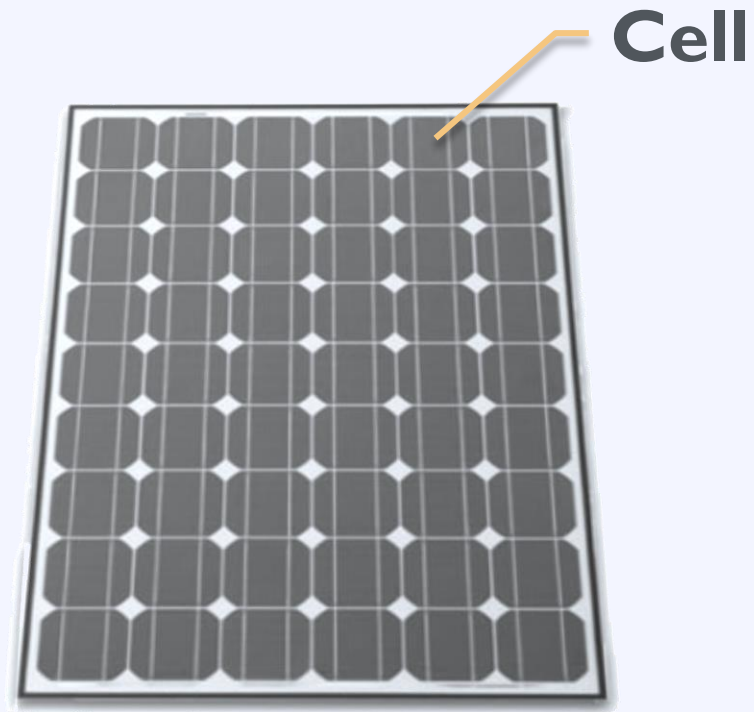


Solar Hot Water



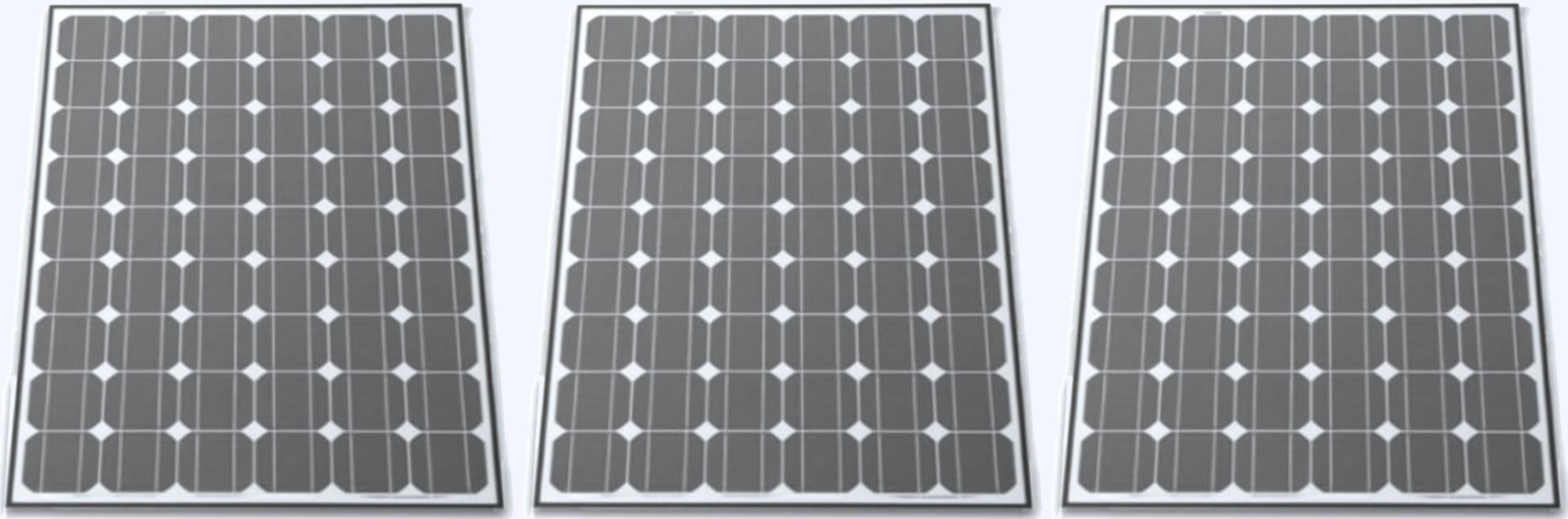
Concentrated Solar Power

Some Basic Terminology



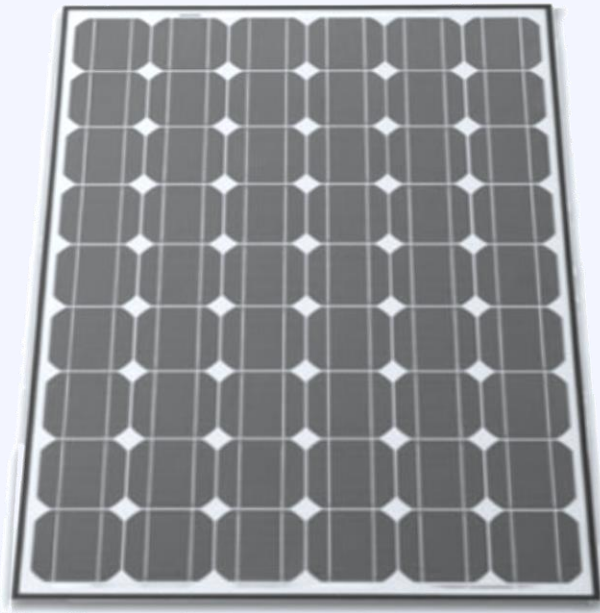
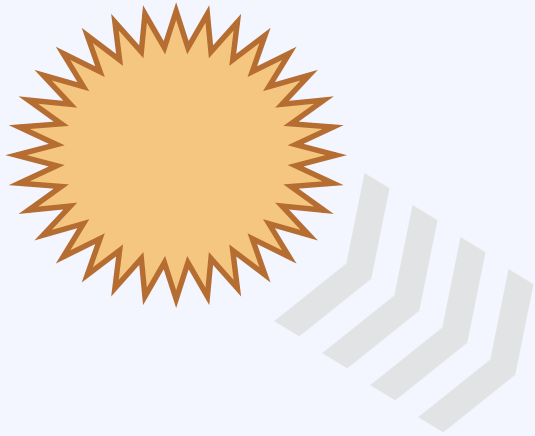
Panel / Module

Some Basic Terminology



Array

Some Basic Terminology



Production
Kilowatt-hour (kWh)

Capacity / Power
kilowatt (kW)

Some Basic Terminology



Residence
5 kW



Factory
1 MW+



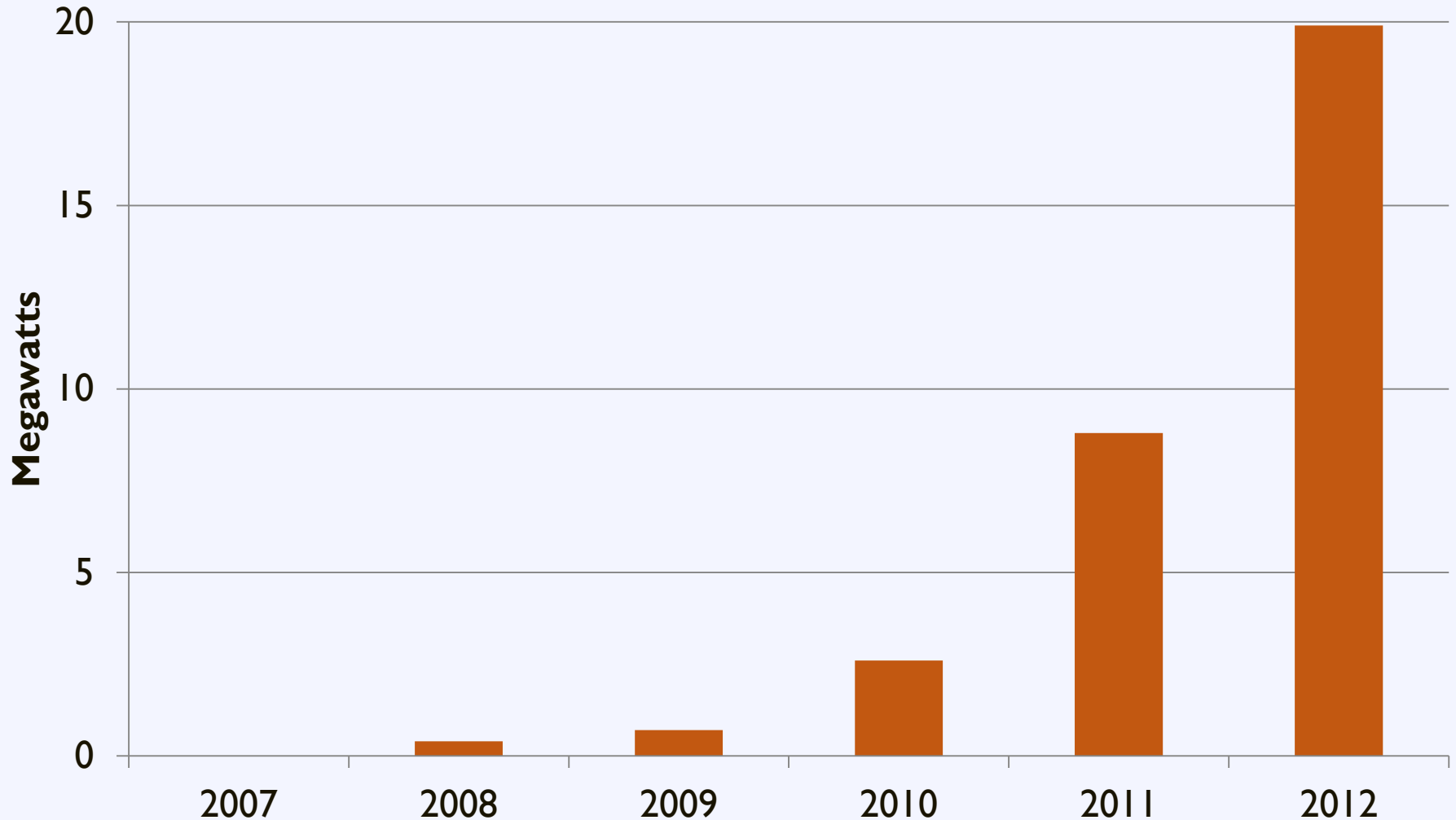
Office
50 – 500 kW



Utility
2 MW+

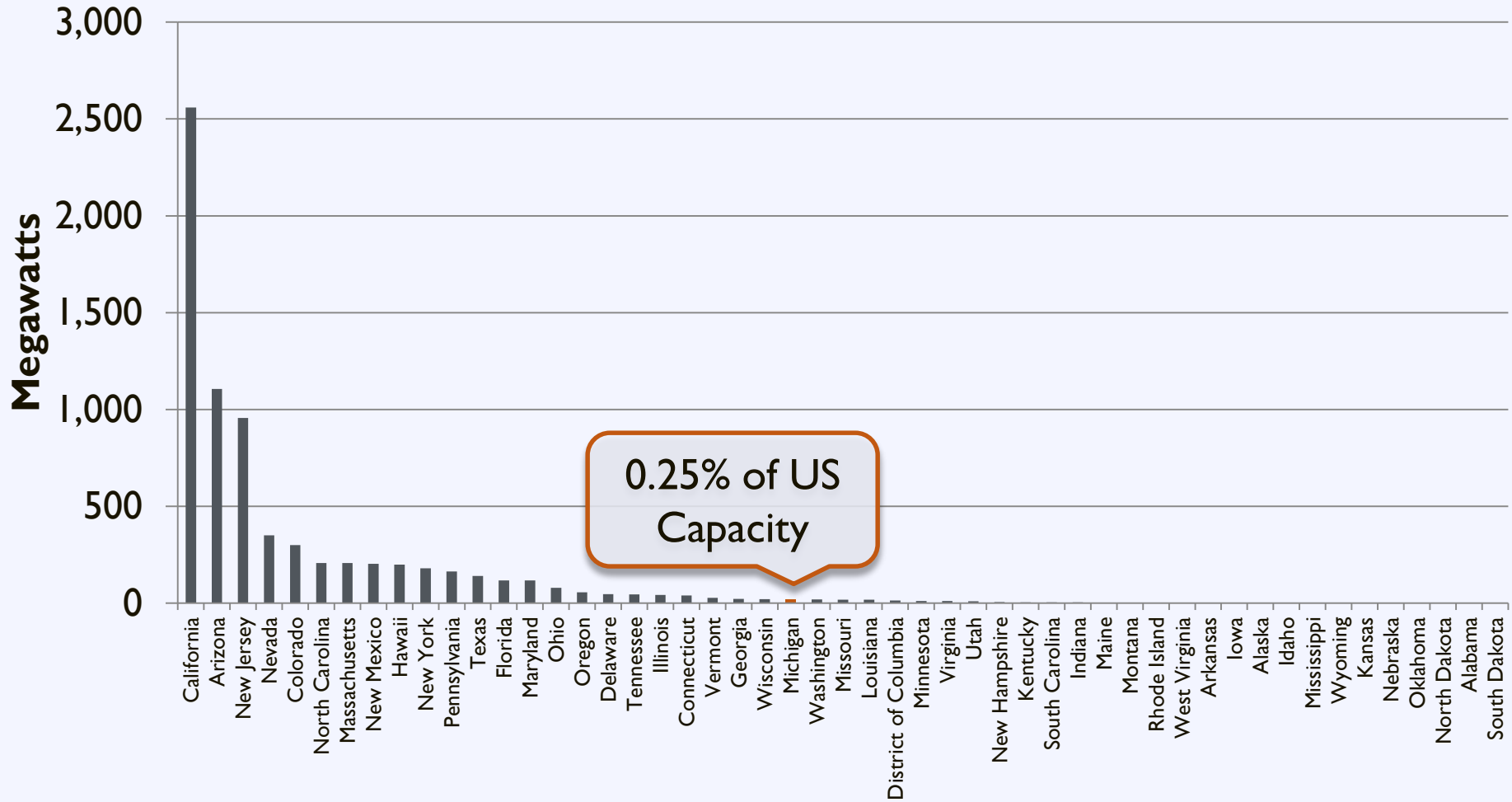
Michigan Solar Market

Cumulative Installed PV Capacity in Michigan



US Solar Market

Installed Capacity (MW) 2012



Michigan Solar Market

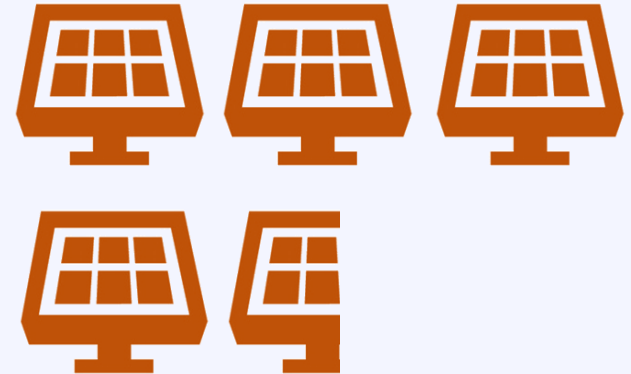
Michigan



2

watts per person

US

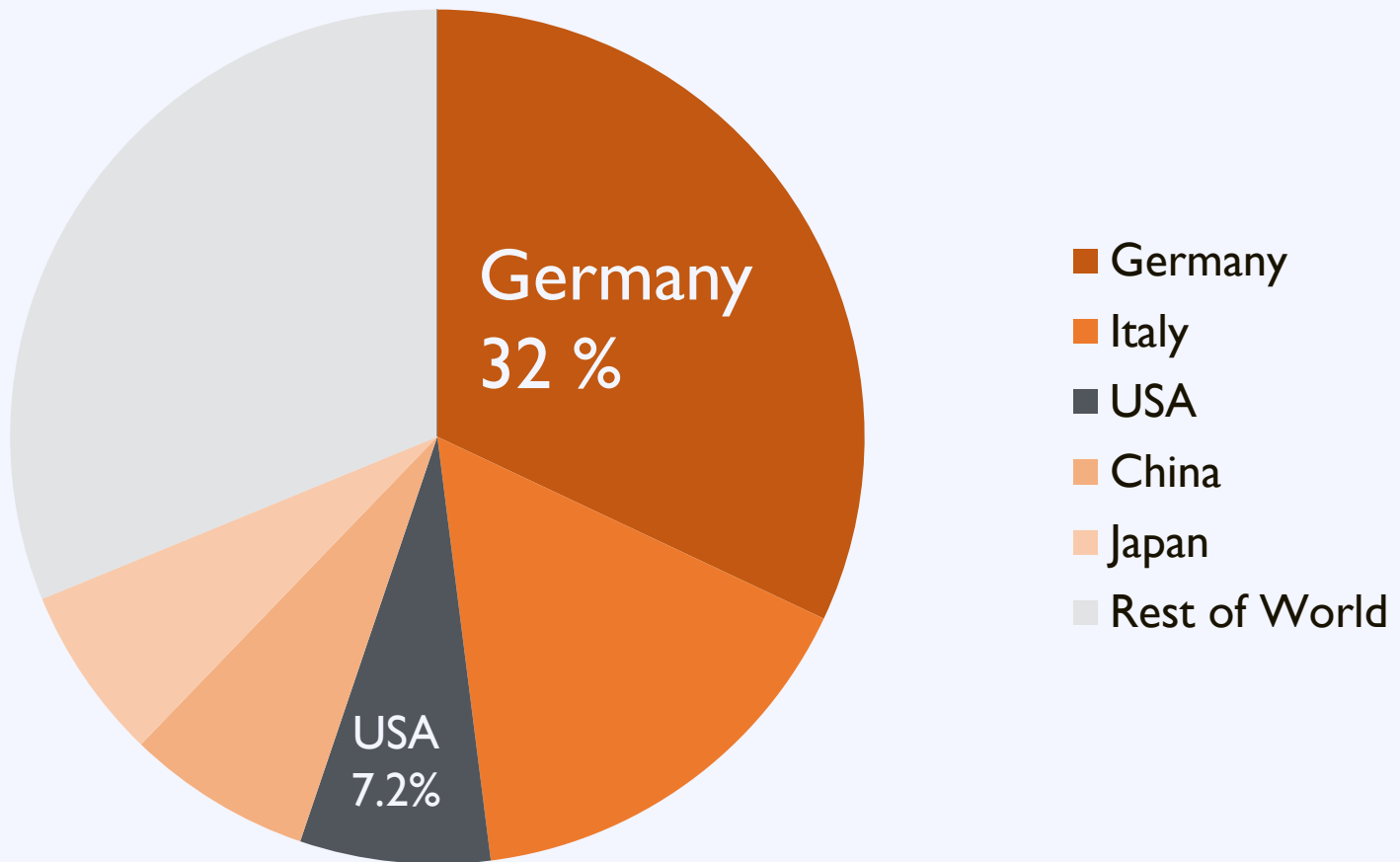


23

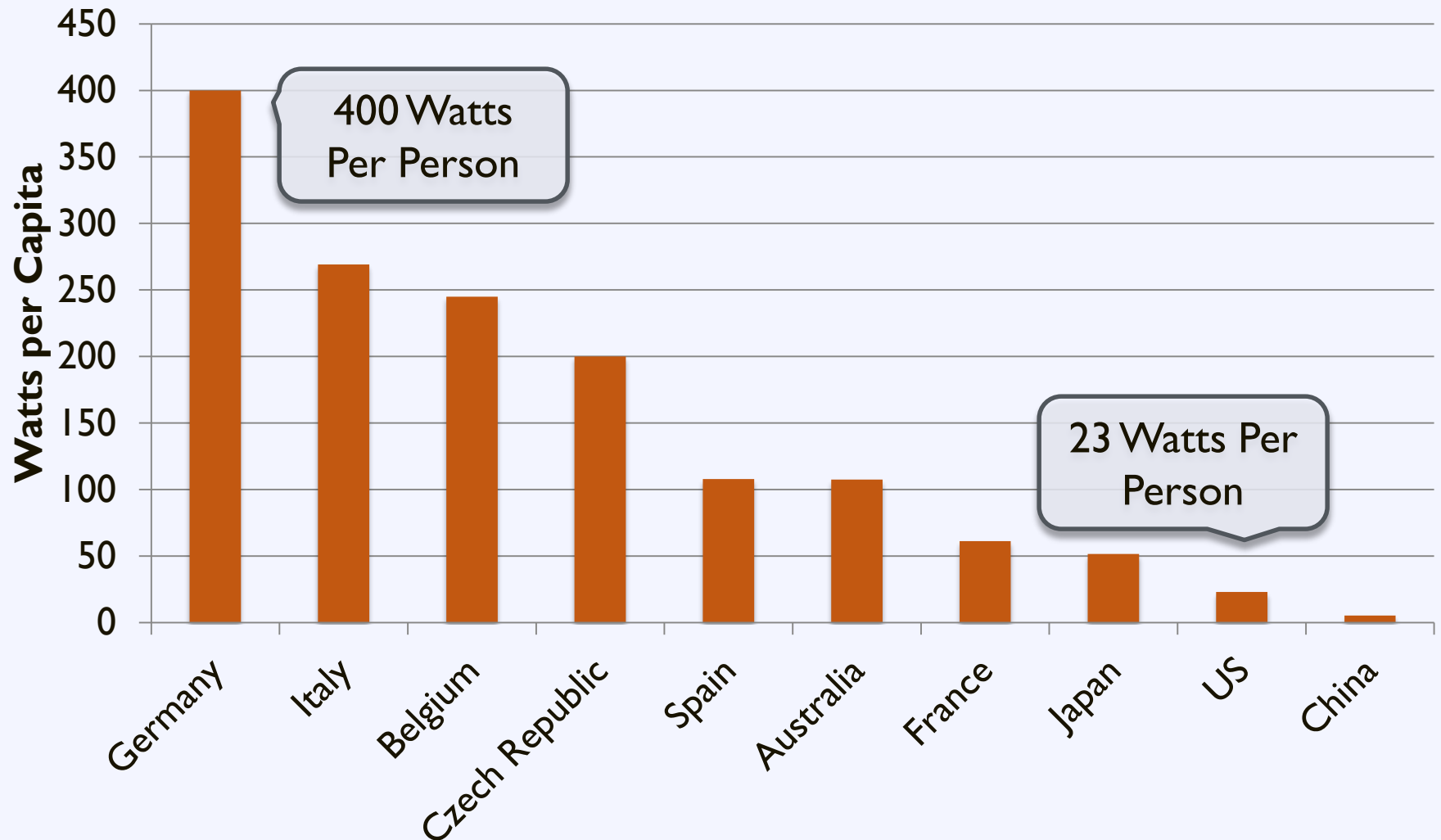
watts per person

World Solar Market

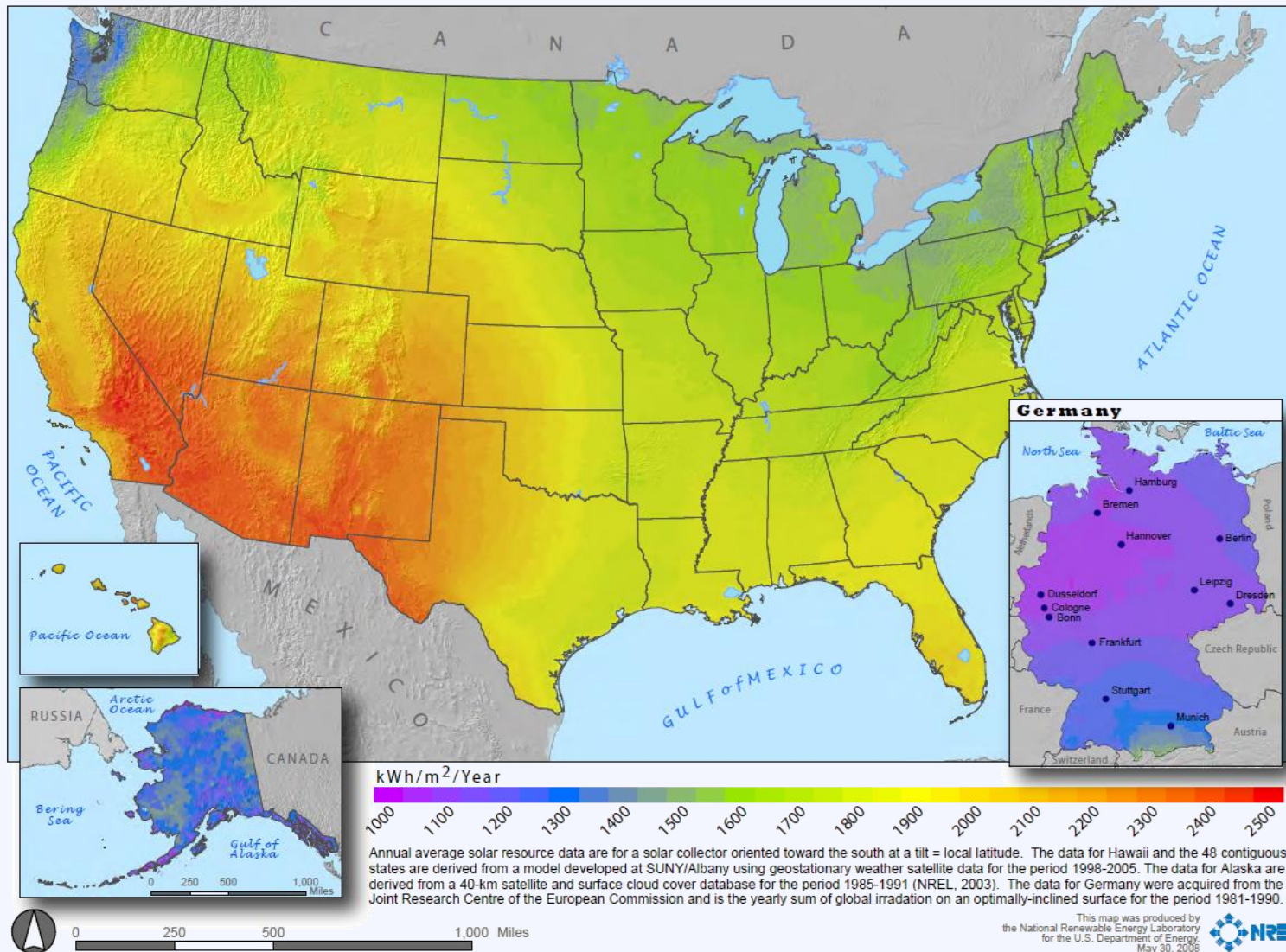
Top 5 Countries Solar Operating Capacity (2012)



Installed Capacity per Capita



US Solar Resource



Explore benefits

and

Overcome barriers

Activity: Identifying Benefits

What is the greatest benefit solar can bring to your community? **[Blue Card]**

Right Now



Write answer on card

During Session



Compile results

After Break



Group discussion

Activity: Addressing Barriers

What is the greatest barrier to solar adoption in your community? **[Green Card]**

Right Now



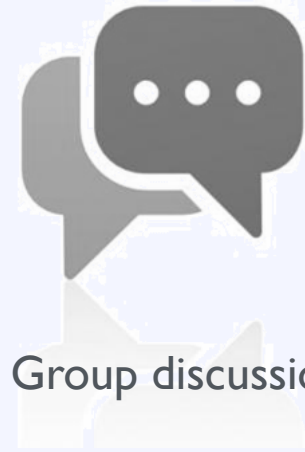
Write answer on card

During Session



Compile results

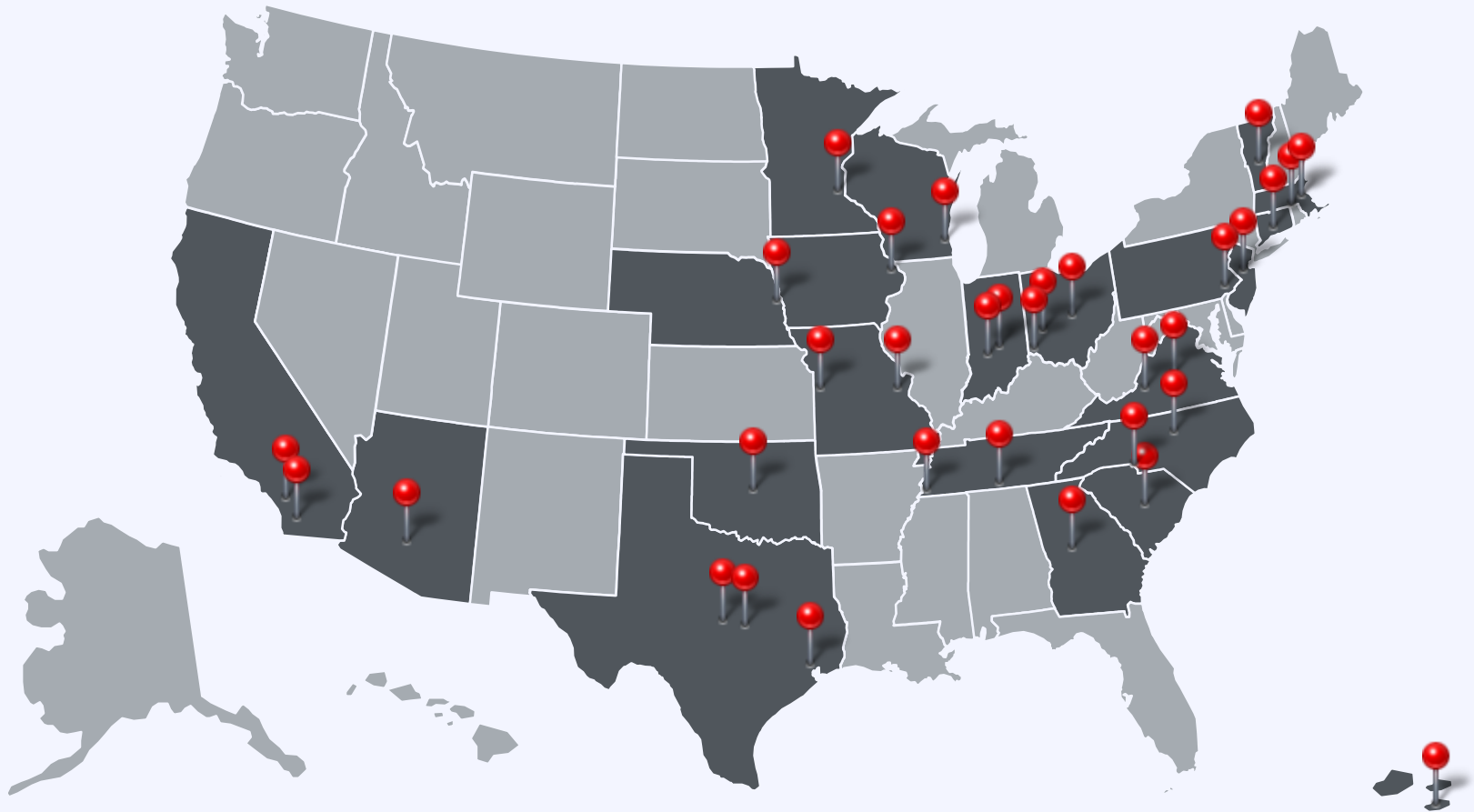
After Break



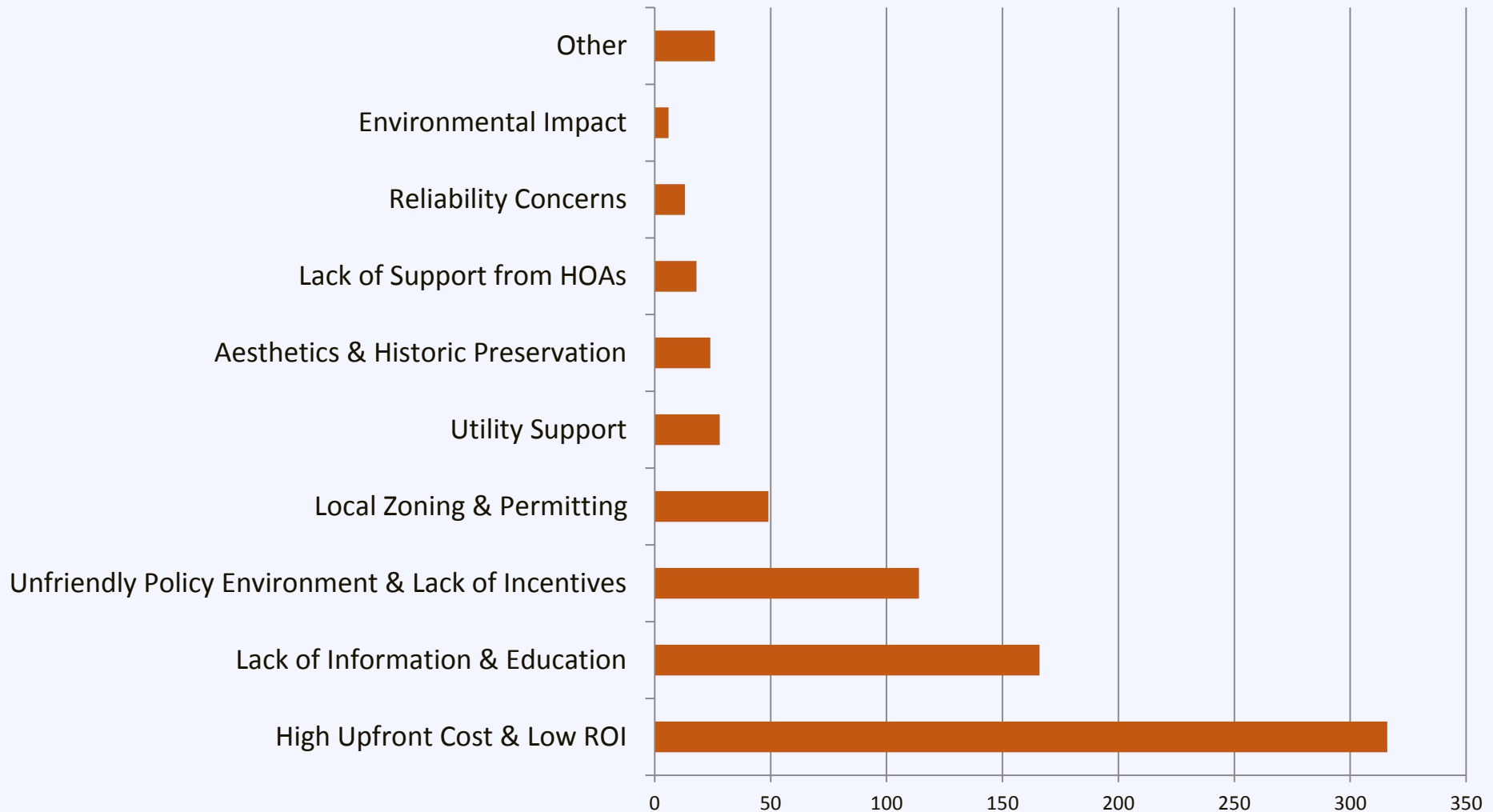
Group discussion

Regional Workshop Surveys

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

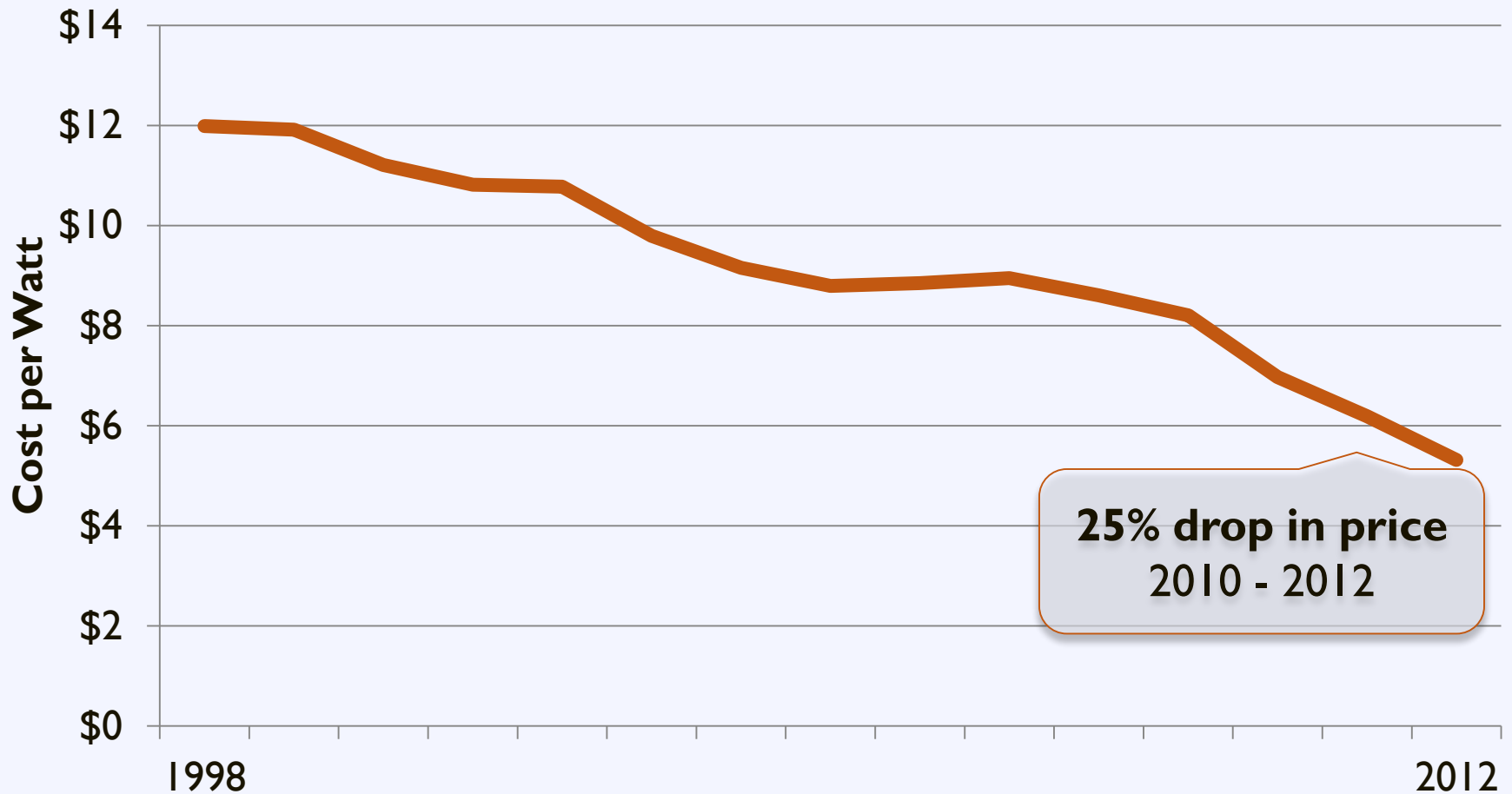


Activity: Addressing Barriers

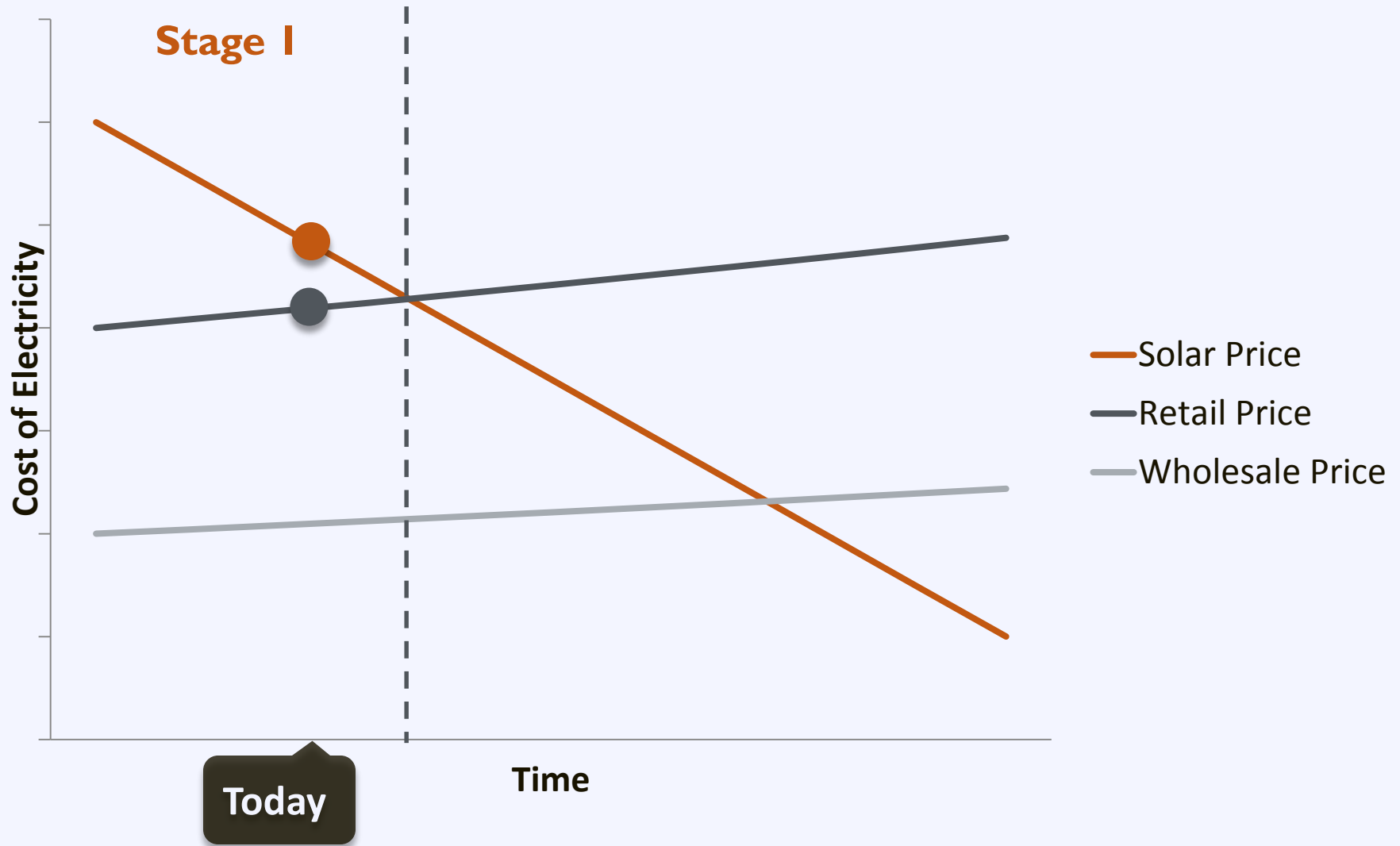


The Cost of Solar PV

US Average Installed Cost for Behind-the-Meter PV

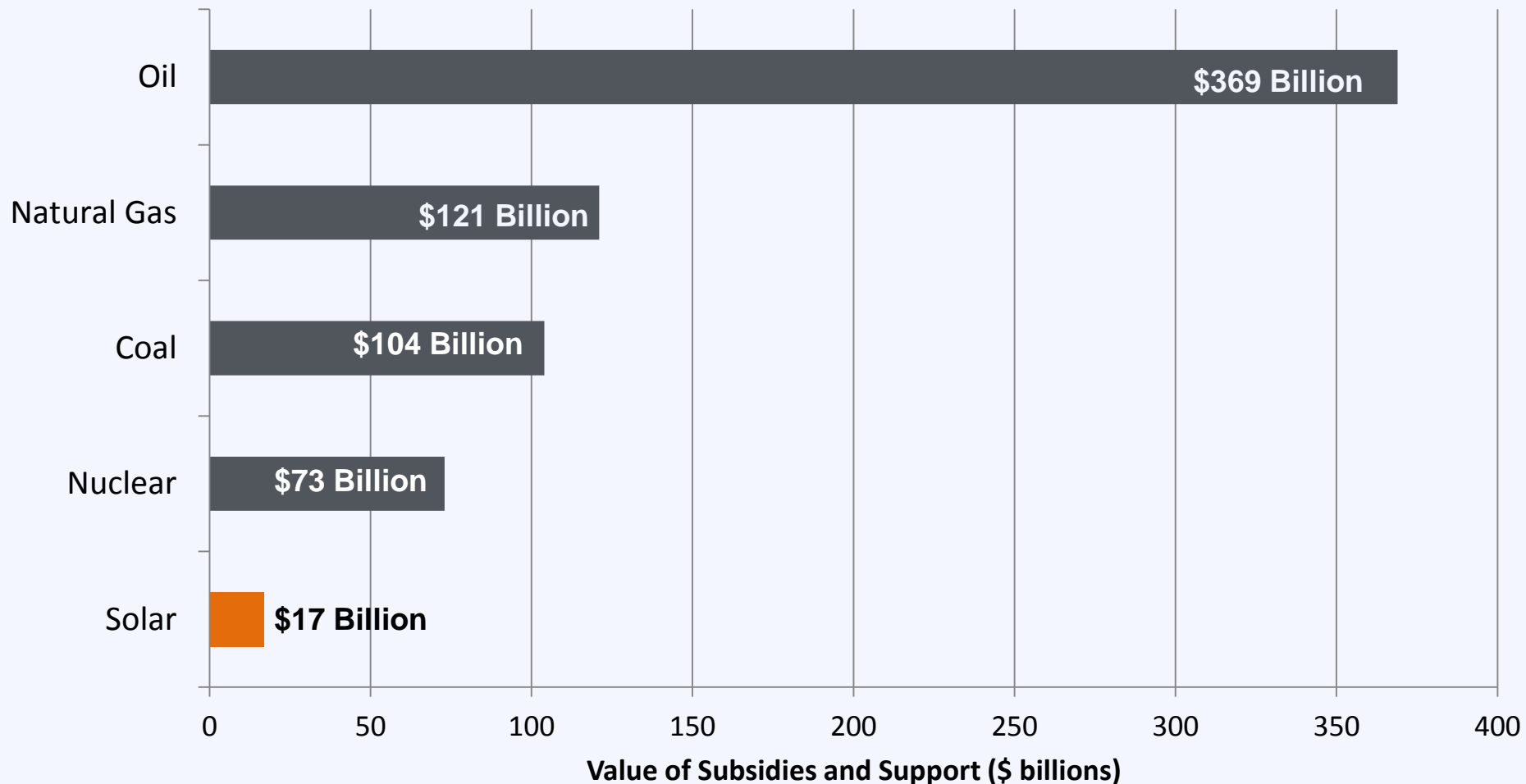


The Cost of Solar PV

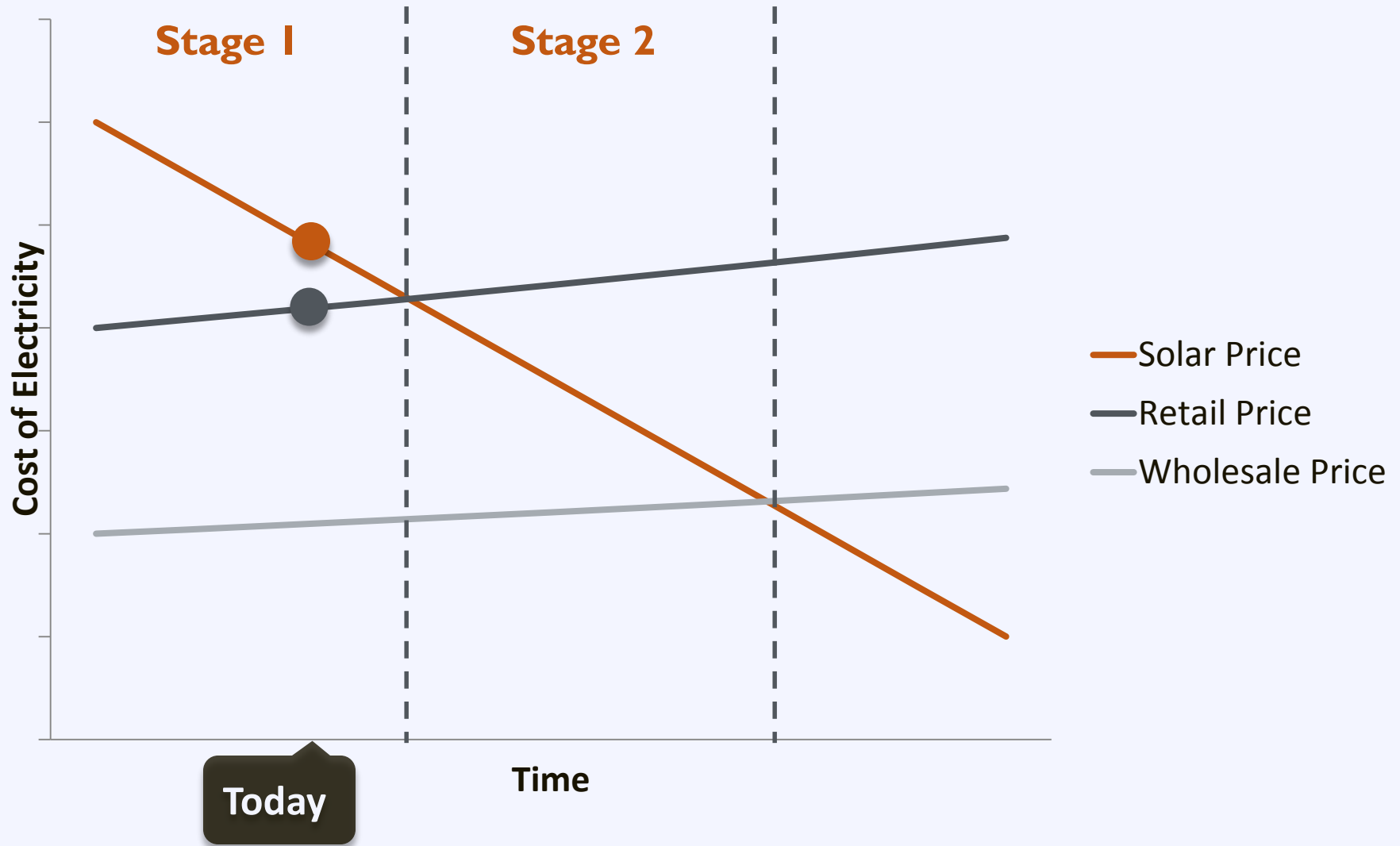


Subsidies and Support

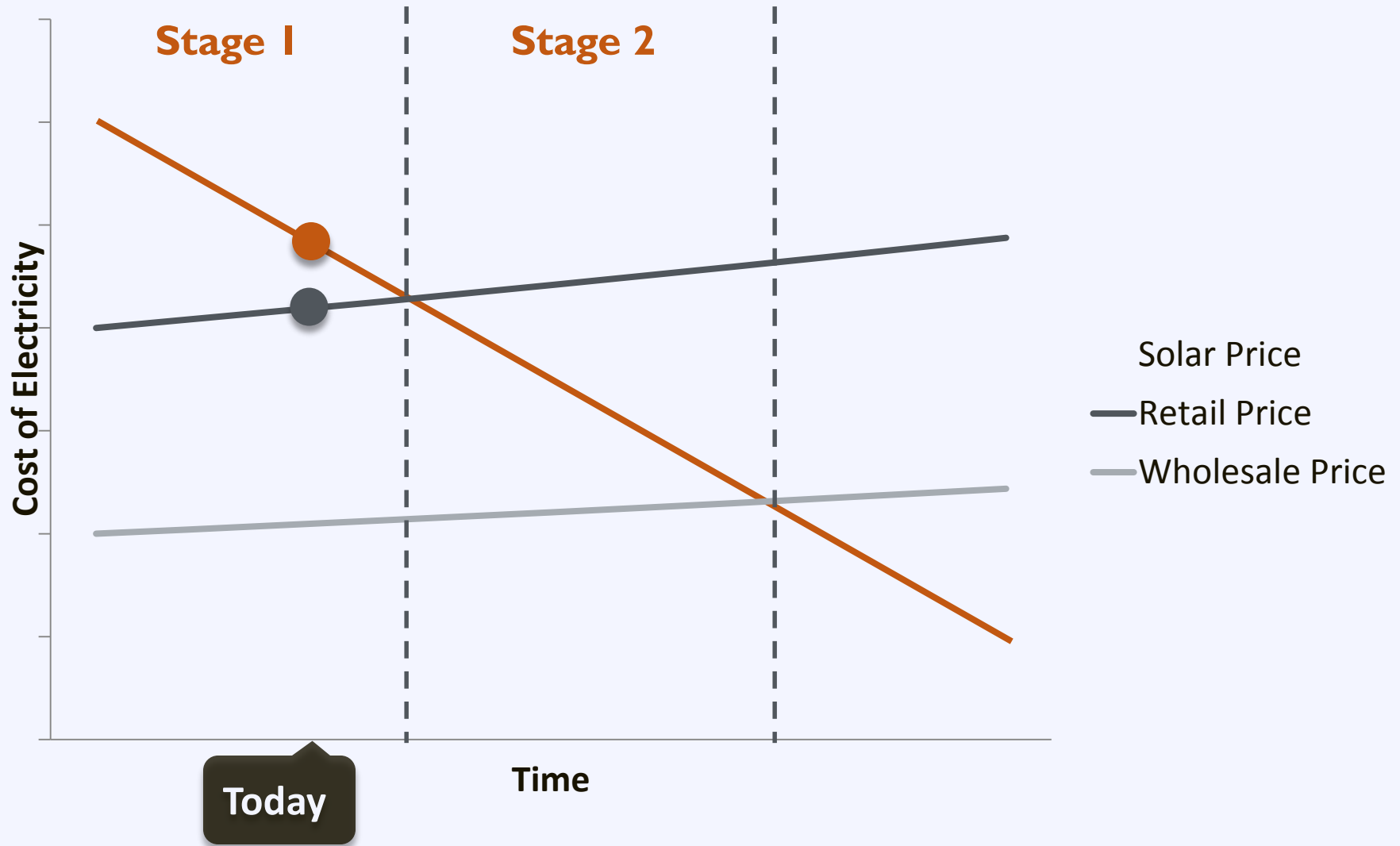
Subsidies for Conventional and Solar Energy, 1950-2010



The Cost of Solar PV

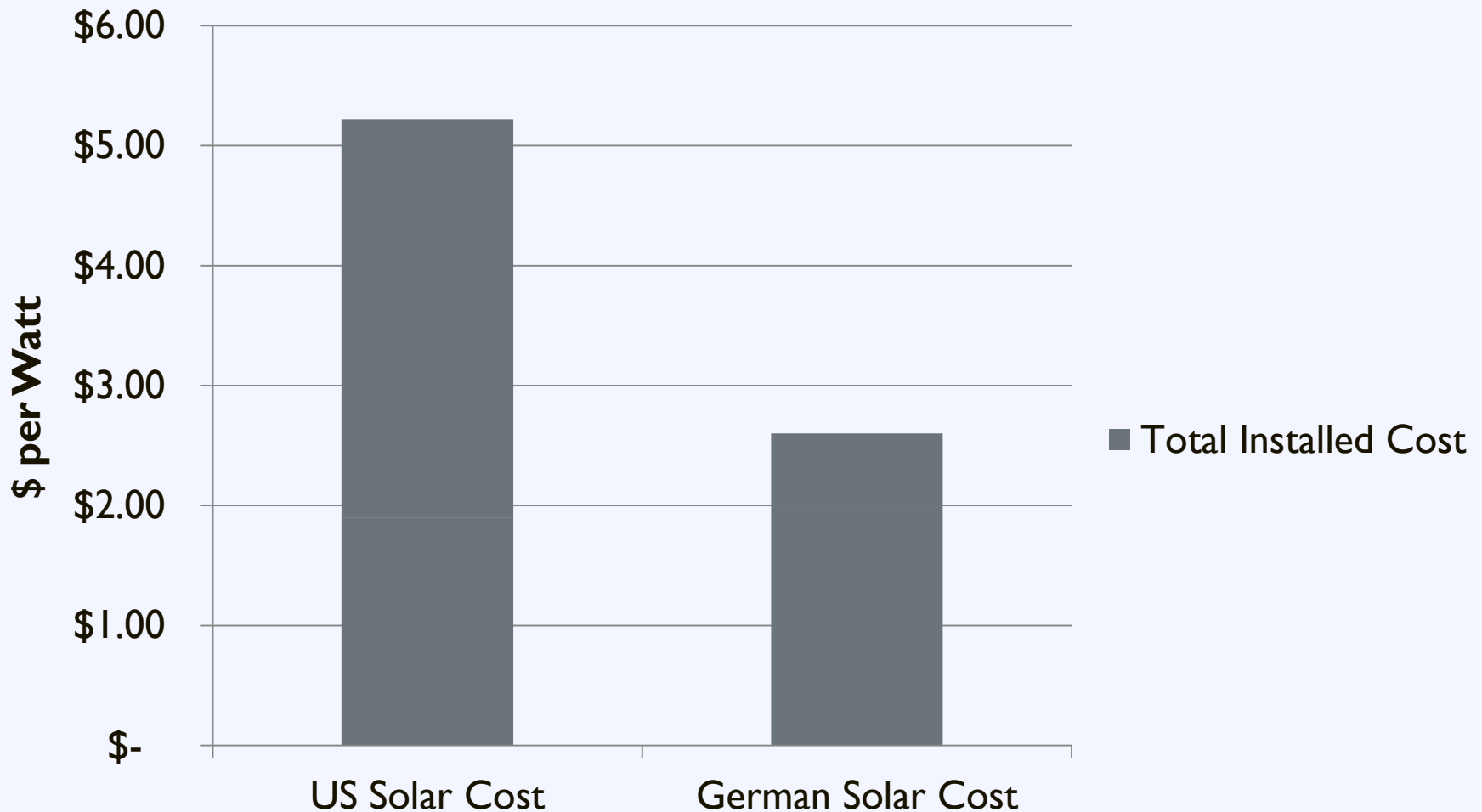


The Cost of Solar PV



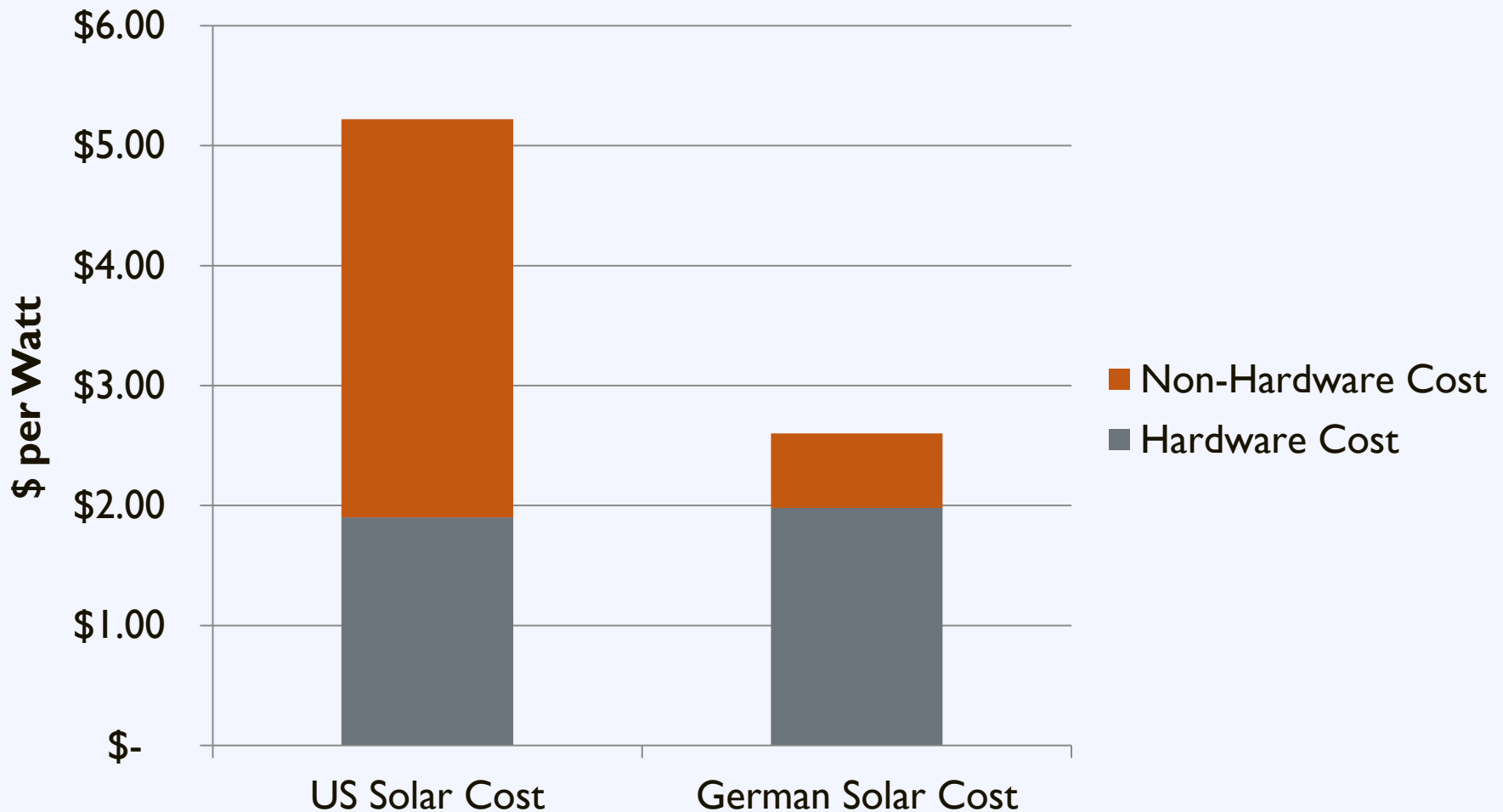
The Cost of Solar in the US

Comparison of US and German Solar Costs



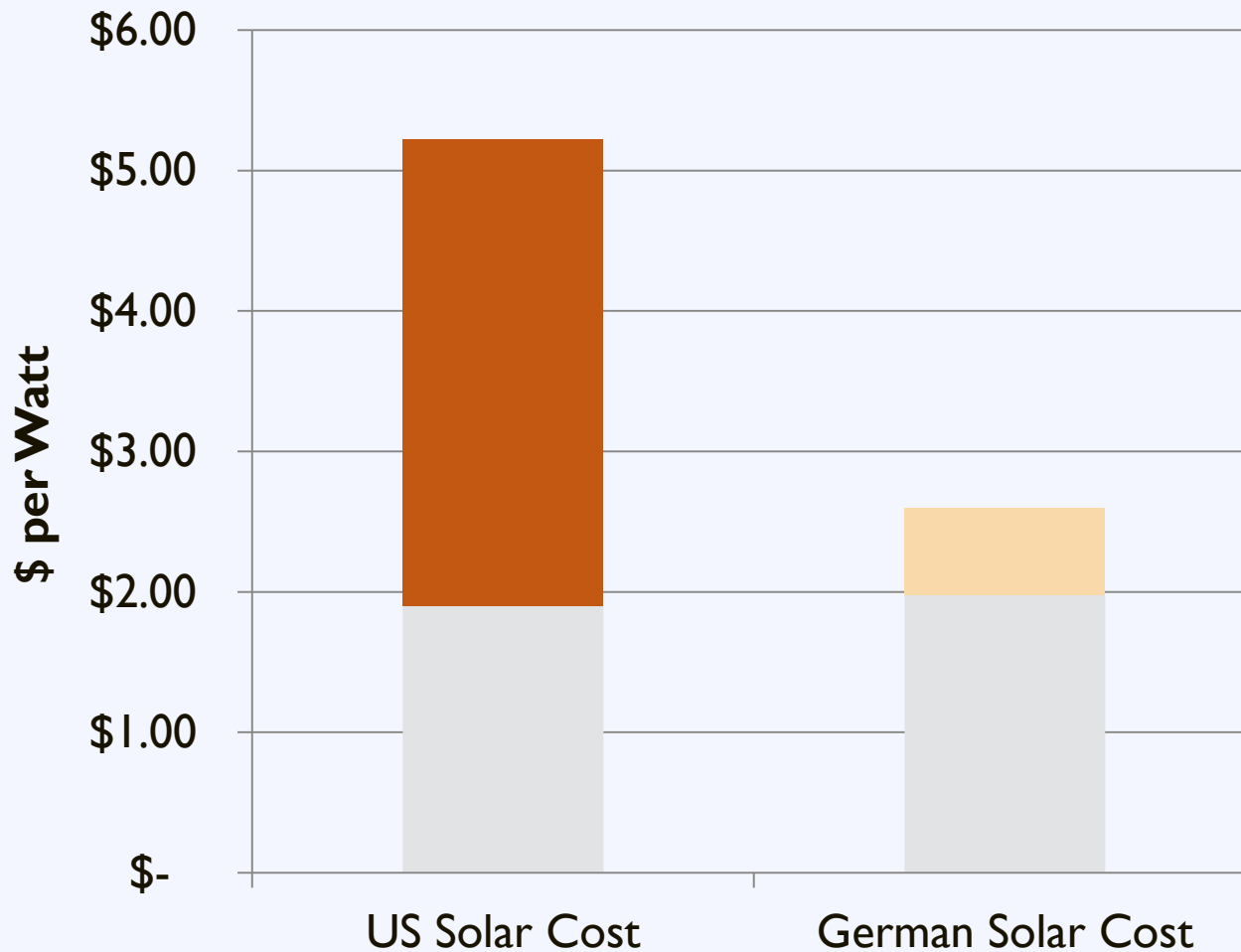
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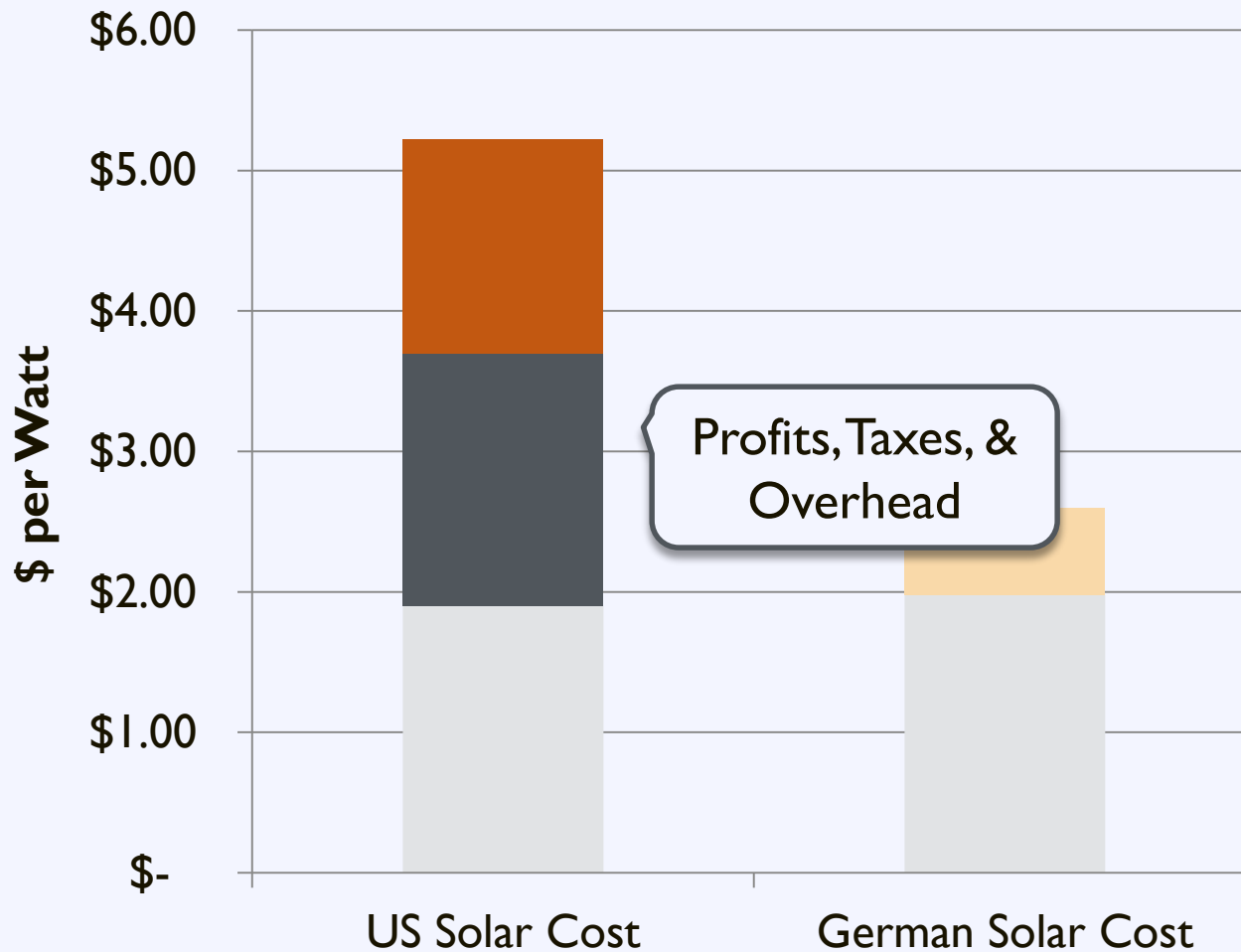
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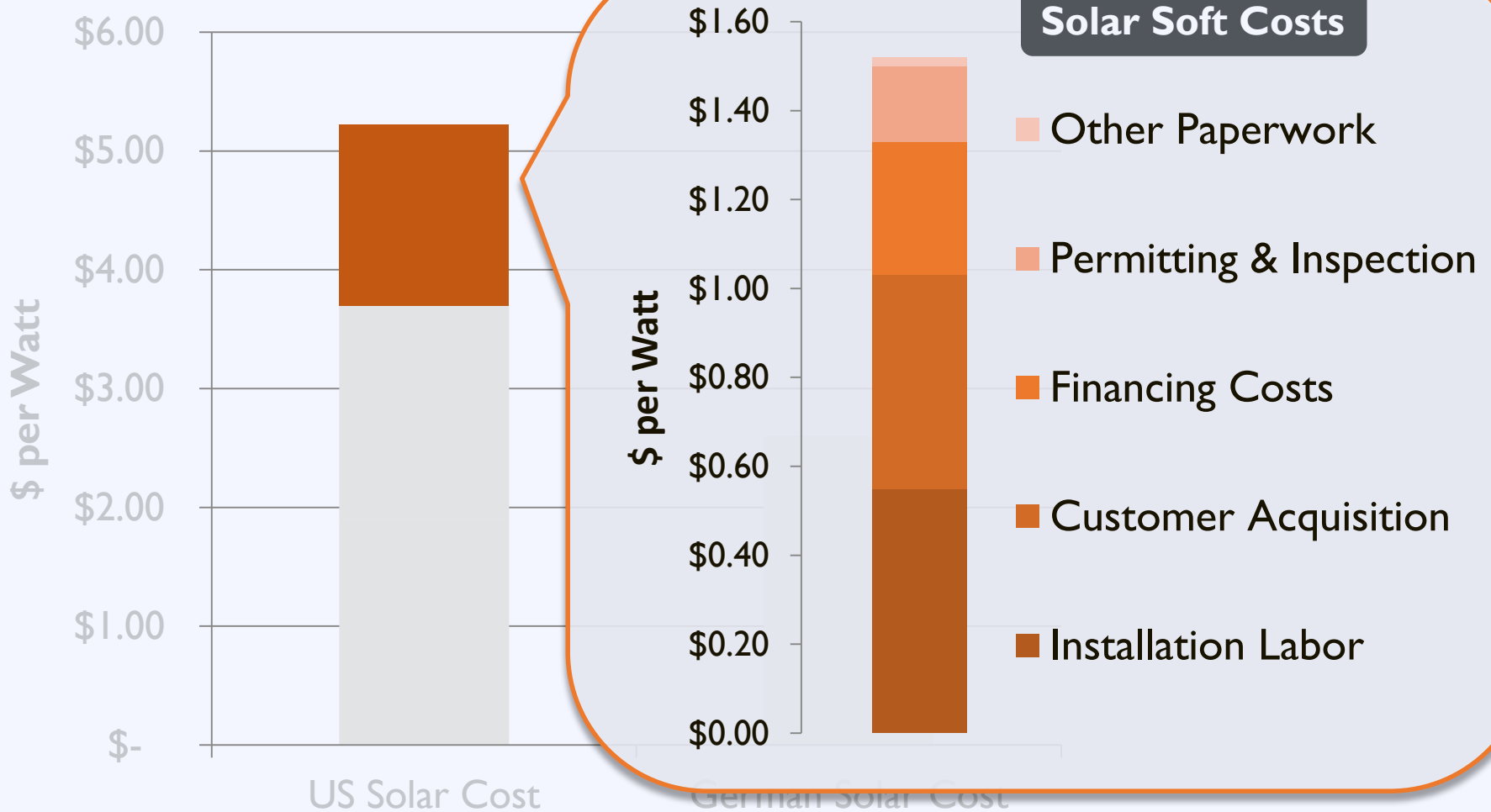
The Cost of Solar in the US

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



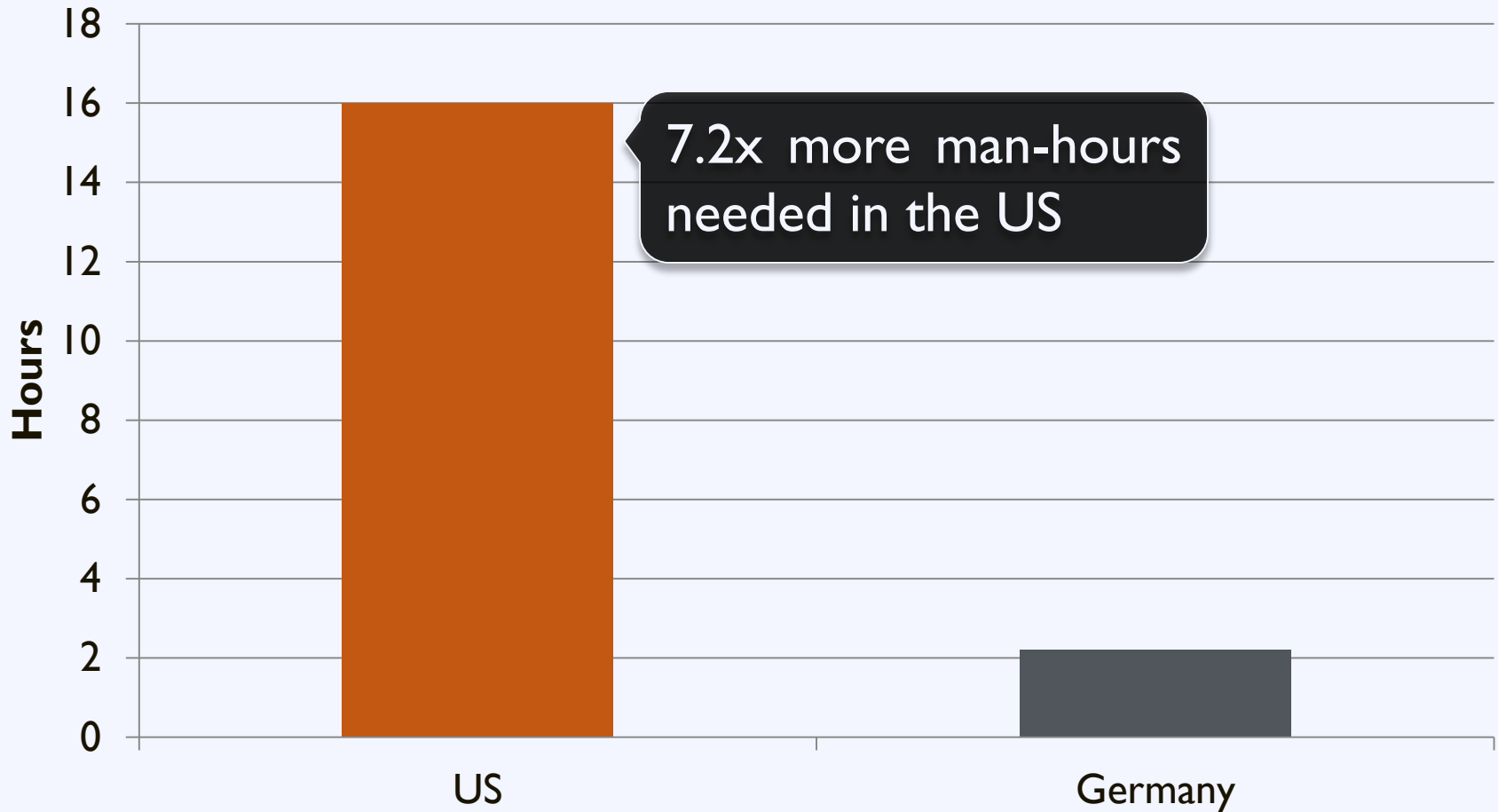
**Germany
Today**

8 days

from inception to completion

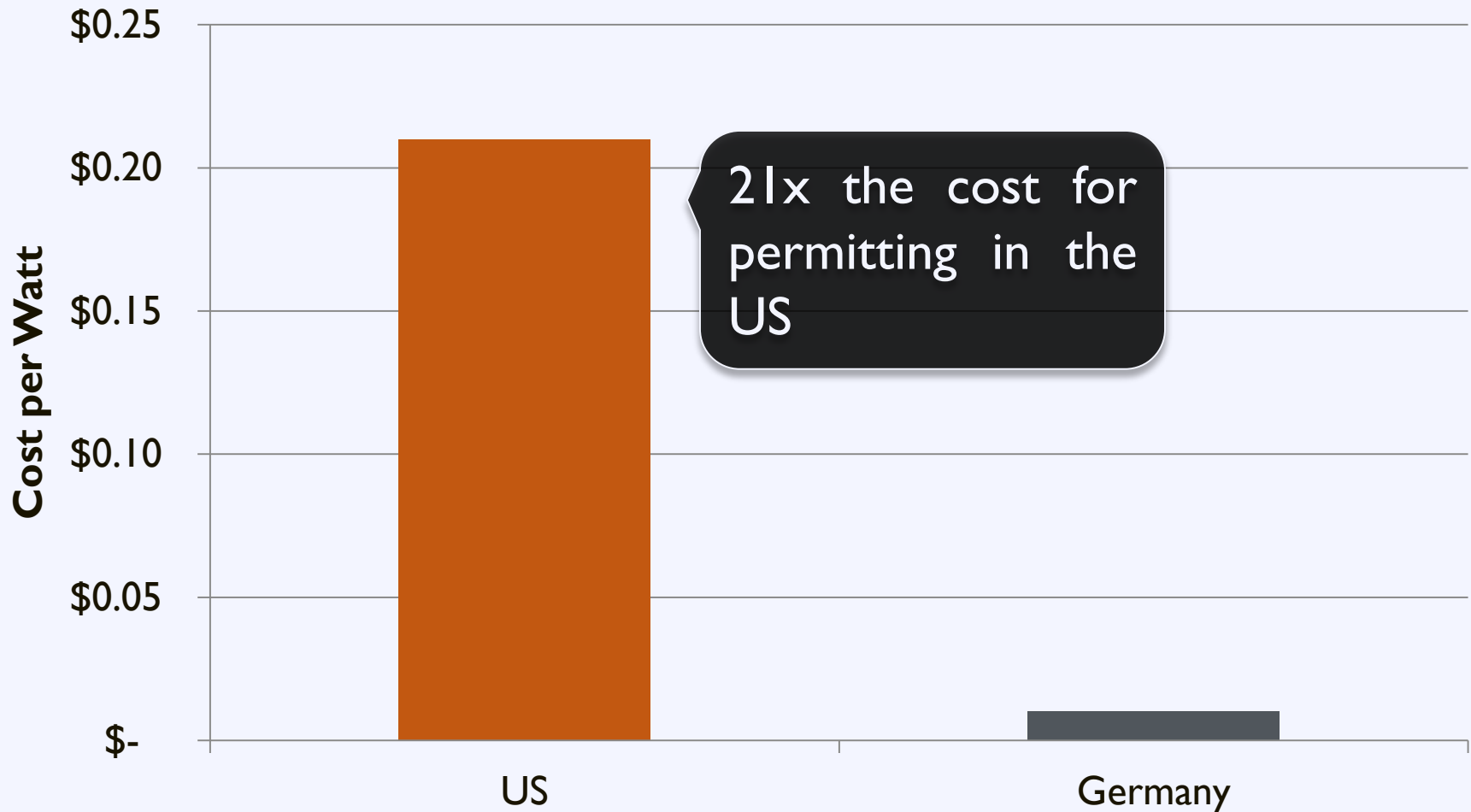
Time to Installation

Average Time to Permit a Solar Installation



Permitting Costs

Average Cost of Permitting in the US and Germany



Germany's Success

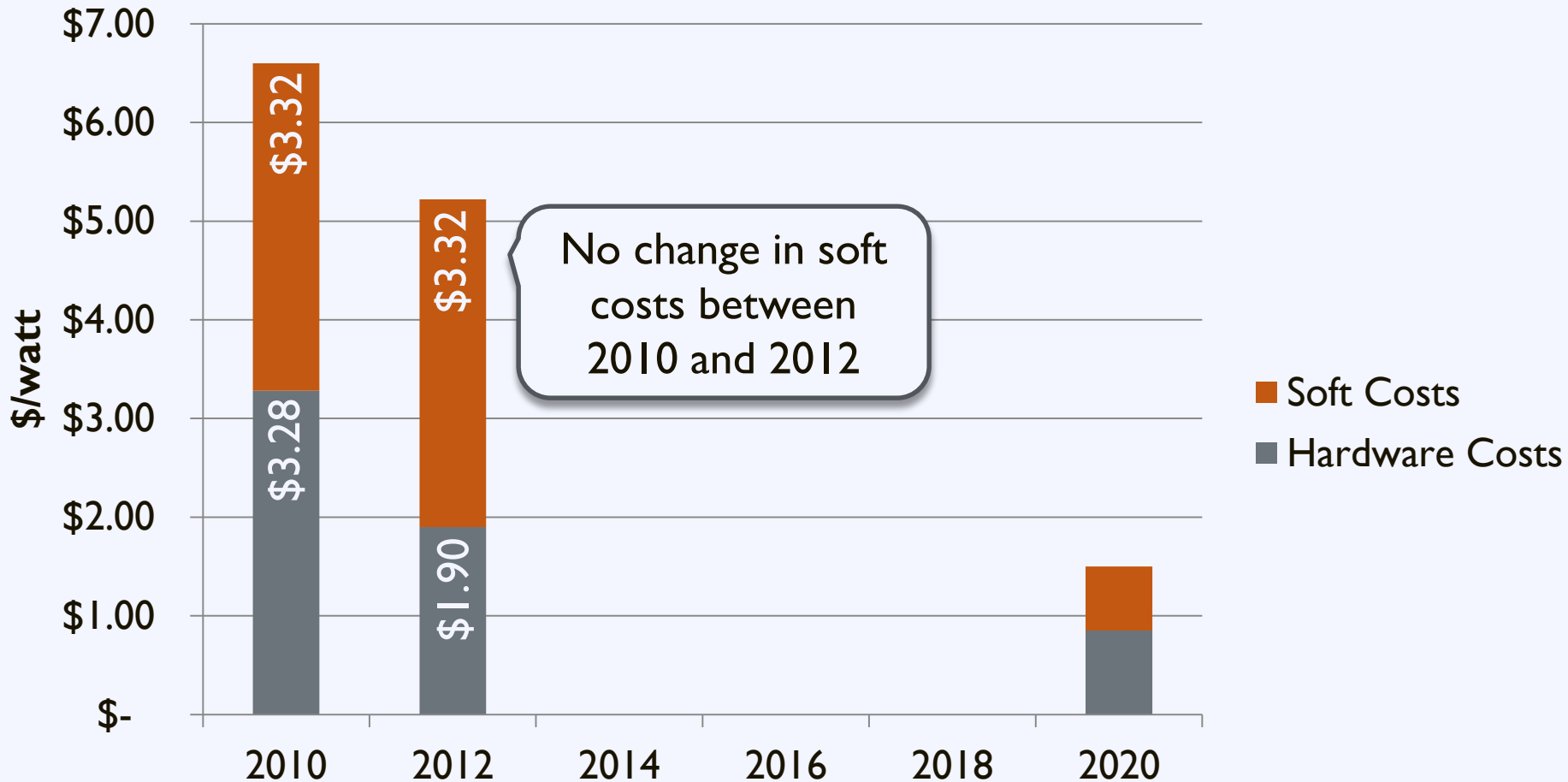
Consistency and Transparency

through

Standardized Processes

The Cost of Solar in the US

Change in Soft Costs and Hardware Costs Over Time



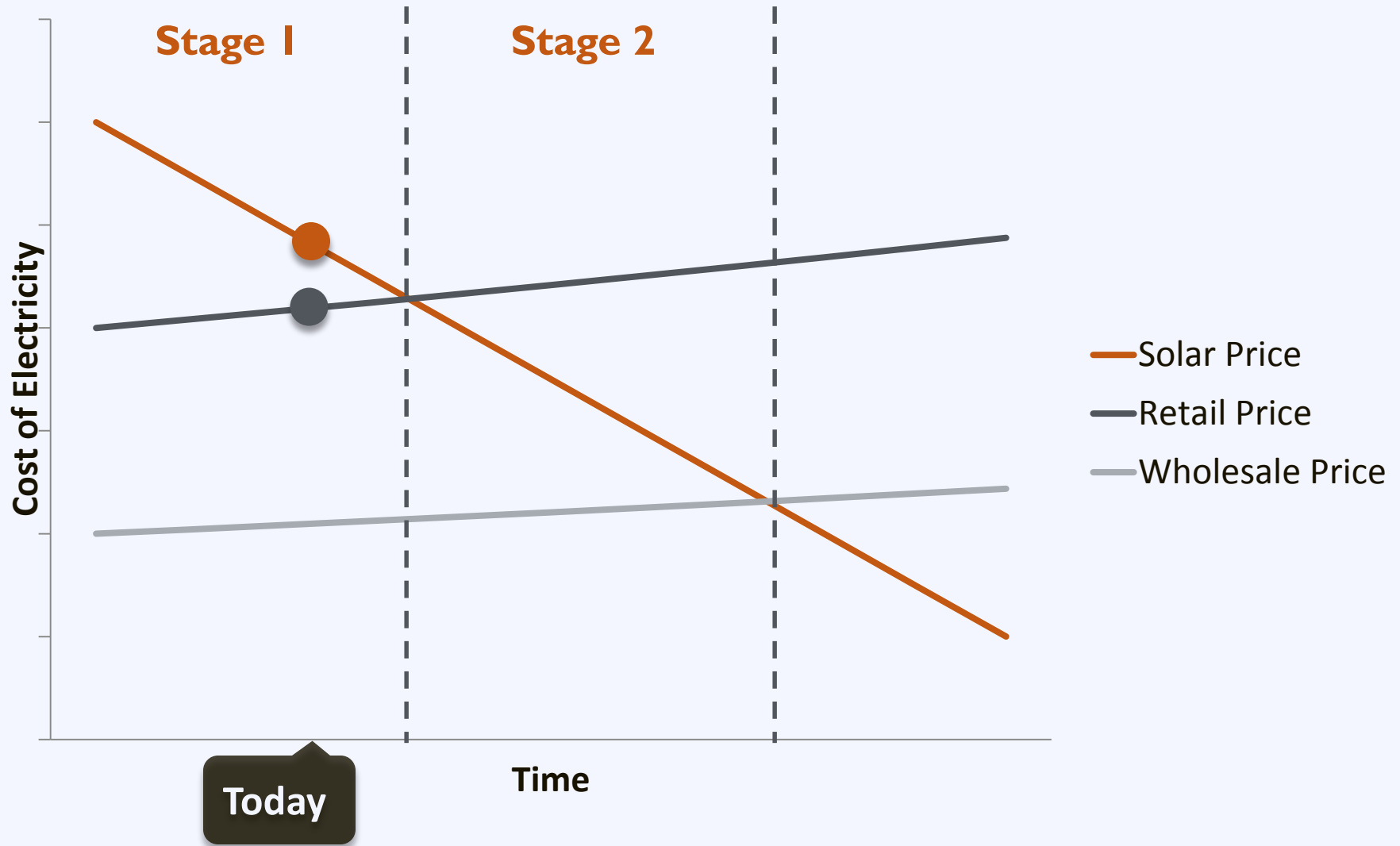
Workshop Goal

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

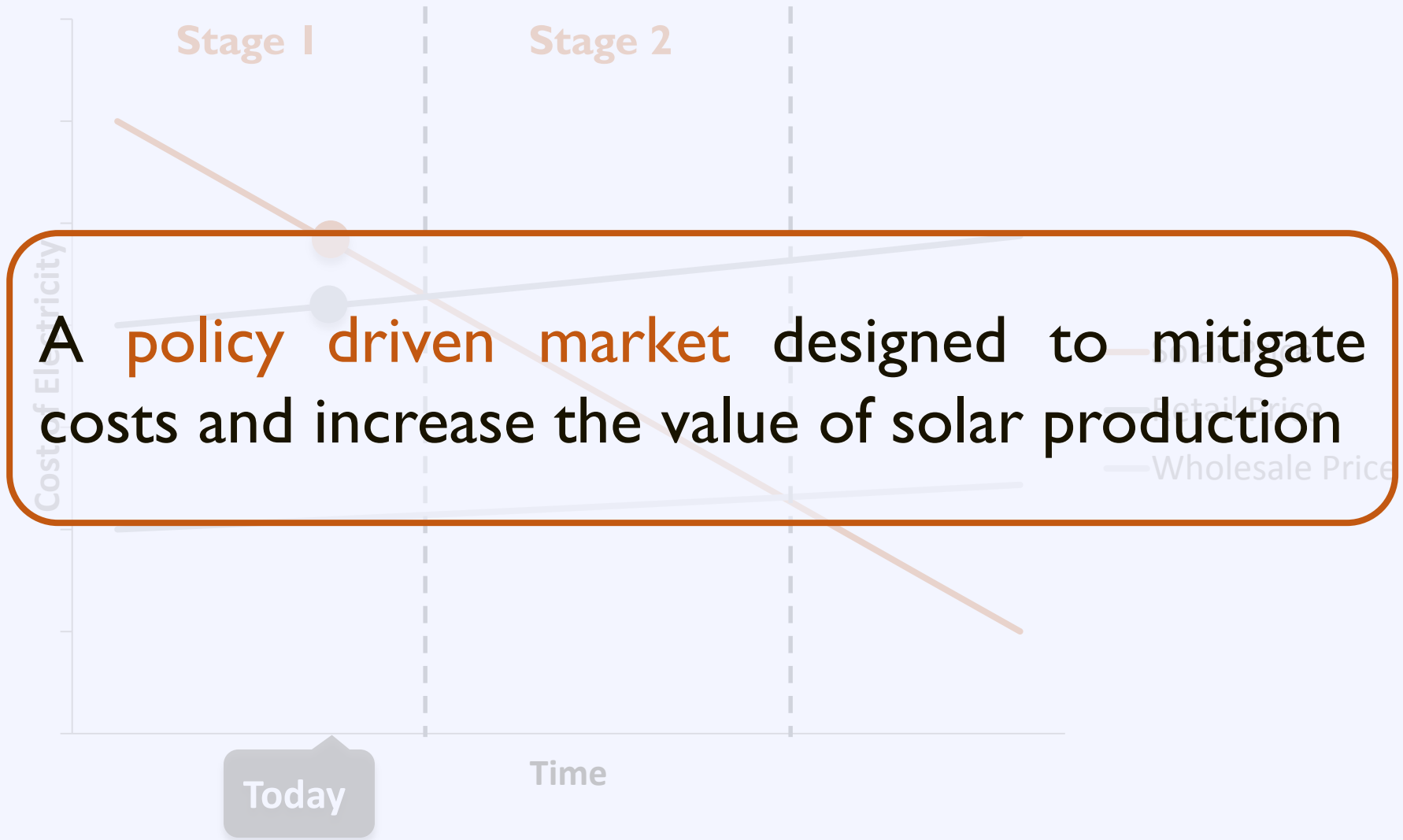
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Solar Market: Trends



Solar Market: Trends



A Policy Driven Market

Federal

Investment Tax
Credit

Accelerated
Depreciation

Qualified Energy
Conservation
Bond

State & Utility

Renewable
Portfolio
Standard

Net Metering

Interconnection

Local

Solar in the
Zoning Code

Solar in the
Building Code

Solar Permits

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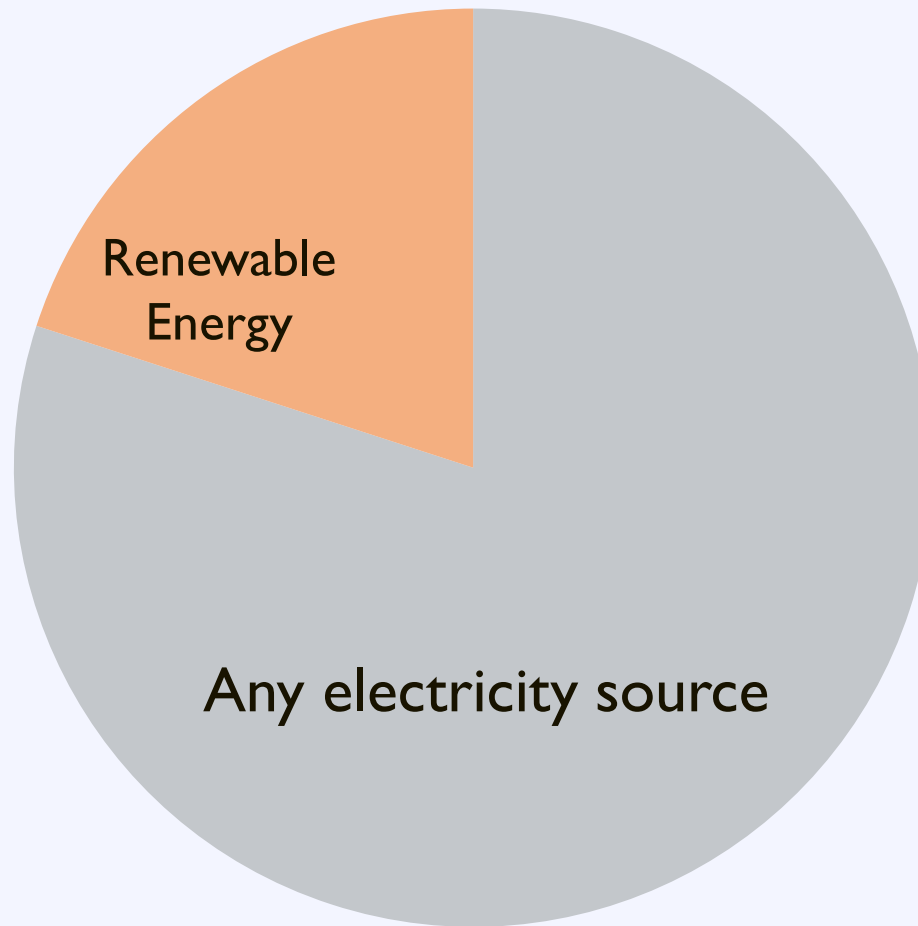
Solar in the
Zoning Code

Solar in the
Building Code

Solar Permits

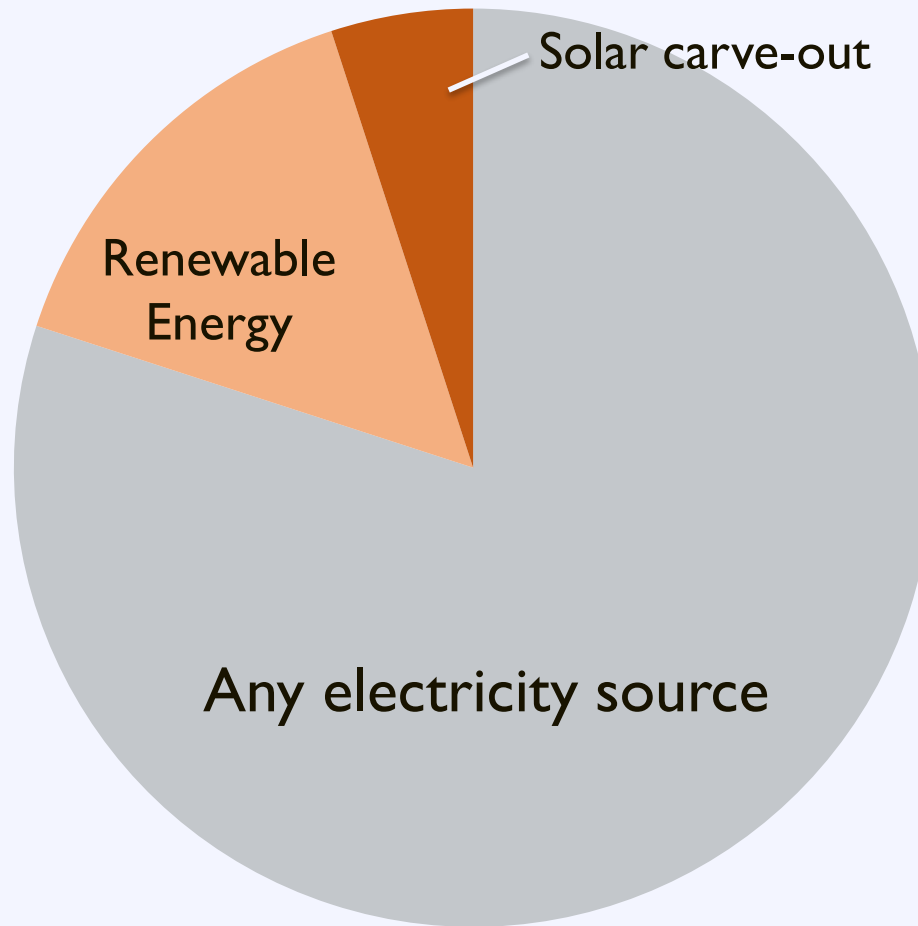
Renewable Portfolio Standard

Retail Electricity Sales



Renewable Portfolio Standard

Retail Electricity Sales



Renewable Portfolio Standard



Fossil Fuel



Renewable Energy

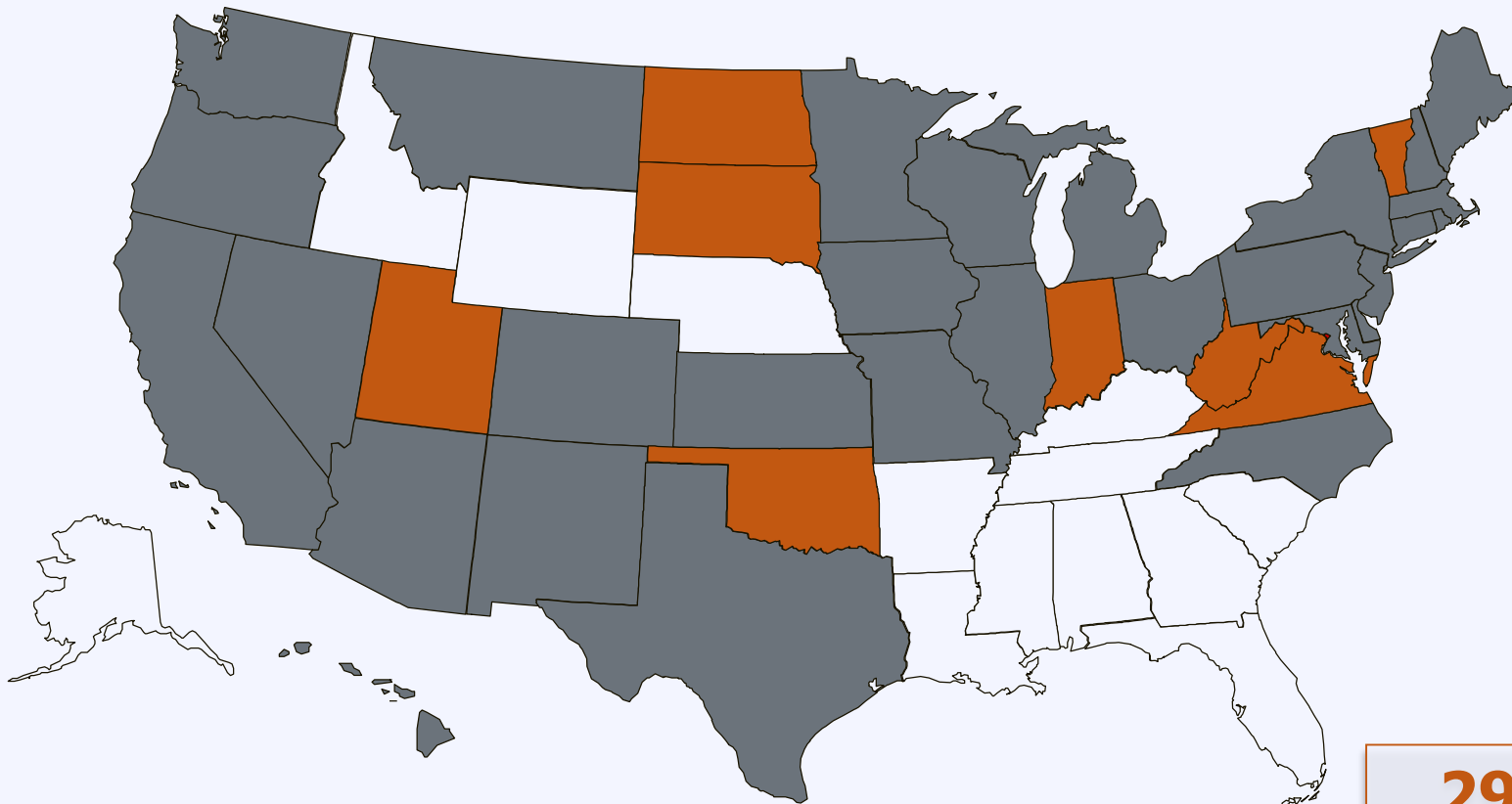
Two revenue streams





Utility

Renewable Portfolio Standard

www.dsireusa.org / August 2012



 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)

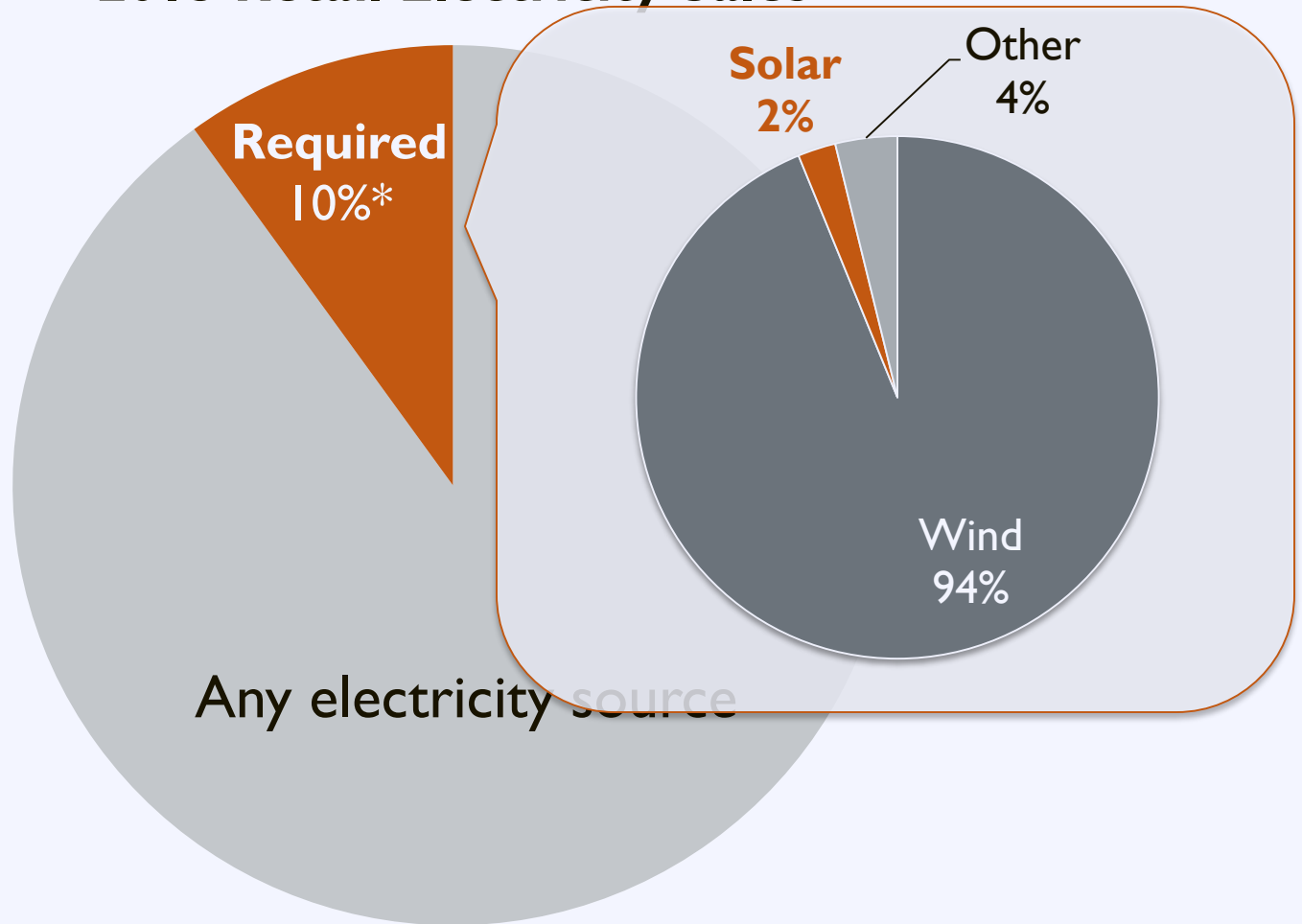
RPS Impacts: Solar Deployment

RPS and Solar/DG Status of Top Ten Solar States by Cumulative Installed Capacity (as of Q4 2012)

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

Michigan RPS

2015 Retail Electricity Sales



Michigan RPS: Future

From a study commissioned by the Governors office in November 2013:

“Utilizing the surcharge caps in the current RPS as a maximum allowable cost...it would be possible to increase the renewable portfolio standard by as much as 8,721 MW through 2035, equivalent to approximately a 30% RPS.”

A Policy Driven Market

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Solar in the
Zoning Code

Solar in the
Building Code

Solar Permits

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: Overview

Morning



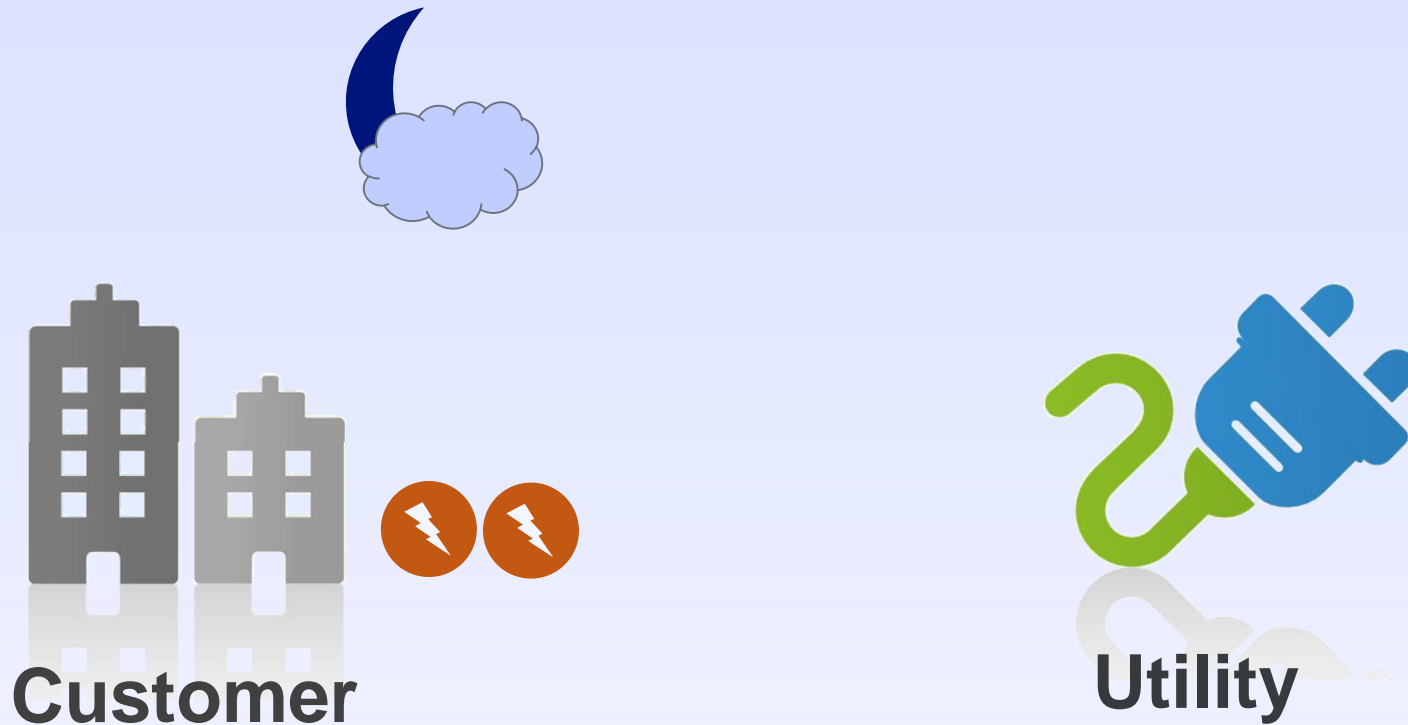
Net Metering: Overview

Afternoon



Net Metering: Overview

Night

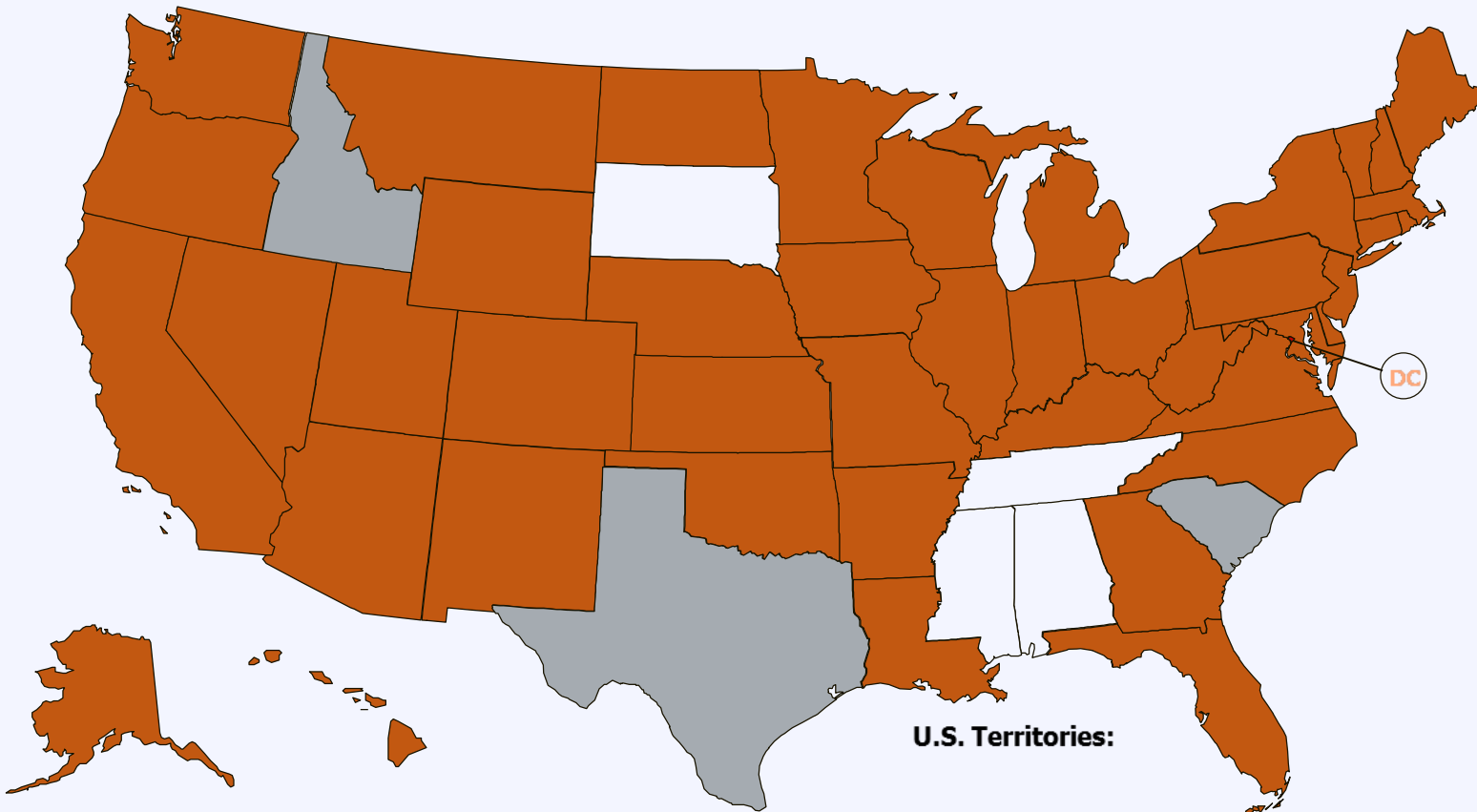


Solar covers 100% of the customer's load, even at night!

Net Metering: Market Share

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

Net Metering



- State policy
- Voluntary utility program(s) only

U.S. Territories:

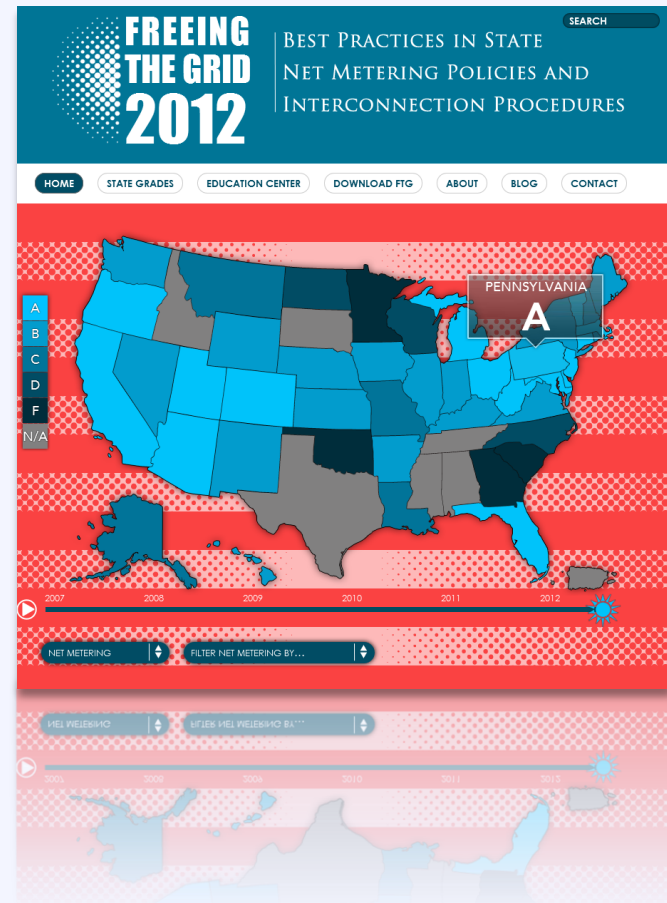
43 states +
Washington DC and 4
territories have Net
Metering Policies

Net Metering: Resources

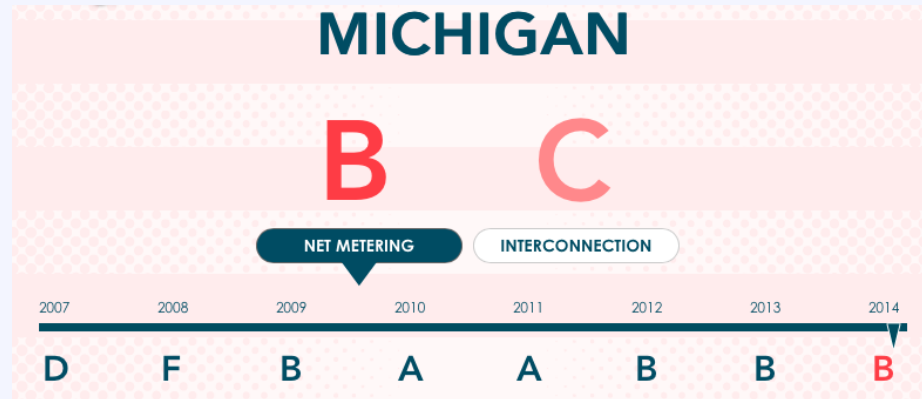
Resource **Freeing the Grid**

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

<http://freeingthegrid.org/>



Net Metering: Michigan



Credit Value

Retail Rate (<20 kW)
Power Rate (>20 kW)



Credit Rollover

Indefinite



System Capacity Limit

150 kW



Aggregate Limit

0.75% of peak load

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Solar in the
Zoning Code

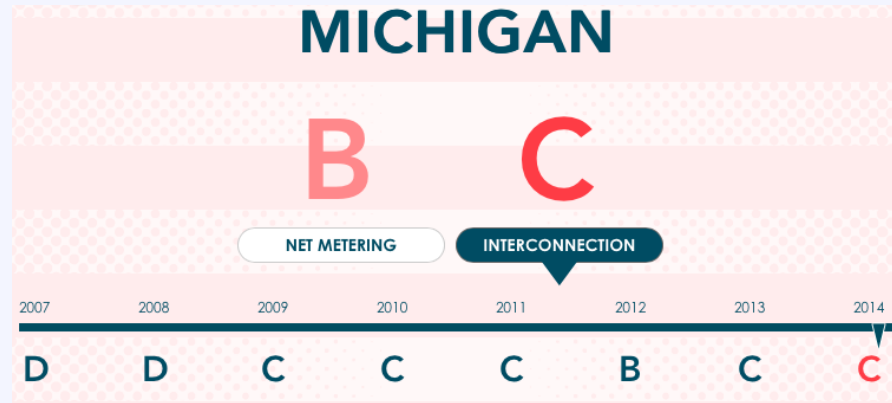
Solar in the
Building Code

Solar Permits

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: Michigan



Applicable Technologies
All DG renewables



Applicable Utilities
IOUs & Co-Ops



System Capacity Limit
None



Bonus
Insurance waived for
projects < 25 kW

Q & A

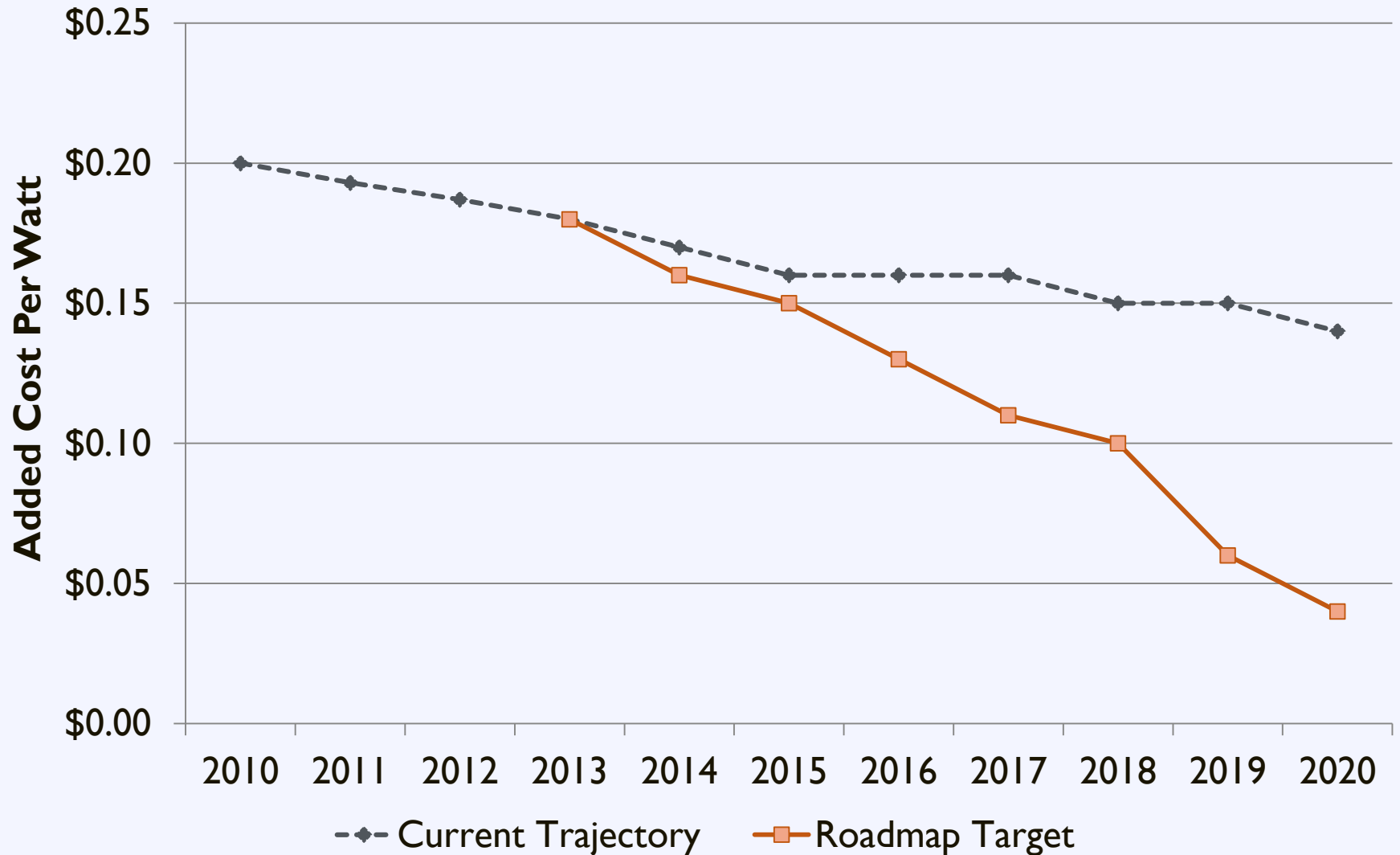
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Regulatory Barriers



Planning & Permitting Roadmap



Solar Ordinance

What is a Solar Ordinance?

A regulatory framework that encourages responsible solar development while preserving the public health, safety, welfare, and character of a community.

Solar Ordinance

What is a Solar Ordinance?

A regulatory framework that encourages responsible solar development while preserving the public health, safety, welfare, and character of a community.

Challenge: Inconsistency

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

Consumer Challenges



The Opportunity

Compare this to **Germany** which has

One Unified Process

where applicants complete

A single two page form

to receive all necessary permits

Benefit of a Solar Ordinance

A solar ordinance helps to ensure

responsible solar development

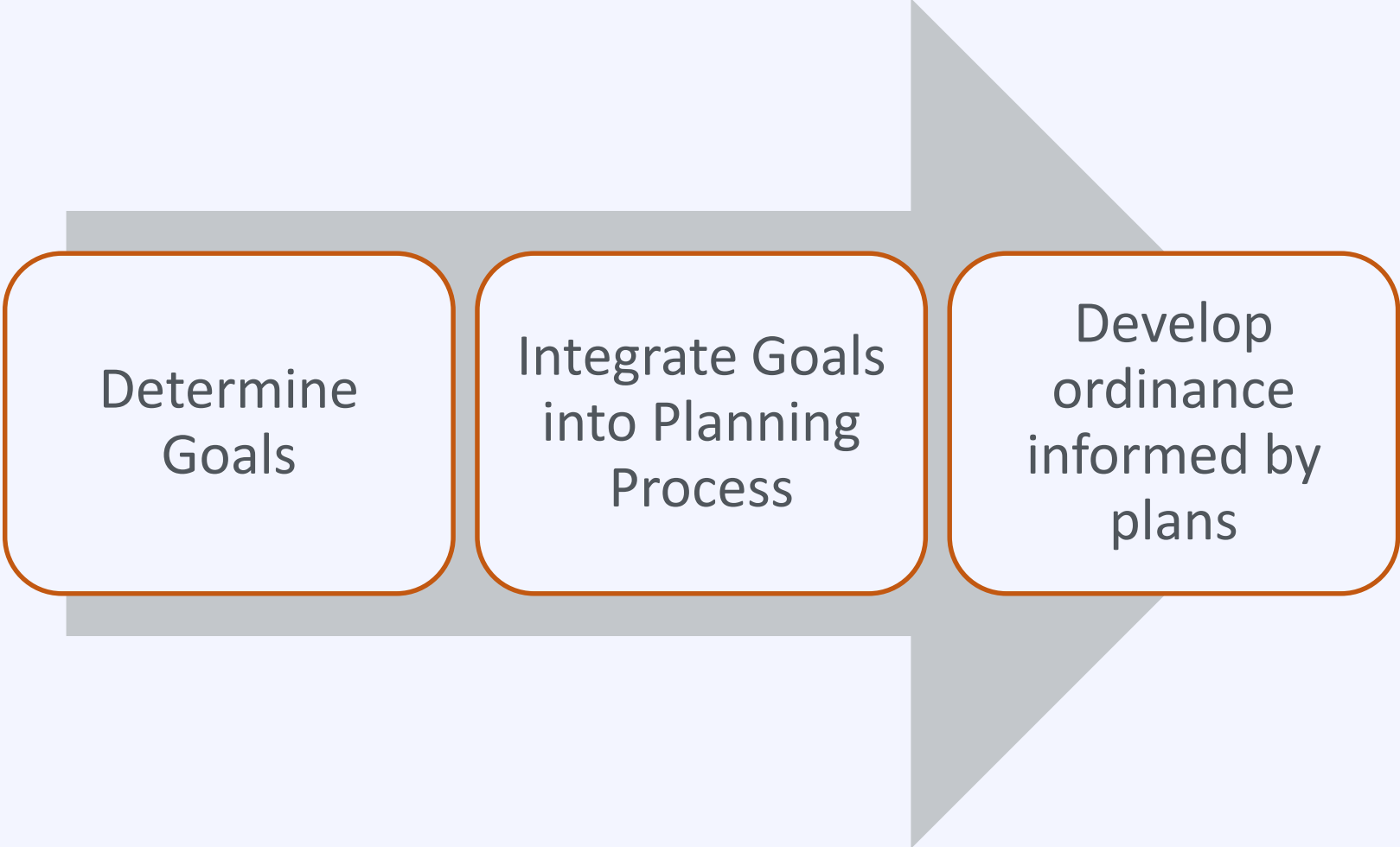
through a

consistent and transparent process

Balancing Growth and Regulation

How does a local government define what types of solar installations are right for their community?

Solar Ordinance: Process



Determine
Goals

Integrate Goals
into Planning
Process

Develop
ordinance
informed by
plans

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Local

Zoning &
Building Code

Solar Access

Solar Permits

Update Zoning Code

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: 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



Source: SolarCentury

Update Building Code

Solar Ready Construction:

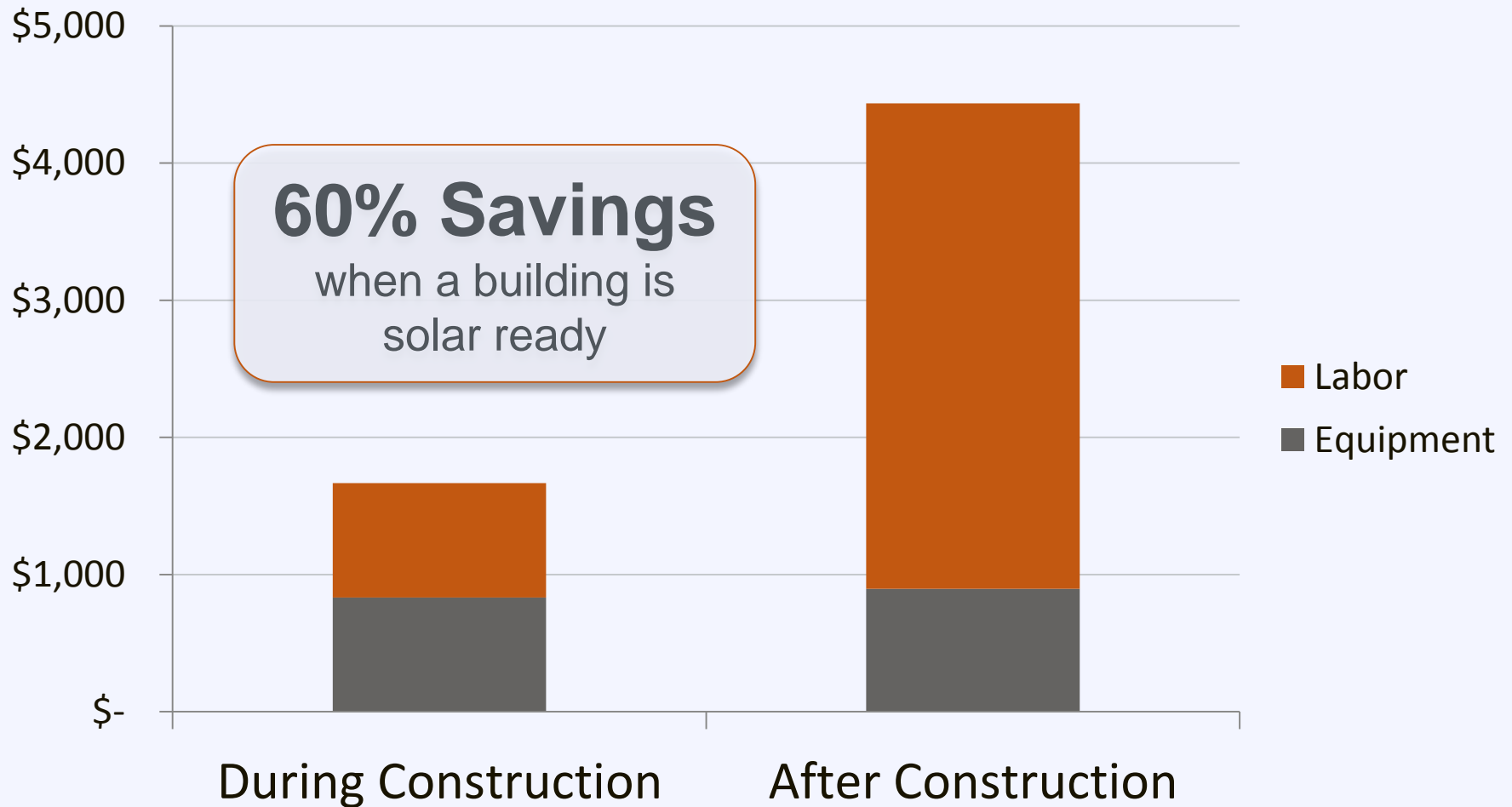
Preparing a building for solar at the outset can help make future solar installations easier and more cost effective.

Update Building Code

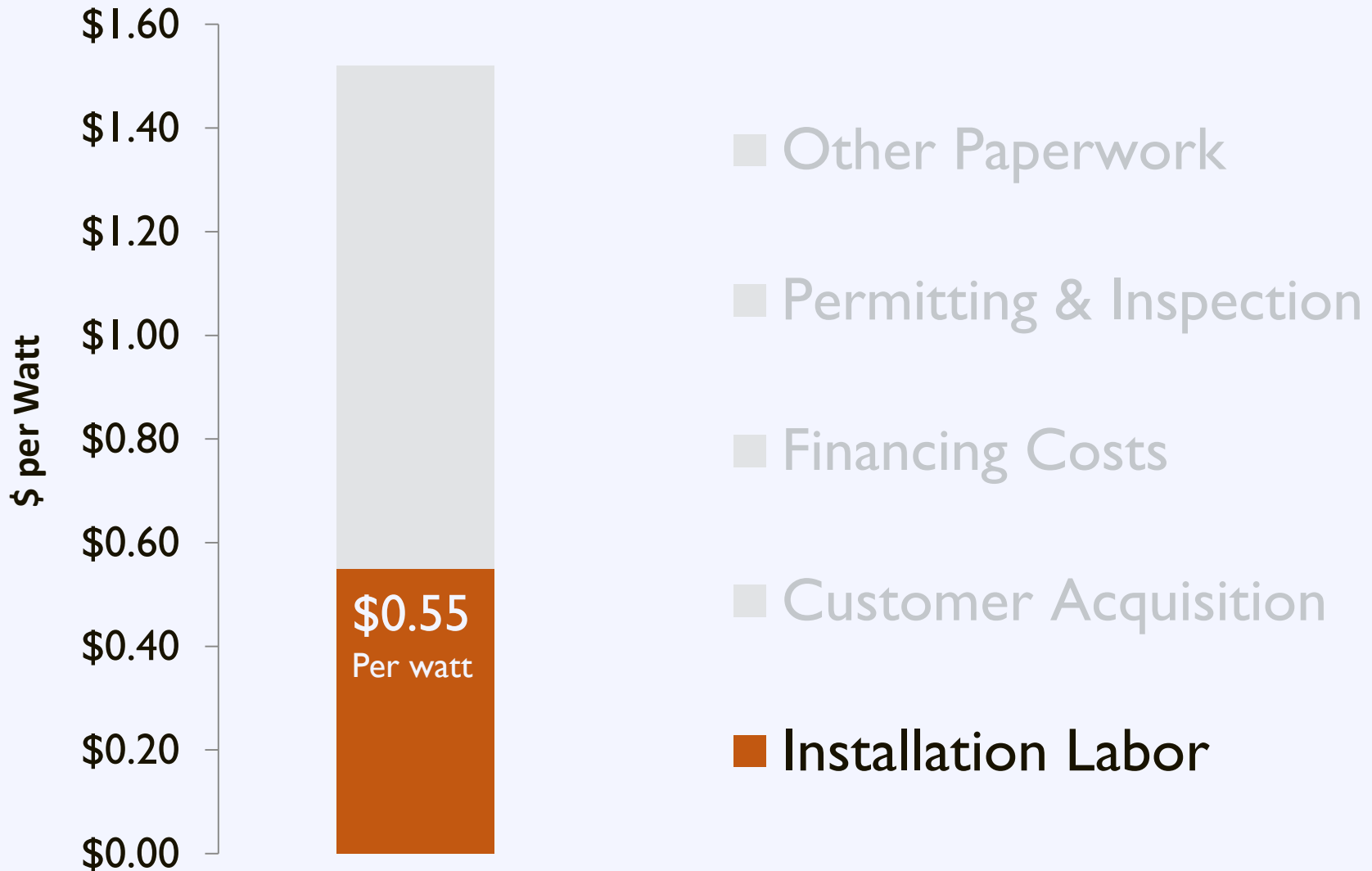
Require builders to:

- ✓ 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

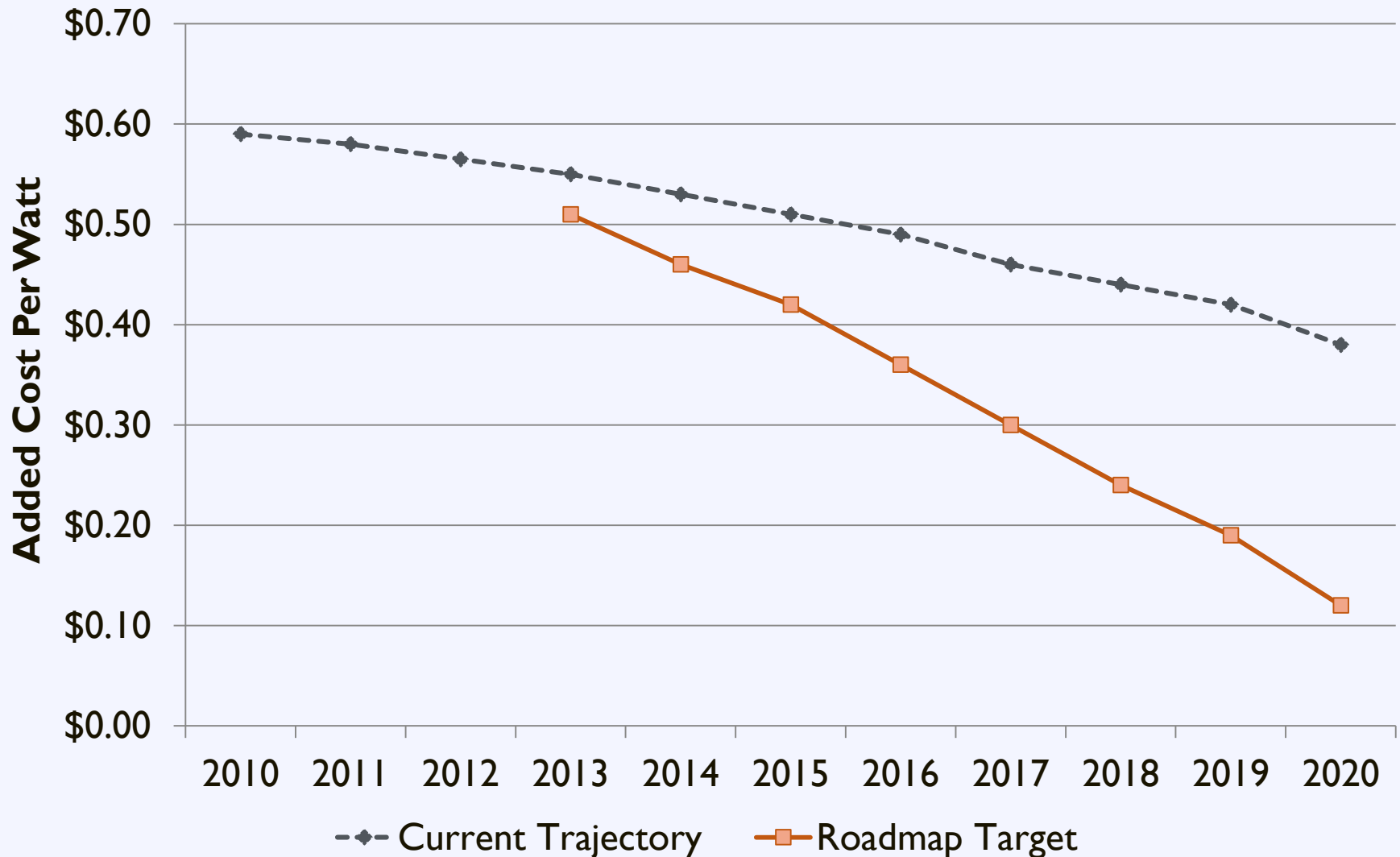
Update Building Code



Installation Soft Costs



Installation Labor Roadmap



A Policy Driven Market

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Solar Permits

Solar Access



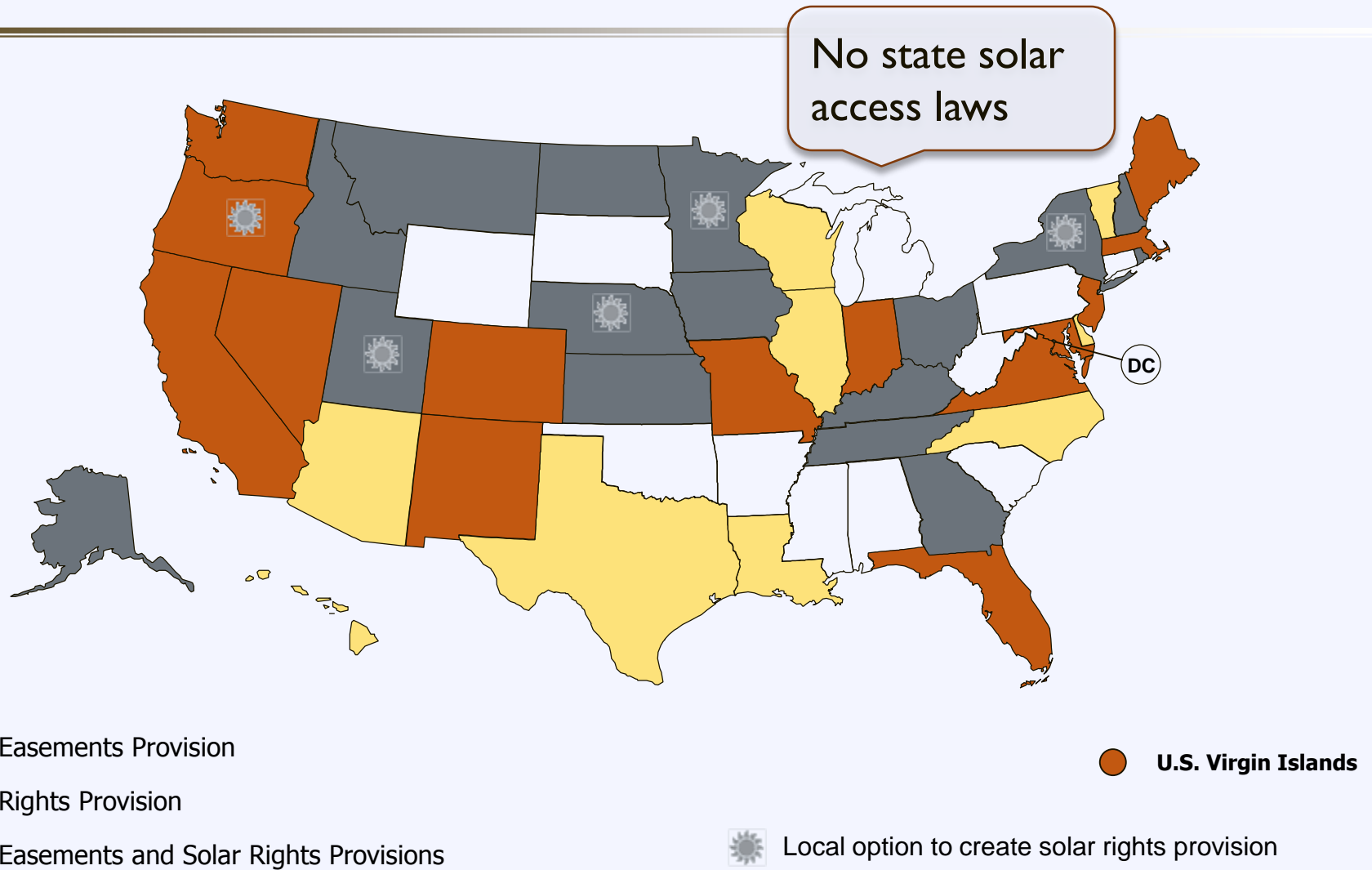
A landowner does not have any legal right to the free flow of light and air across the adjoining land of his neighbor

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

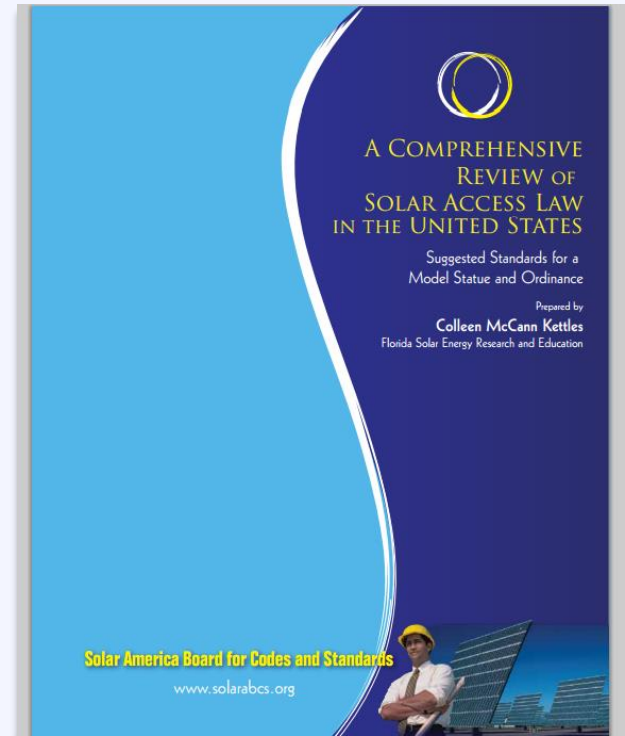


Solar Access

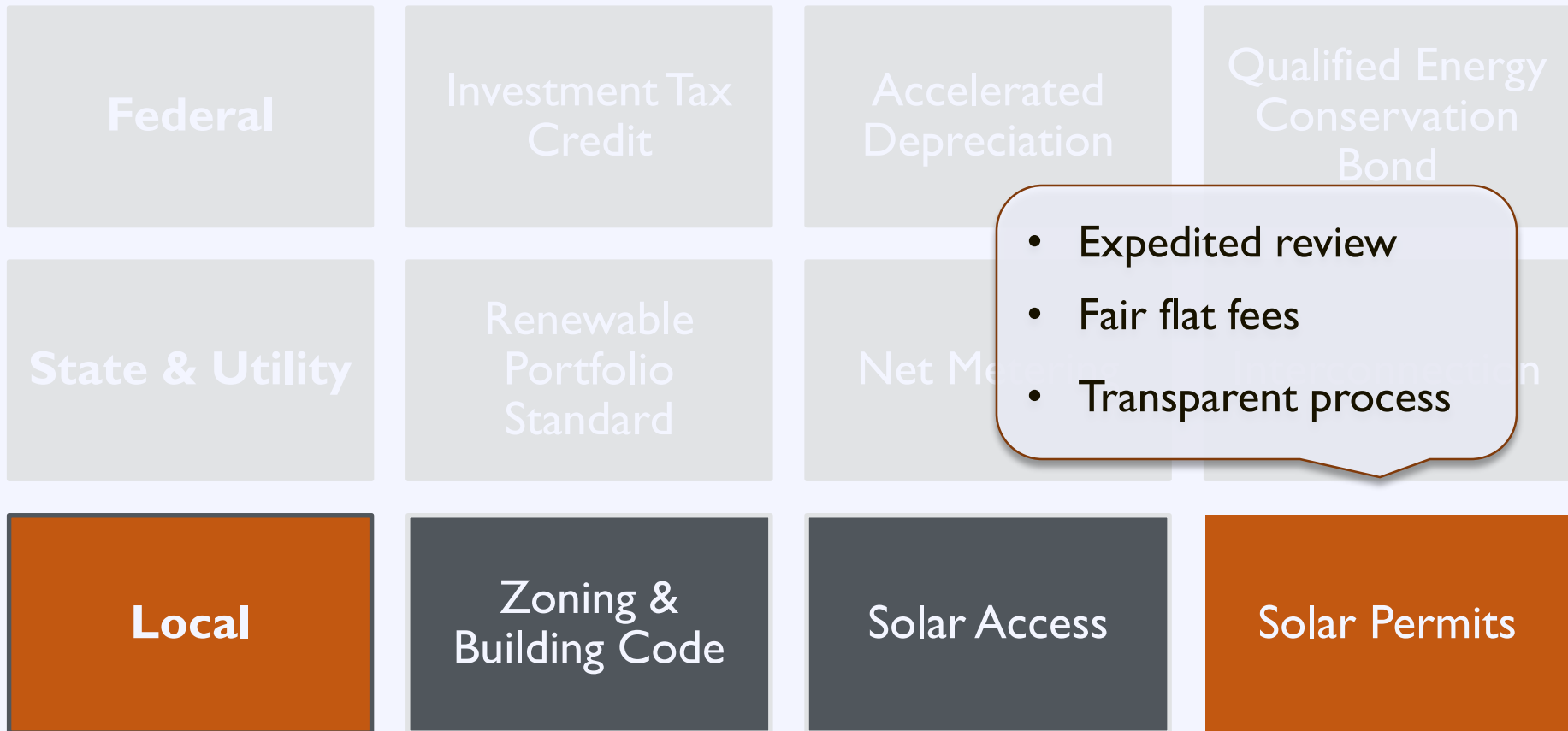
Resource **Solar America Board for Codes & Standards**

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

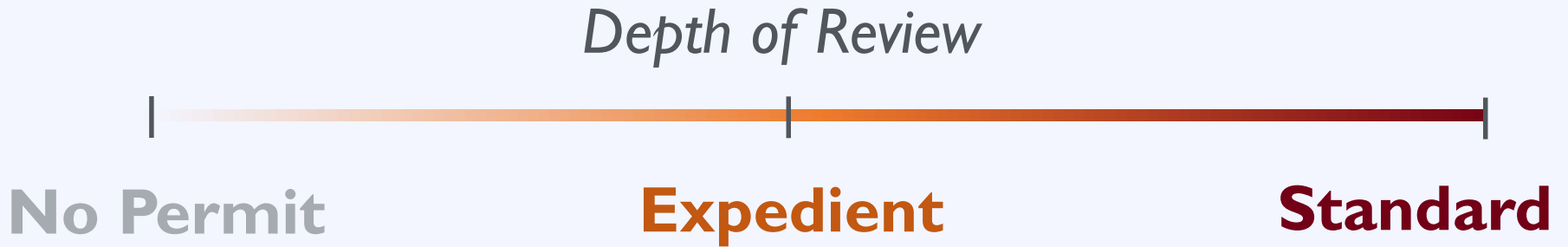
www.solarabcs.org



A Policy Driven Market



Expedited Review



Expedited Review

Depth of Review



Expedient

Within established design parameters

Impacts are well understood

Quick, Easy, Cheap

Expedient

Outside of established design parameters

Review necessary to understand impacts

Standard

Flexible

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

Solar America Board for Codes and Standards
Collaborate • Contribute • Transform

ABOUT US | CODES & STANDARDS | CURRENT ISSUES

Codes & Standards

The Solar America Board for Codes and Standards (Solar ABCs) collaborates and enhances the practice of developing, implementing, and disseminating solar codes and standards. The Solar ABCs provides formal coordination in the planning and revision of separate, though interrelated, solar codes and standards. We also provide access for stakeholders to participate with members of standards making bodies through working groups and research activities to set national priorities on technical issues. The Solar ABCs is a centralized repository for collection and dissemination of documents, regulations, and technical materials related to solar codes and standards.

The Solar ABCs creates a centralized home to facilitate photovoltaic (PV) market transformation by:

- Creating a forum that fosters generating consensus 'best practices' materials.
- Disseminating such materials to utilities, state and other regulating agencies.
- Answering code-related questions (technical or statutory in nature).
- Providing feedback on important related issues to DOE and government agencies.

Learn more about solar codes and standards development:

The below organizations all publish codes and standards for PV products and each organization has its own process to develop and publish standards.

- [ASTM](#)
- [IAPMO Standards](#)
- [International Code Council](#)
- [International Electrotechnical Commission](#)
- [IEEE](#)
- [National Fire Protection Association](#)
- [SEMI](#)
- [Underwriters Laboratories](#)

Expedited Review

Depth of Review

Expedient

Within established design parameters

Expedient

Outside of established design parameters

Standard

Review necessary to understand impacts

Flexible

I-I. Example Design Criteria:

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

Expedited Review

|
**No Permit
Required**

Only interconnection
agreement required

Cost-Based Recovery Fees



Residential
Flat Fees



Commercial
Fee Calculator

$$\text{Fee} = (\text{Est. Staff Time} \times \text{Rate}) + \text{Additional Review}$$

Transparent process

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...

▼ 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

Departments & Services » Building Department

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

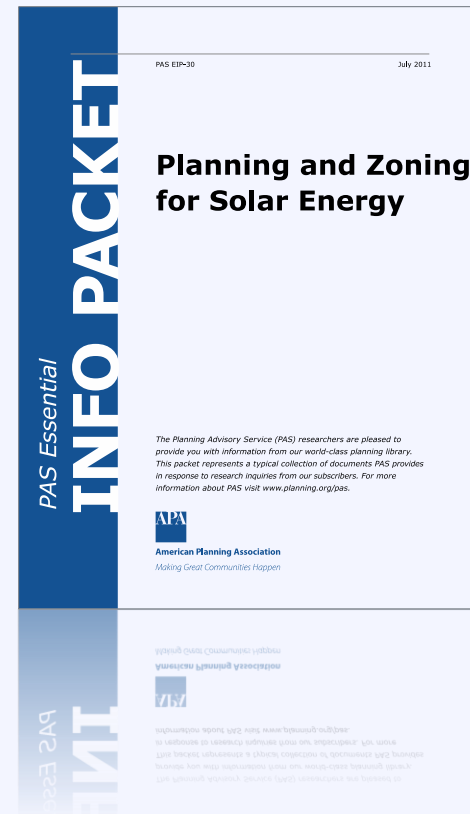
Model Ordinance Resources

Resource

Planning and Zoning for Solar Energy

This Essential Info Packet provides a number of articles and guidebooks to help planners plan for solar in their communities.

planning.org/research/solar



Model Ordinance Resource

Resource

Becoming a Solar-Ready Community

A guidebook for Michigan communities outlining 10 steps to becoming Solar Ready

www.michigan.gov



Agenda

- 08:45 – 09:10 Solar 101 for Communities
- 09:10 – 09:30 Understanding the Solar Regulatory Landscape
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Activity: Identifying Benefits

What is the greatest benefit solar can bring to your community? **[Blue Card]**

Right Now



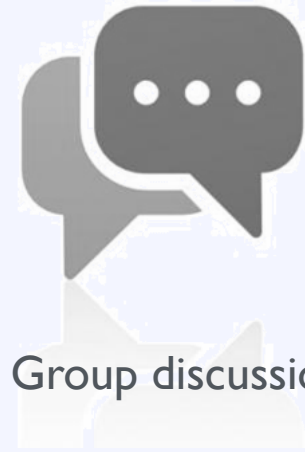
Write answer on card

During Session



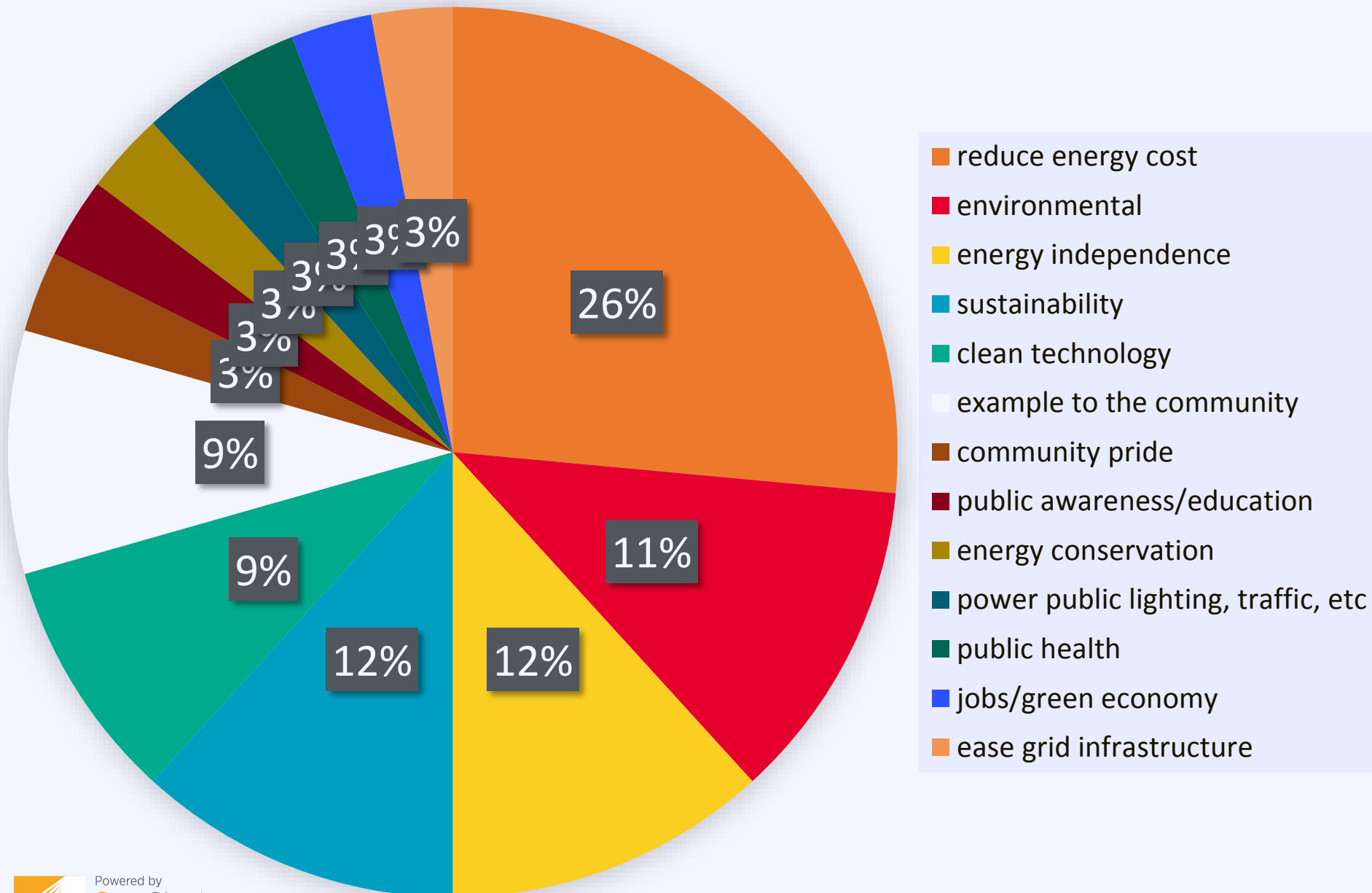
Compile results

After Break



Group discussion

Results of Benefits Activity

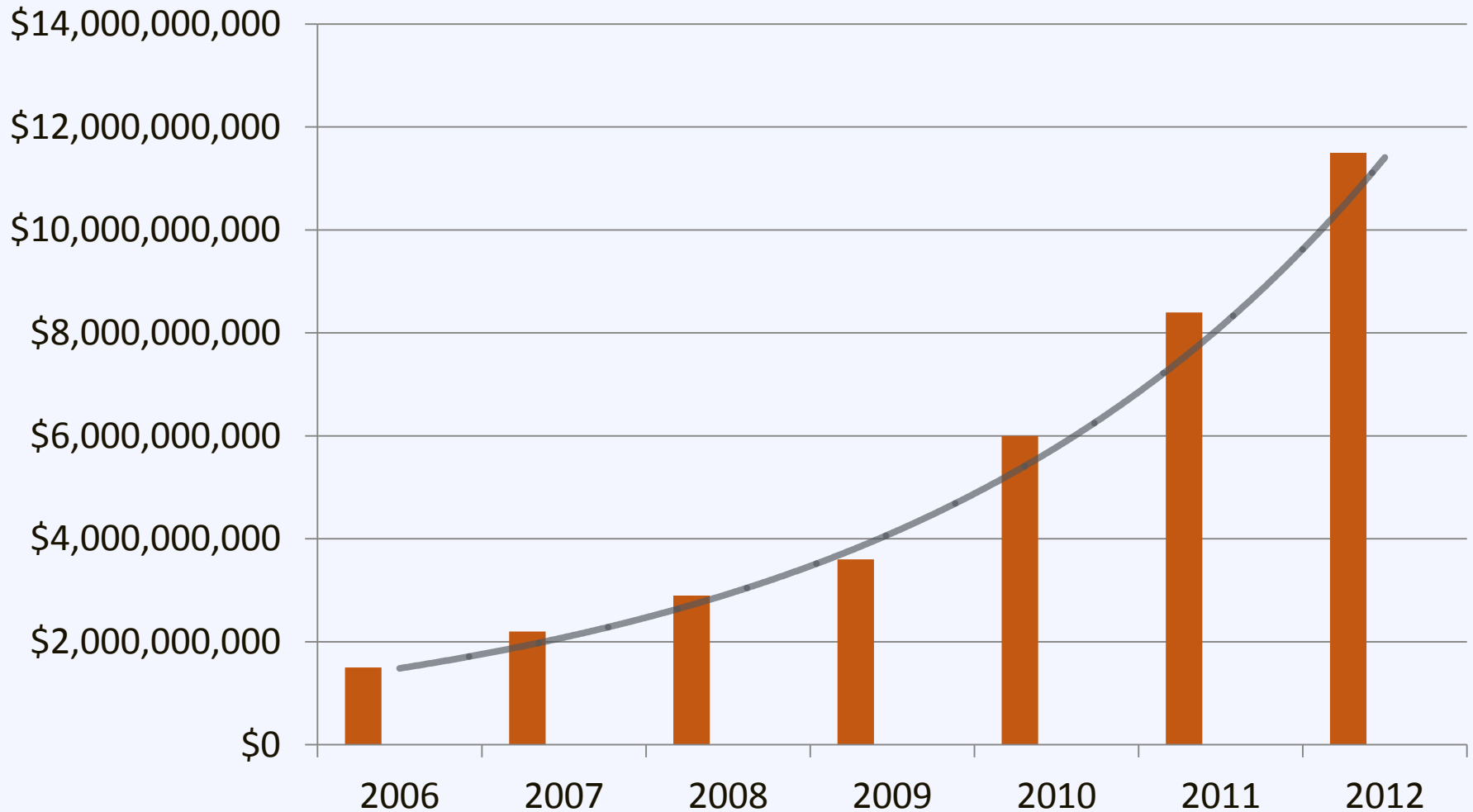


Benefits of Solar Energy

- Local economy growth
- Local jobs
- Energy independence
- Stabilizes price volatility
- Valuable to utilities
- Smart investment

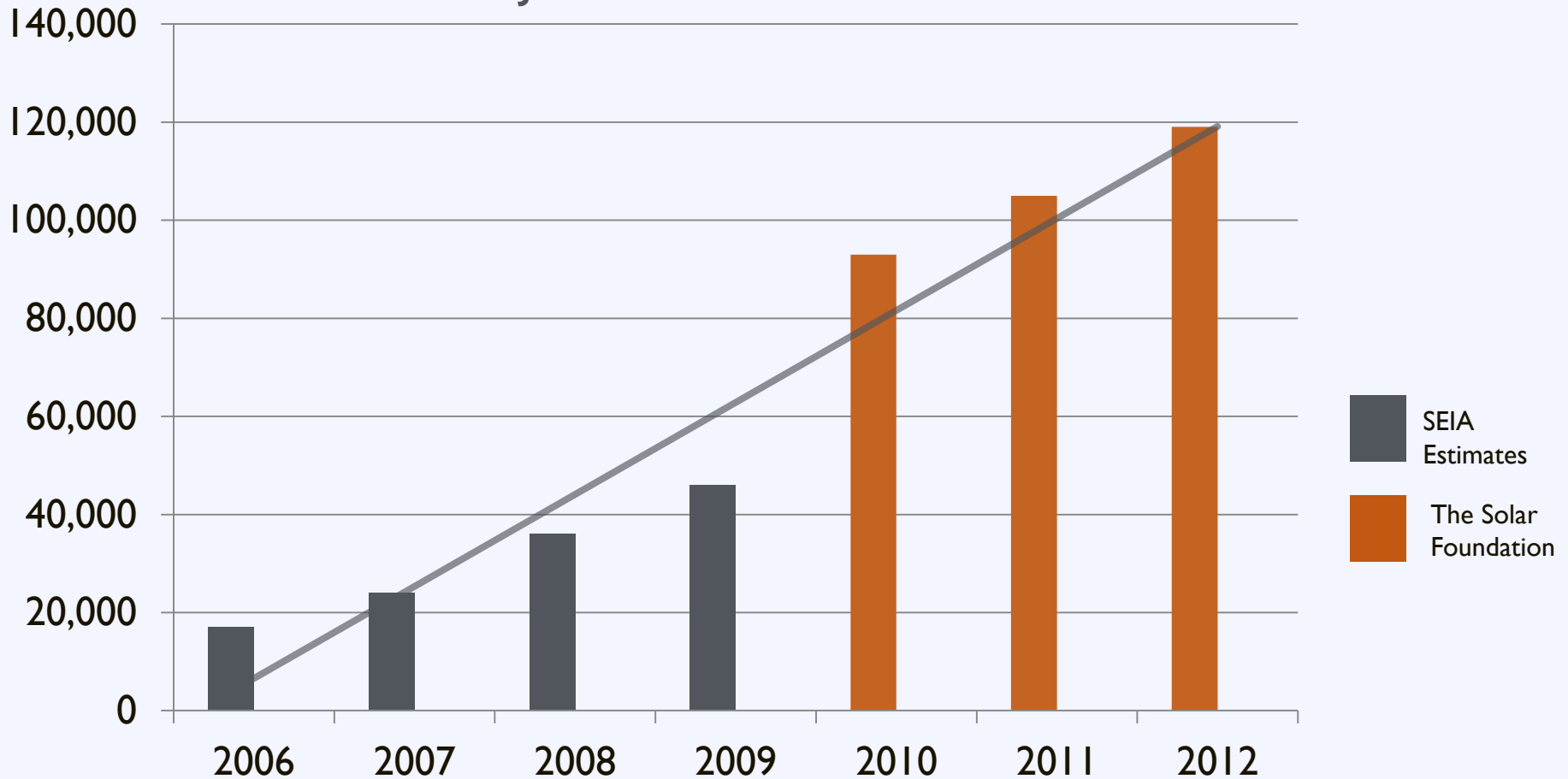


Economic Growth



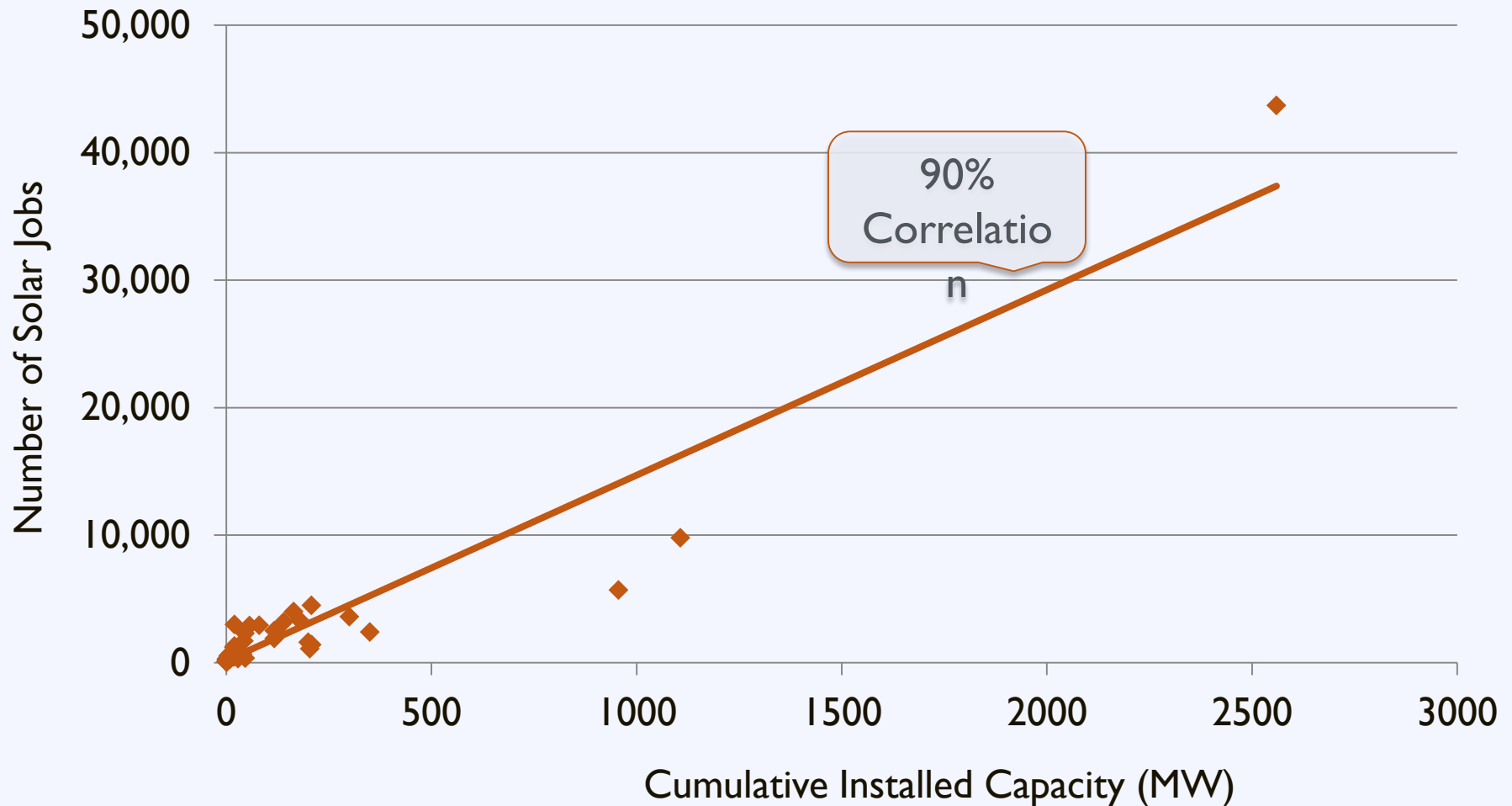
Job Creation

Solar Job Growth in the US



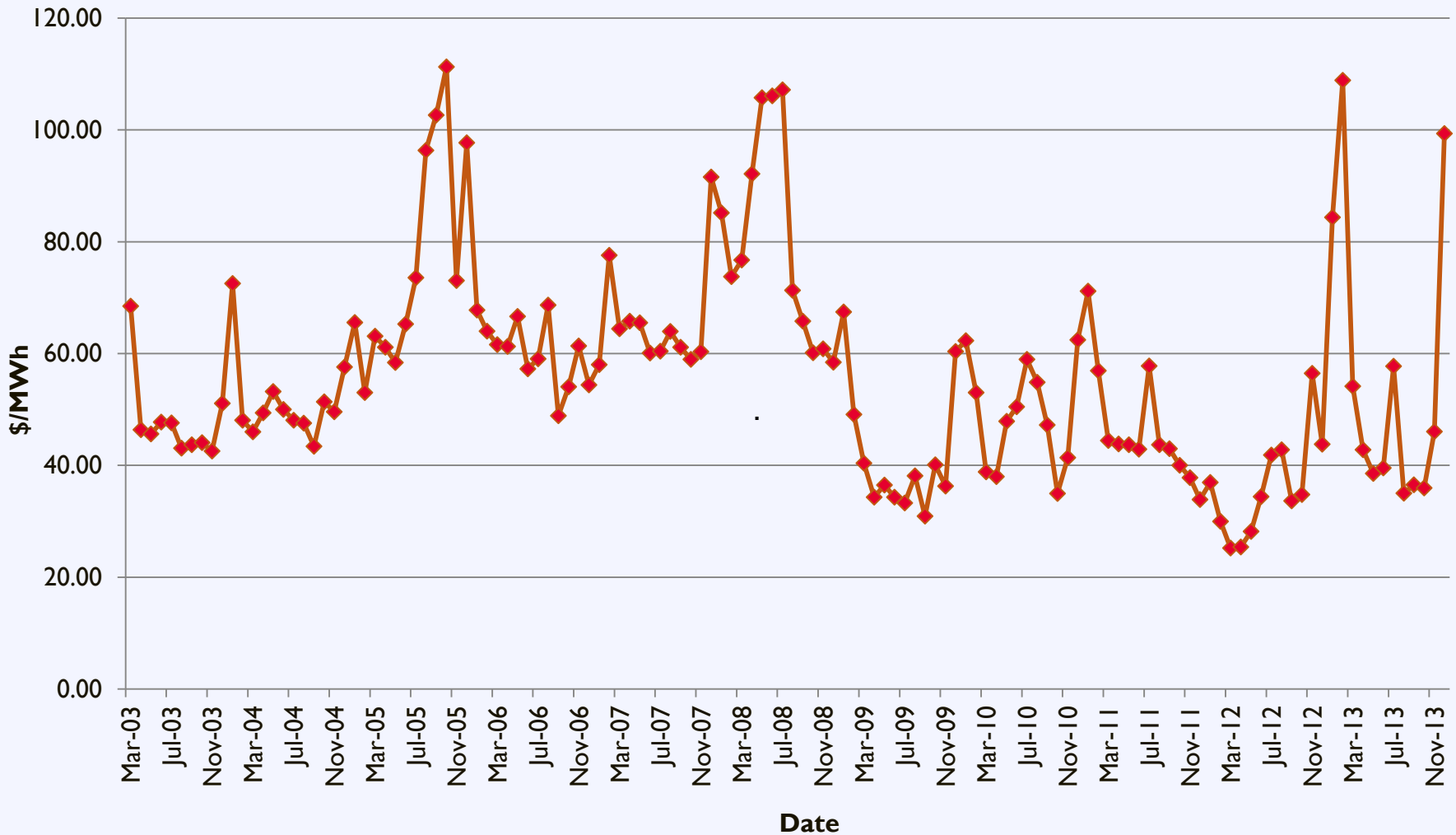
Job Creation

Correlation of Market Size & Jobs in Each State



Price Stability

Boston Area Historic Average Wholesale Electricity Price



Smart Investment for Homes

From NREL:

Solar homes sold

20% faster

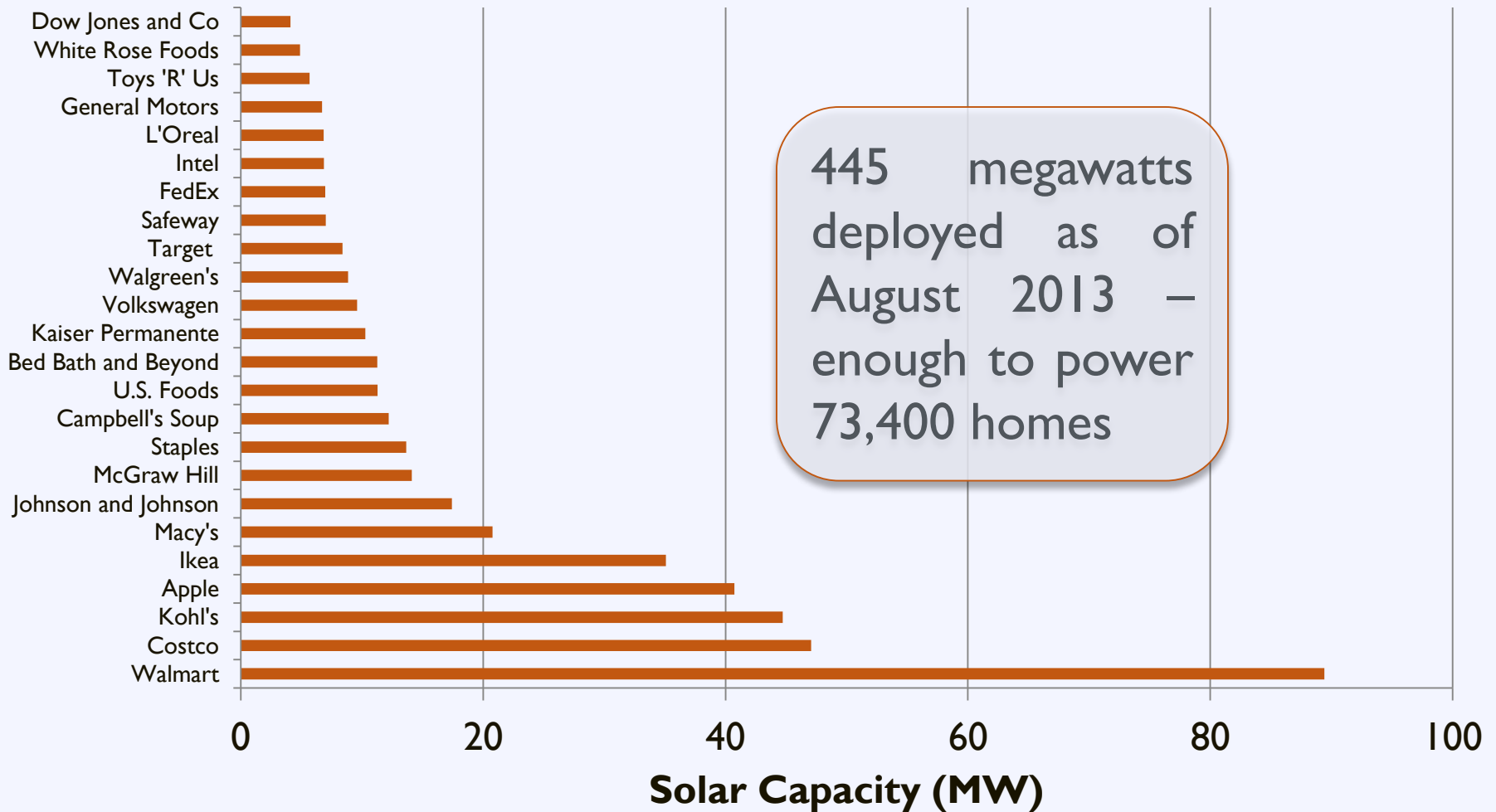
and for

17% more

than the equivalent non-solar homes
in surveyed California subdivisions

Smart Investment for Business

Top 20 Companies by Solar Capacity



Smart Investment for Gov't



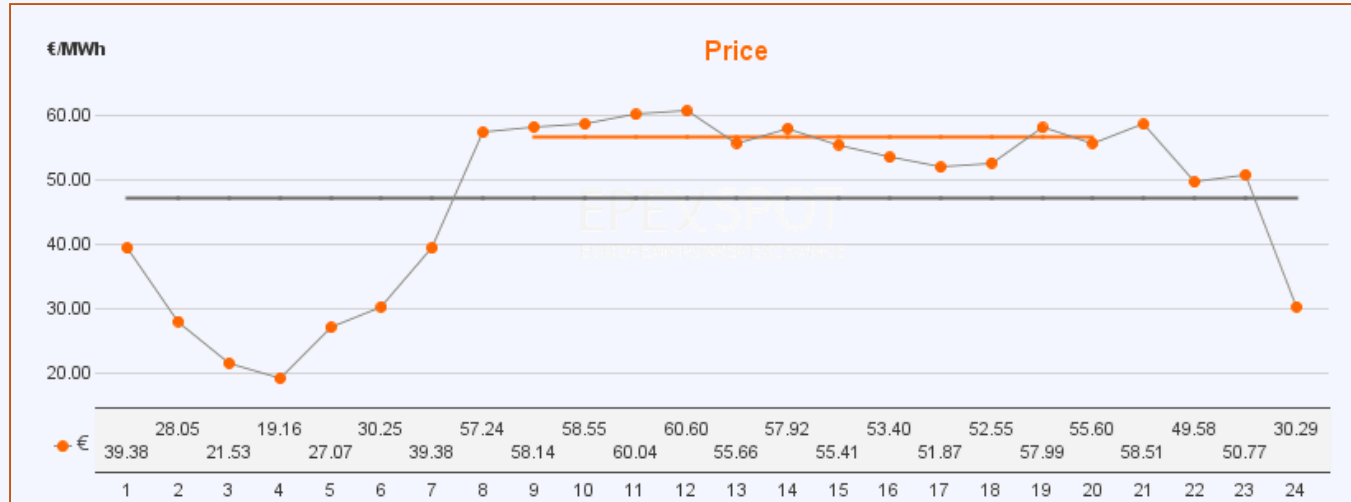
Valuable to Utilities

- Avoided Energy Purchases
- Avoided T&D Line Losses
- Avoided Capacity Purchases
- Avoided T&D Investments
- Fossil Fuel Price Impacts
- Backup Power



Valuable to Utilities

2008

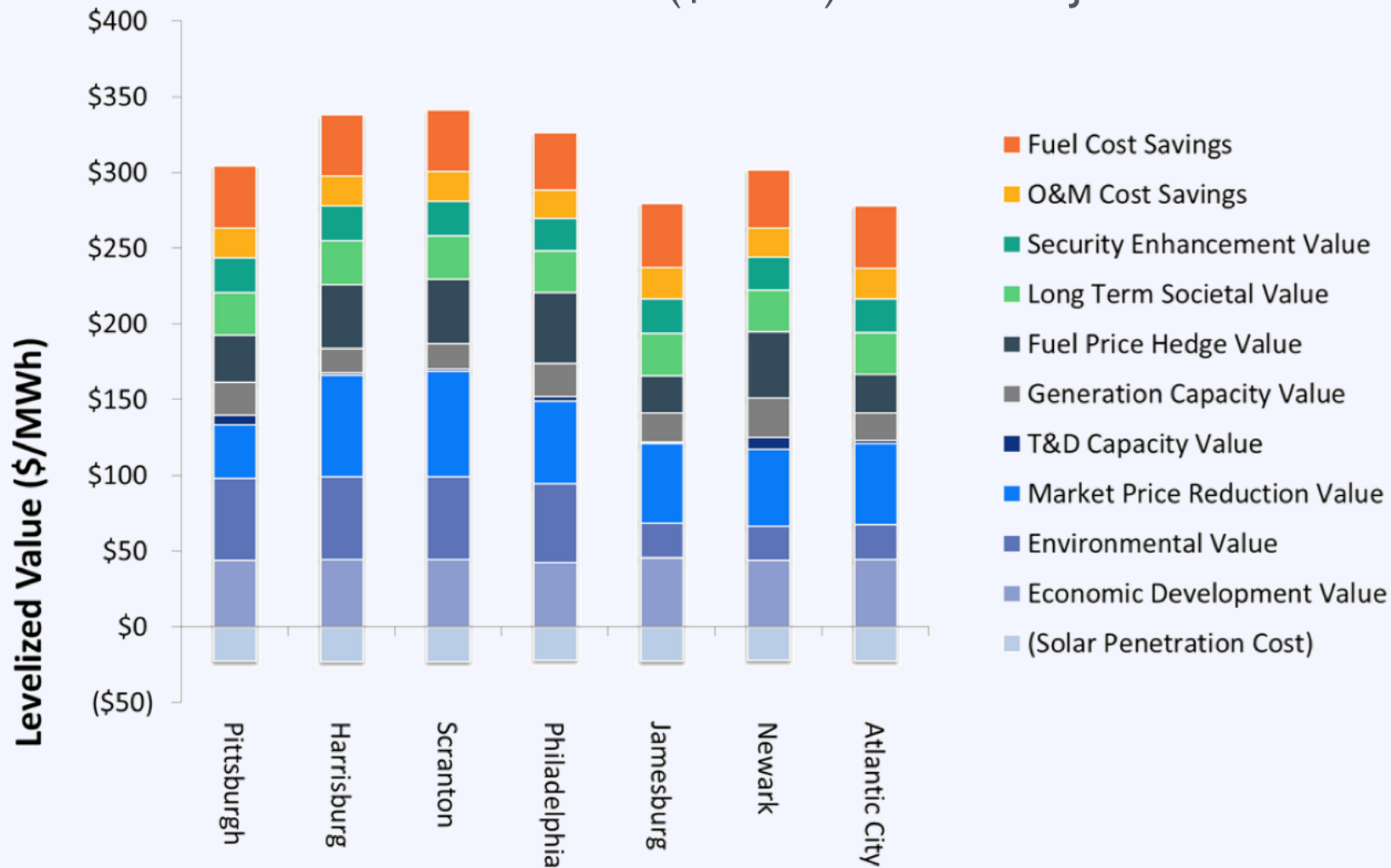


2012



Quantified Value

Levelized Value of Solar (\$/MWh) in PA and NJ



Activity: Addressing Barriers

What is the greatest barrier to solar adoption in your community? [Green Card]

Right Now



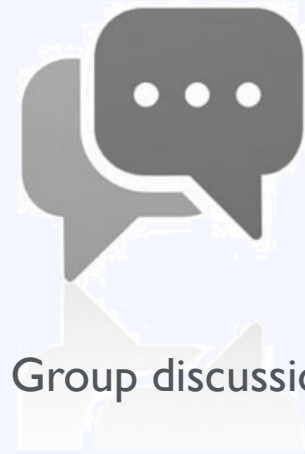
Write answer on card

During Session



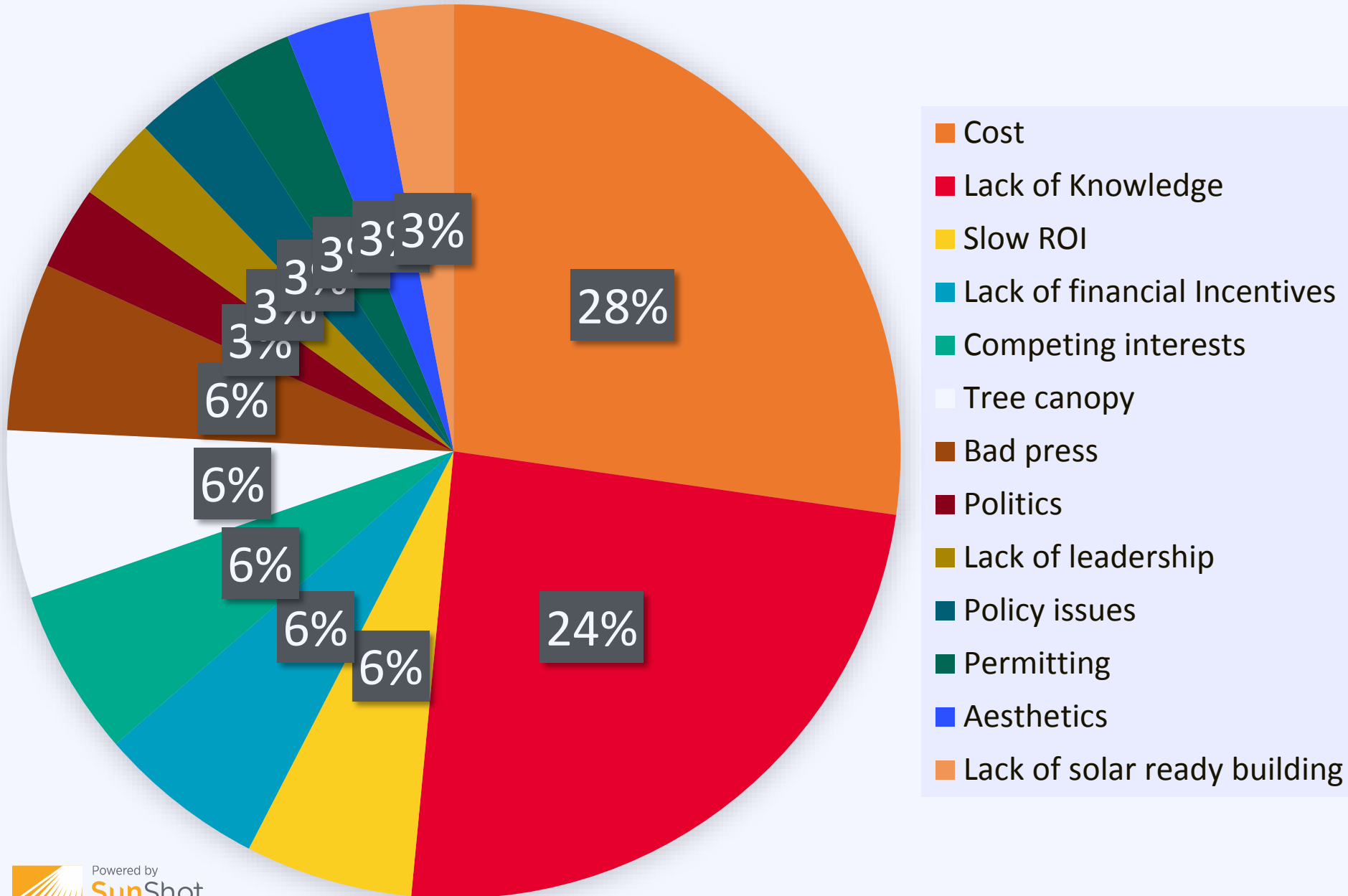
Compile results

After Break

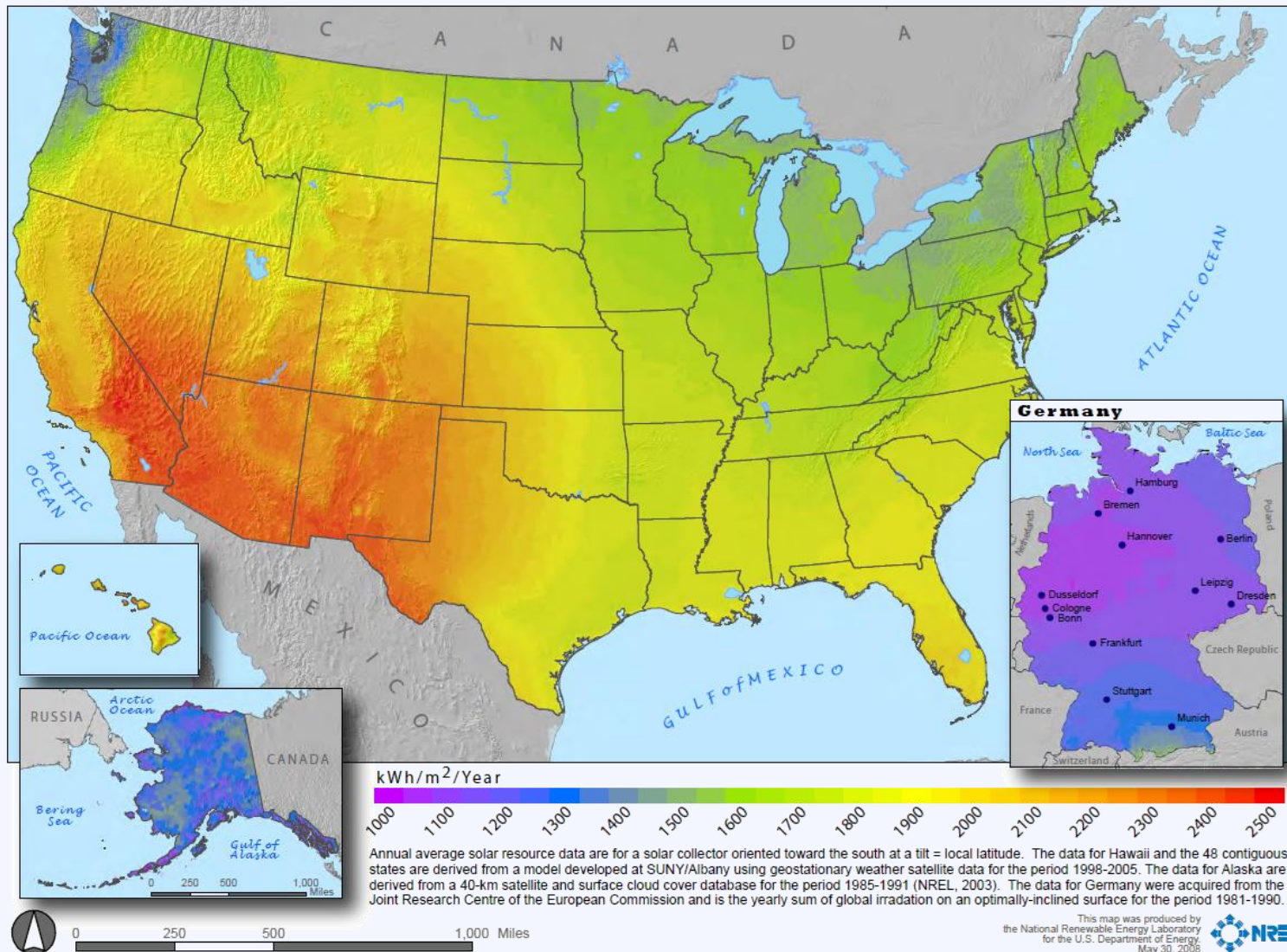


Group discussion

Results of Barriers Activity

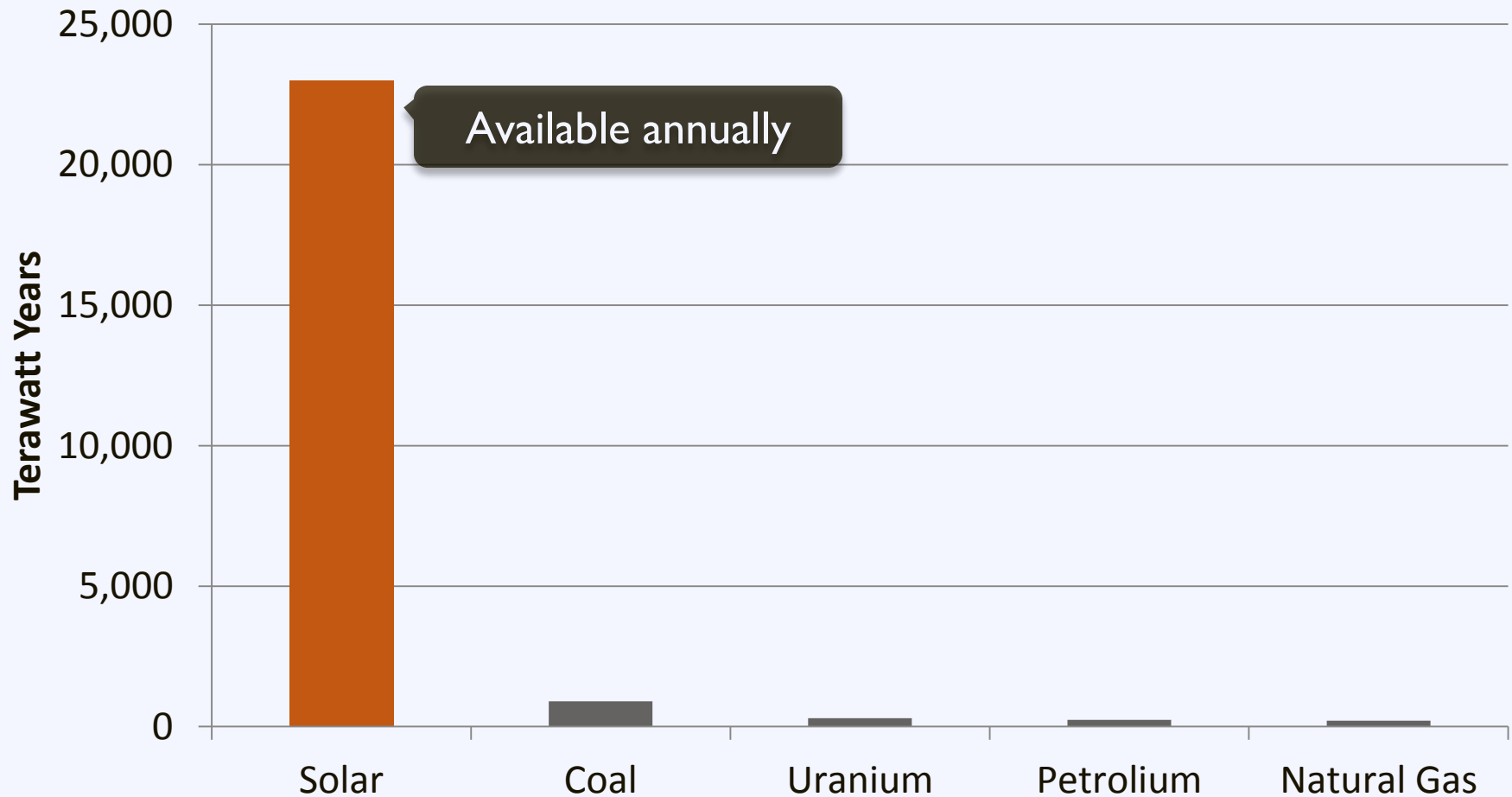


Fact: Solar works across the US



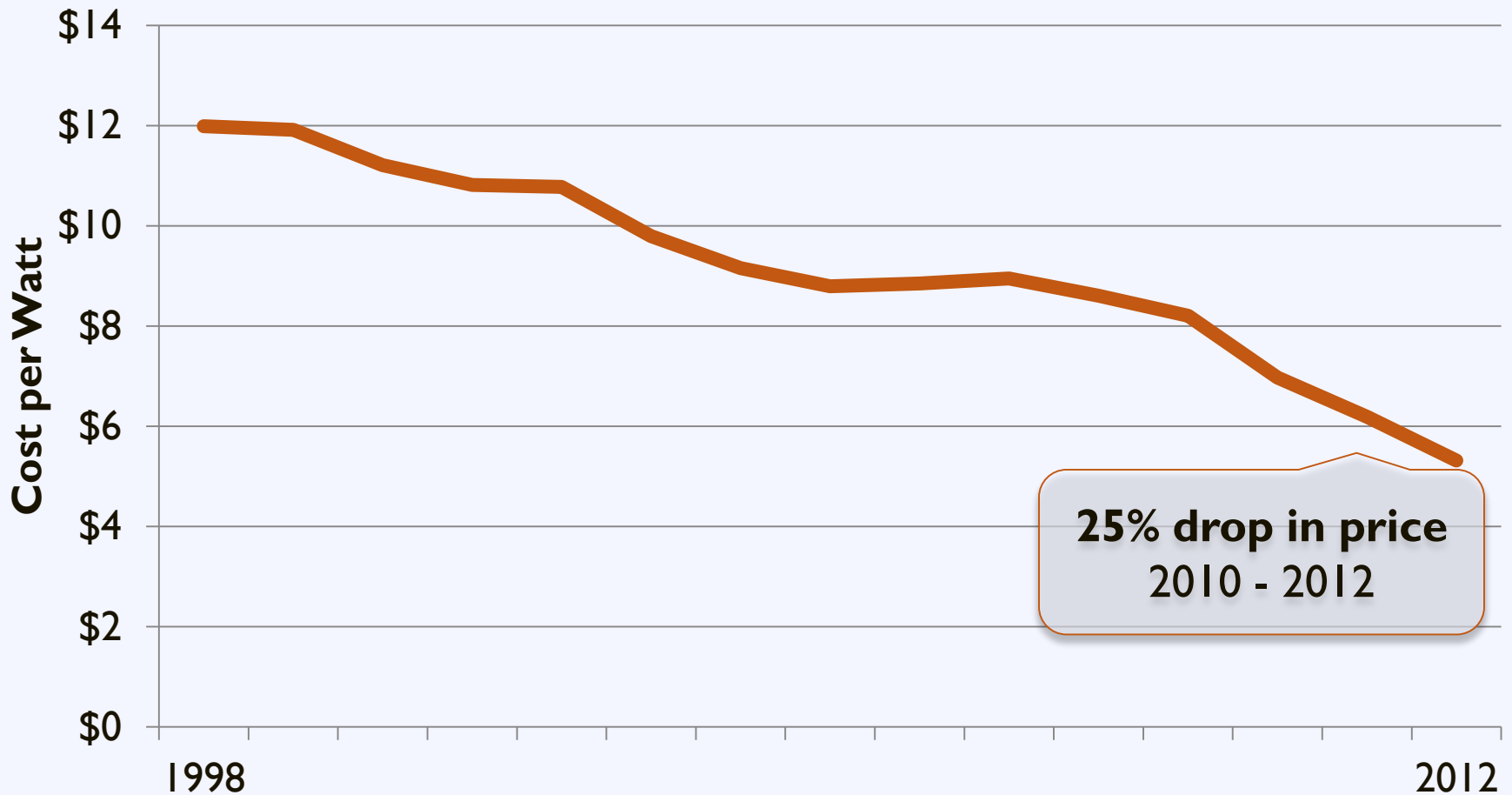
Fact: Solar is a ubiquitous resource

Resource Availability



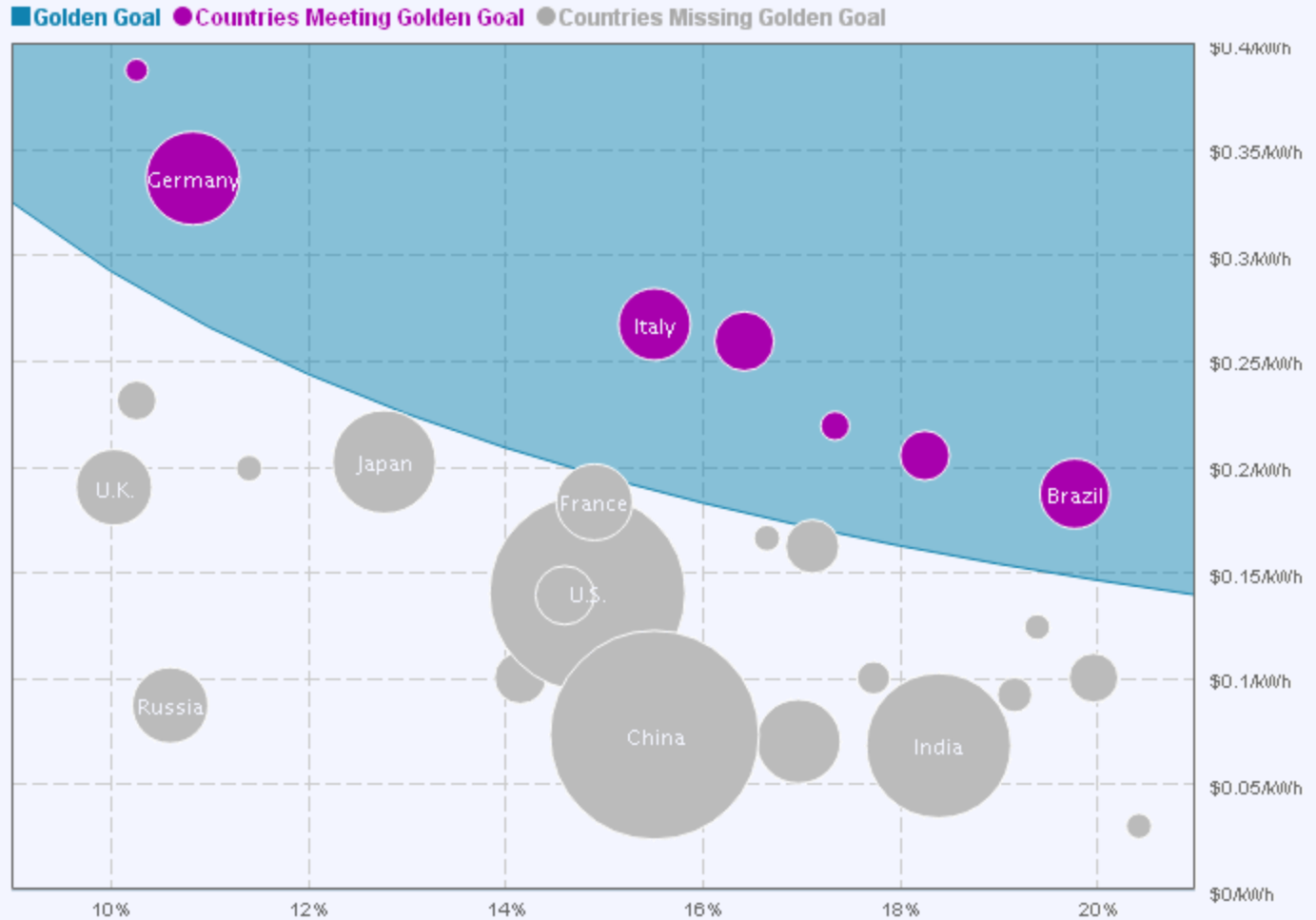
The Cost of Solar PV

US Average Installed Cost for Behind-the-Meter PV



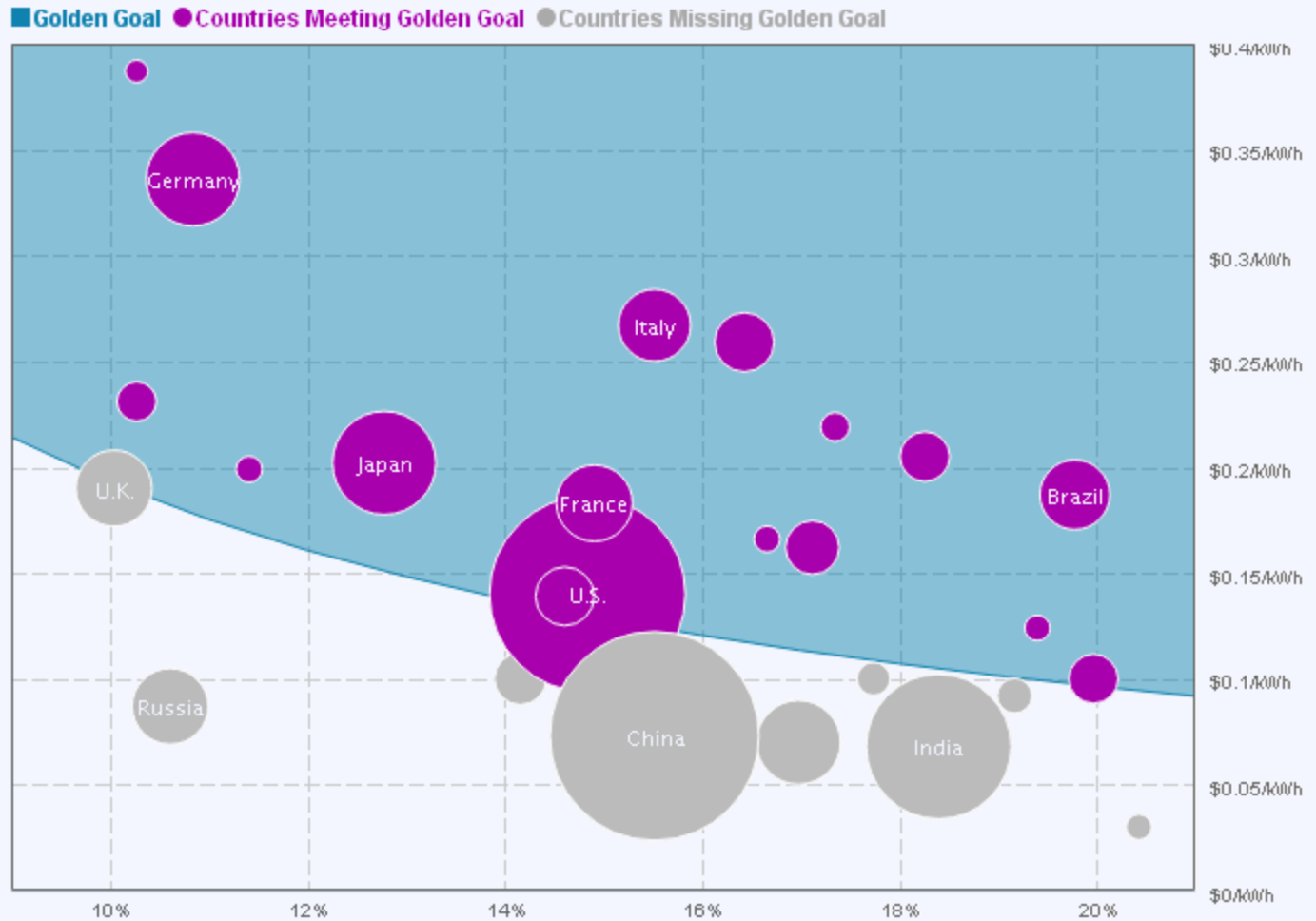
Fact: Solar is cost competitive

2012



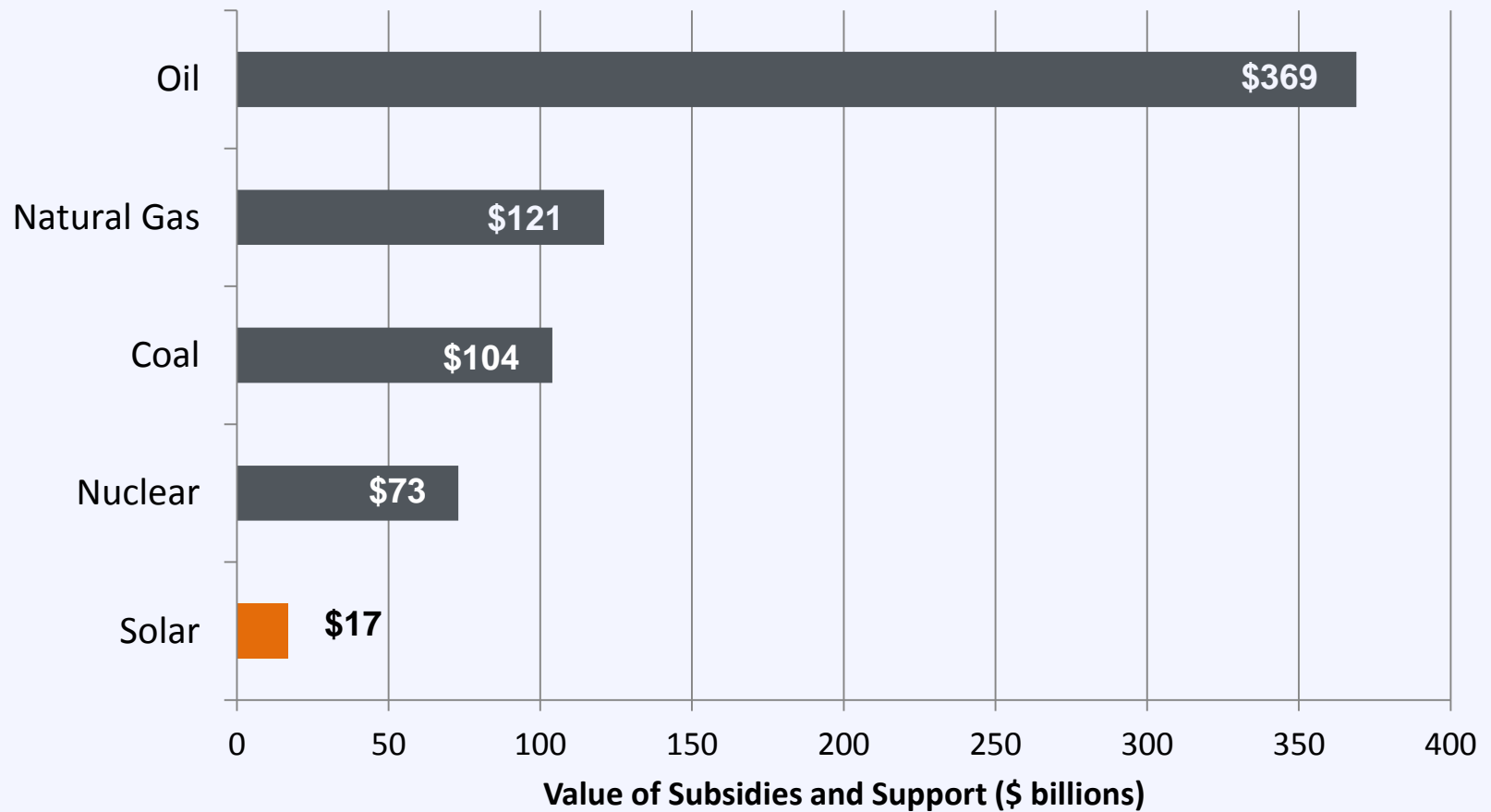
Fact: Solar is cost competitive

2020



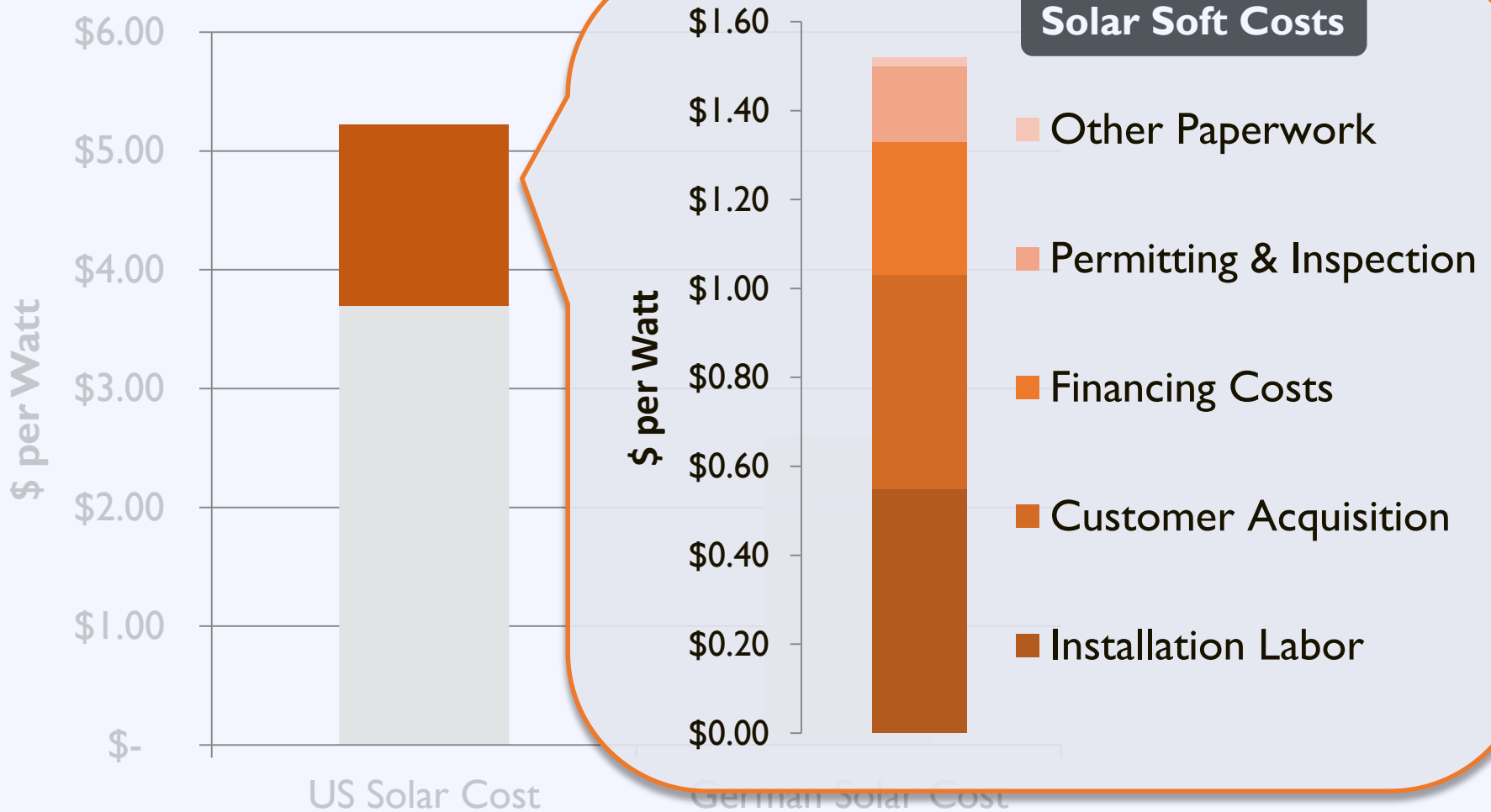
Subsidies and Support

Subsidies for Conventional and Solar Energy, 1950-2010



The Cost of Solar in the US

Comparison of US and German Solar Costs



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Discussion:

When considering updating code and streamlining permitting, who are the stakeholders and what role do they play?

Discussion:

What are barriers that may impede or prevent the adoption of a solar ordinance and streamlined permitting process?

Discussion:

What are effective strategies to overcome these barriers?

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Next Steps: Solar Ready Community

1. Begin the discussion ✓
2. Adopt a resolution
3. Establish a guiding policy
4. Update code language
5. Create an easy-to-use permitting process

Next Steps: Solar Ready Community

6. Provide easy access to information
7. Establish solar installation targets
8. Train staff
9. Pursue solar business opportunities
10. Go the extra mile

Next Steps: Solar Ready Community

6. Provide easy access to information

7. Establish solar installation targets

8. Train staff

9. Pursue solar business opportunities

10. Go the extra mile

Train Staff

Resource

Midwest Solar Training Network (MSTN)

MSTN fills a critical need for accessible, high quality, market-valued training in solar system design, installation, sales and inspection through train-the-trainer programs



www.midwestsolartraining.org

Next Steps: Solar Ready Community

6. Provide easy access to information

7. Establish solar installation targets

8. Train staff

9. Pursue solar business opportunities

10. Go the extra mile

Ownership Options for Solar

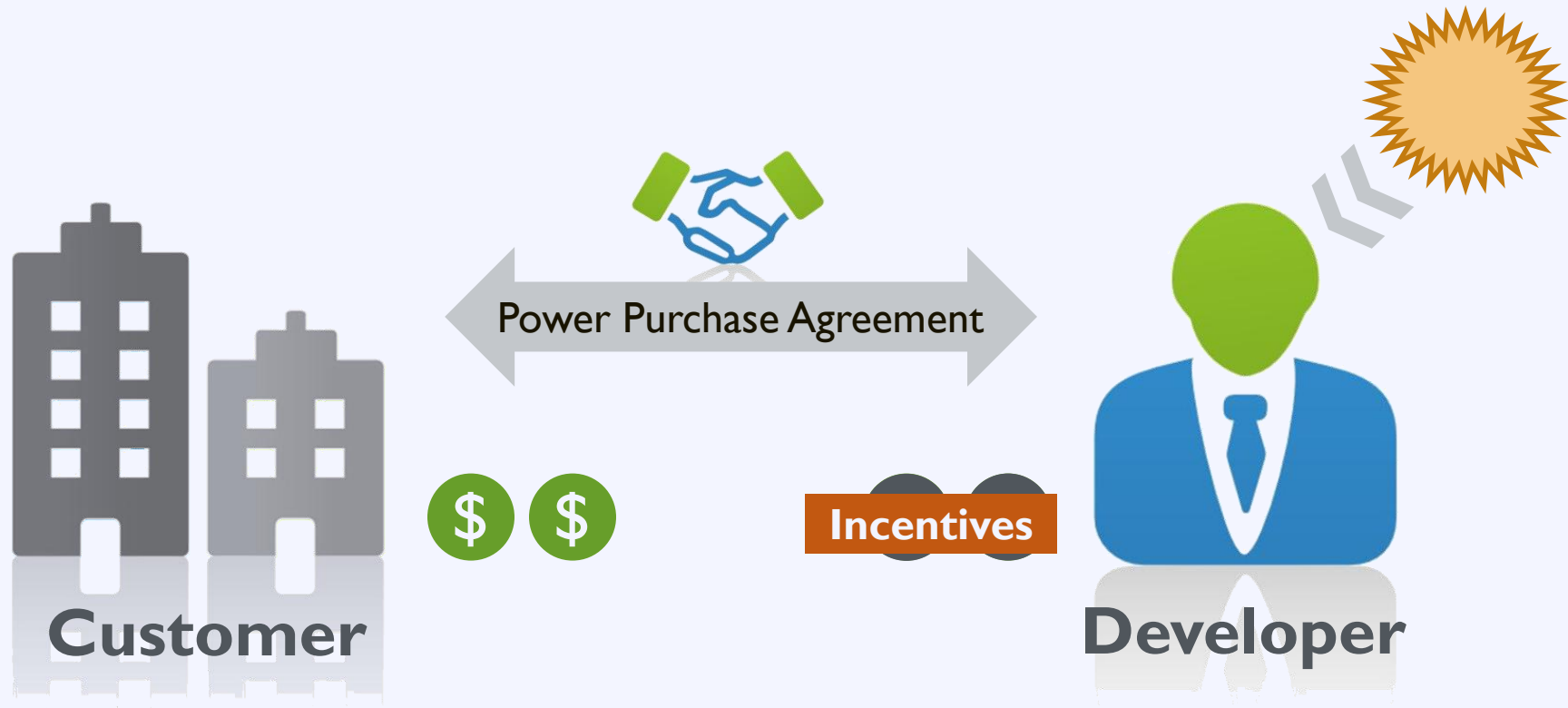
Direct
Ownership

Third-Party
Ownership

Direct Ownership

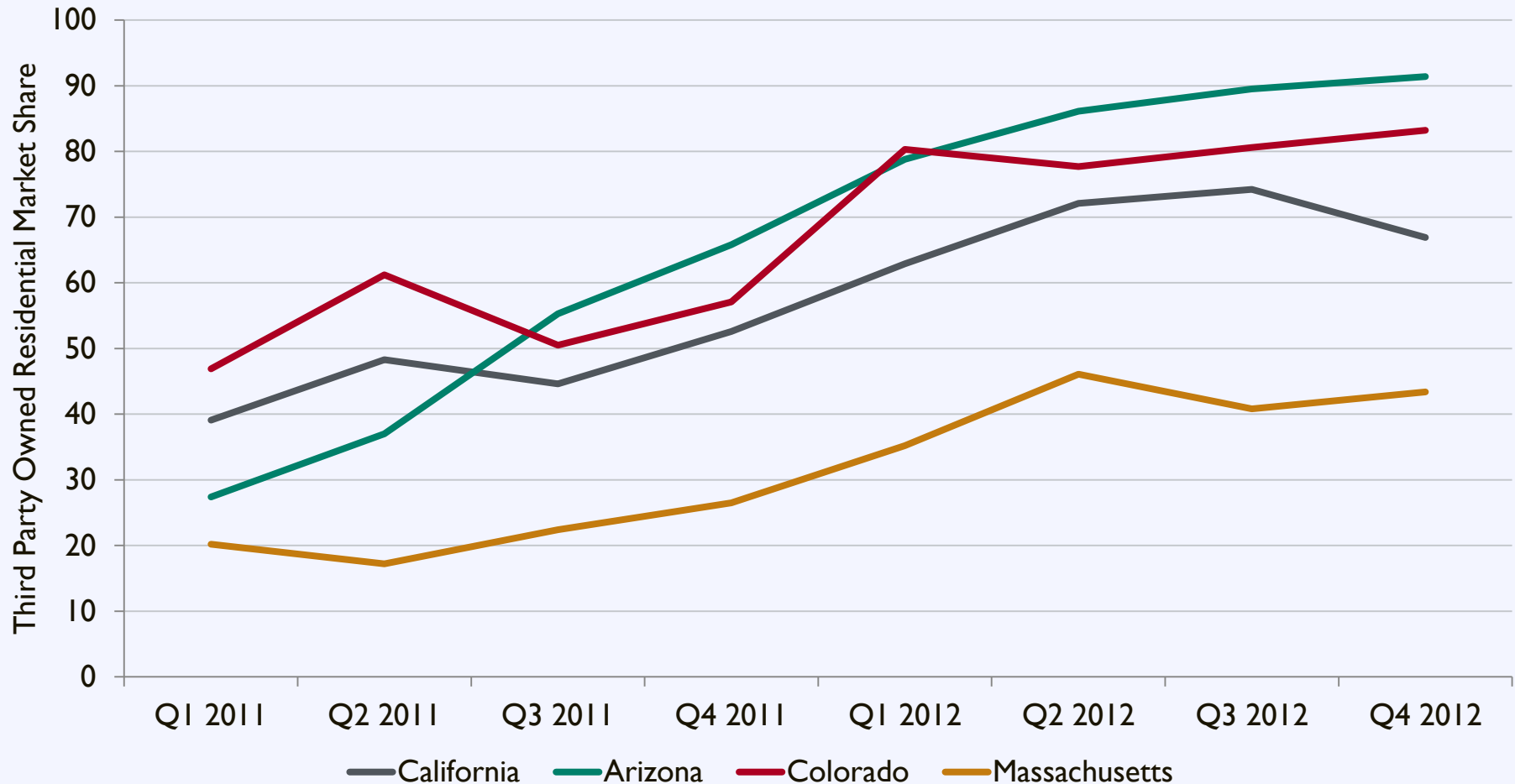


Third Party Ownership

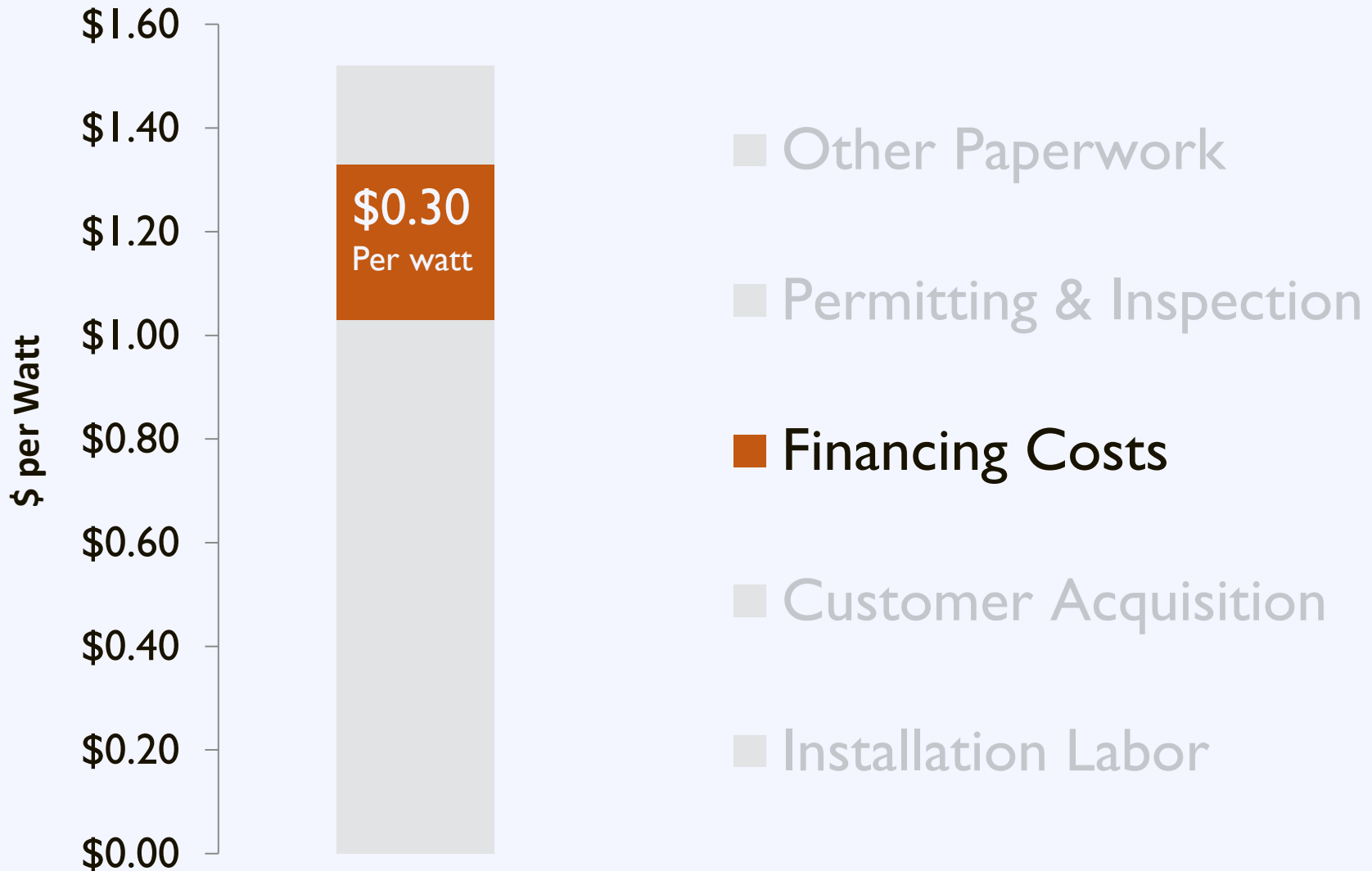


Third Party Ownership

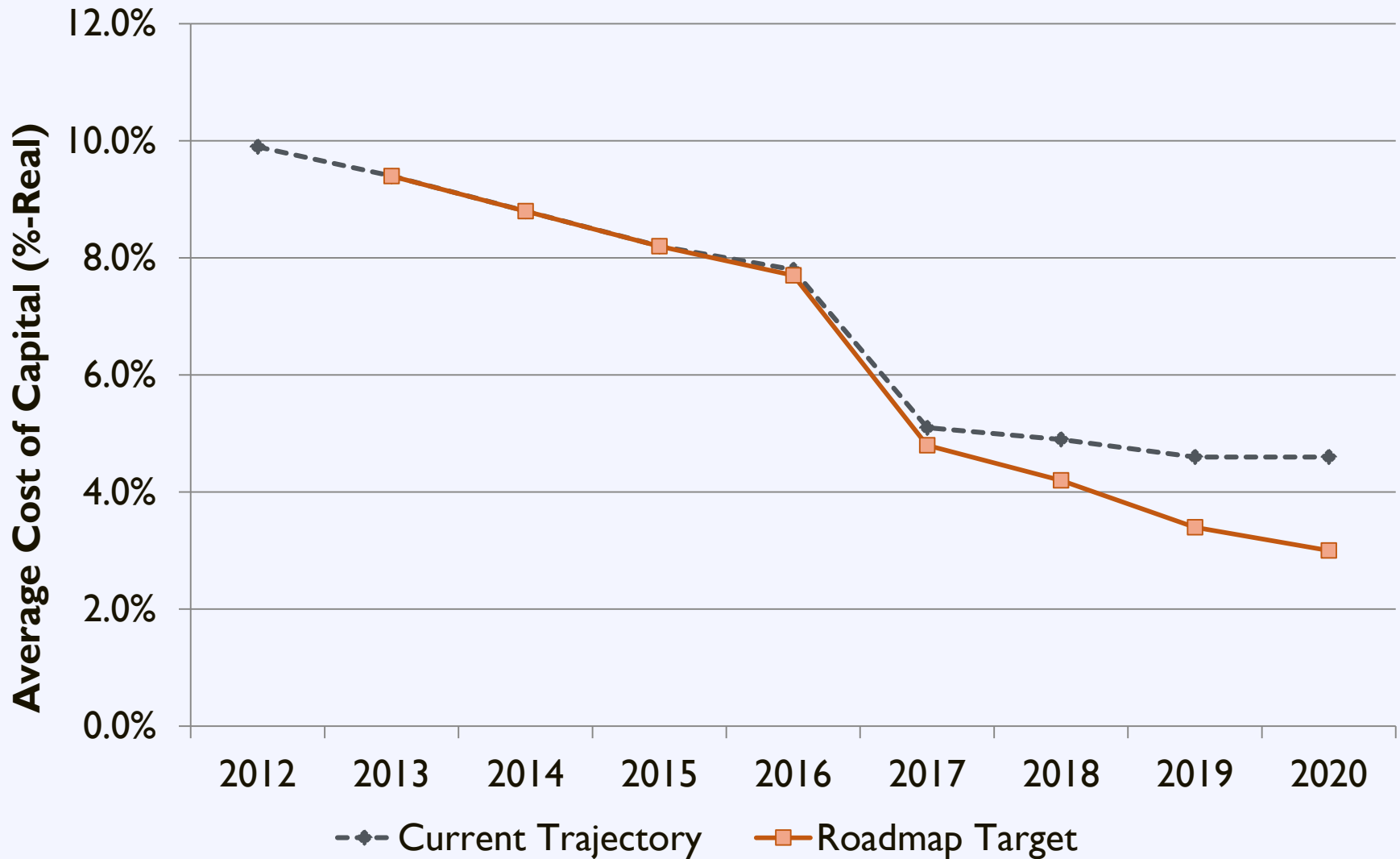
Percentage of New Residential Installations Owned by Third Party in CA, AZ, CO, and MA



Third Party Ownership



Finance Cost Targets



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

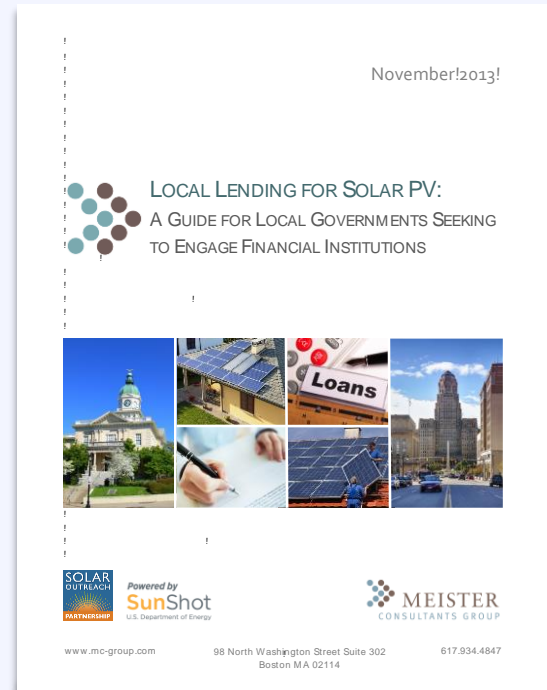
actively financing solar PV projects

Solarize: Resources

Resource Local Lending for Solar PV

A guide for local governments seeking to engage financial institutions

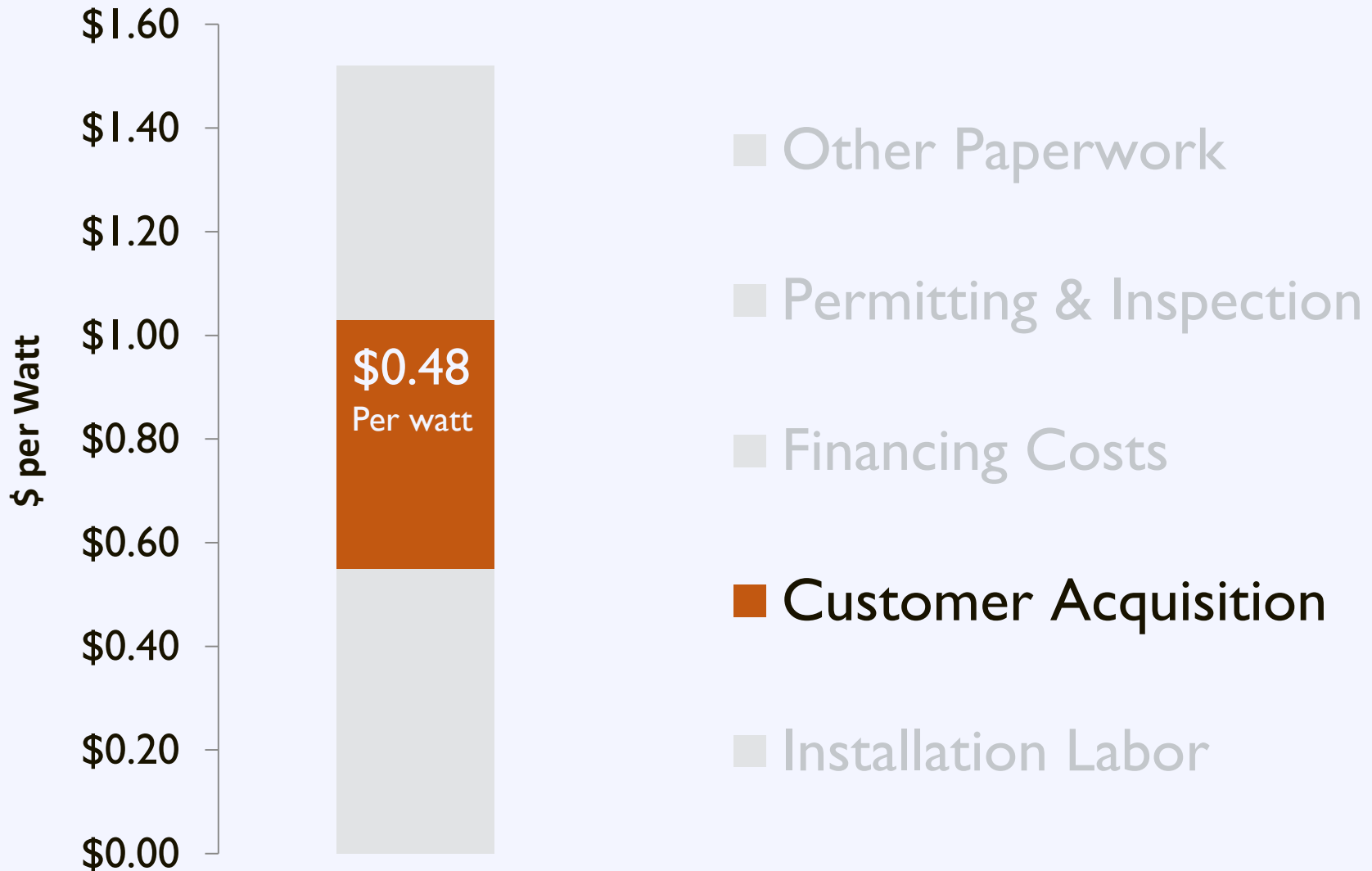
www.solaroutreach.org



Next Steps: Solar Ready Community

6. Provide easy access to information
7. Establish solar installation targets
8. Train staff
9. Pursue solar business opportunities
- 10. Go the extra mile**

Customer Acquisition



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



Solutions

Group purchase

Complexity



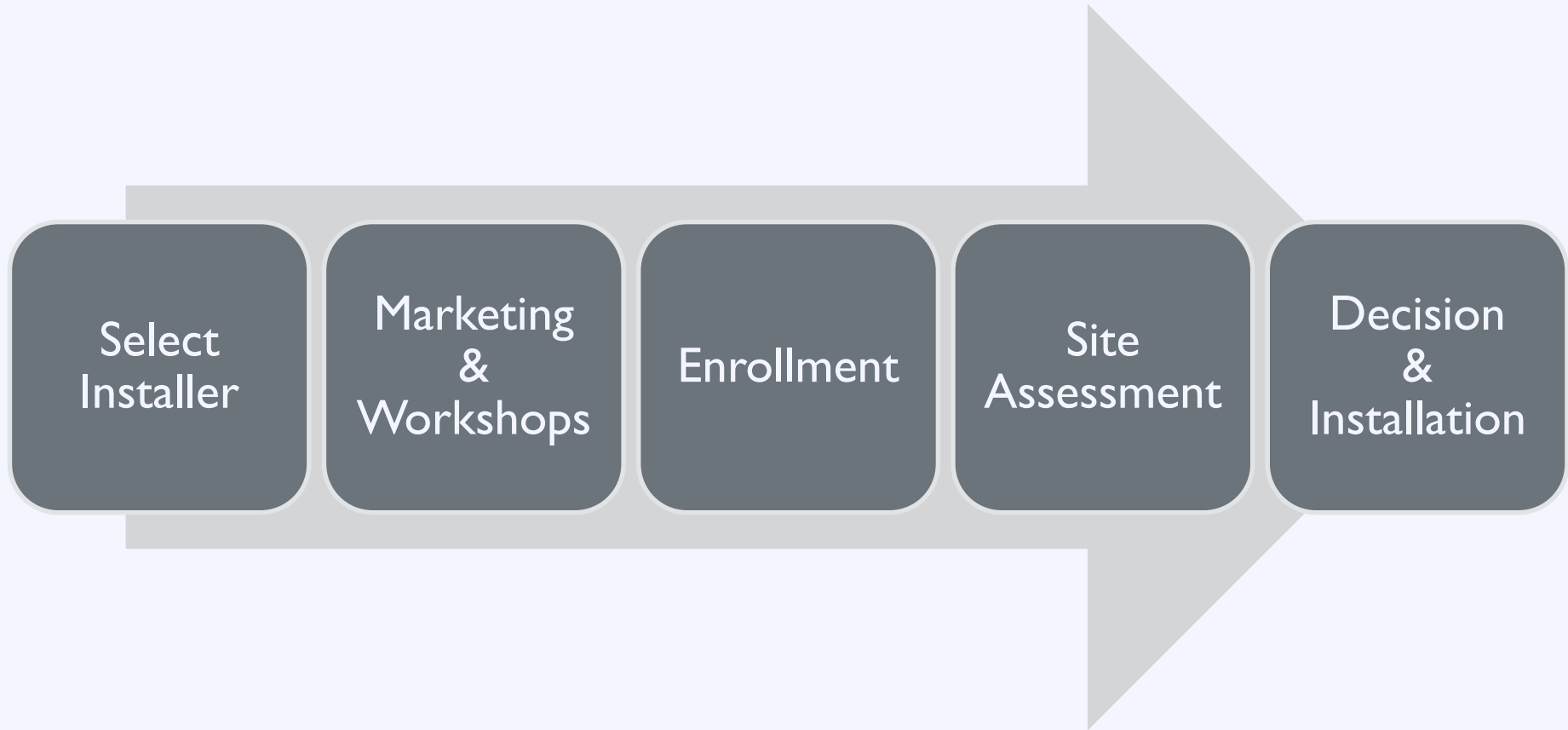
Community outreach

Customer inertia



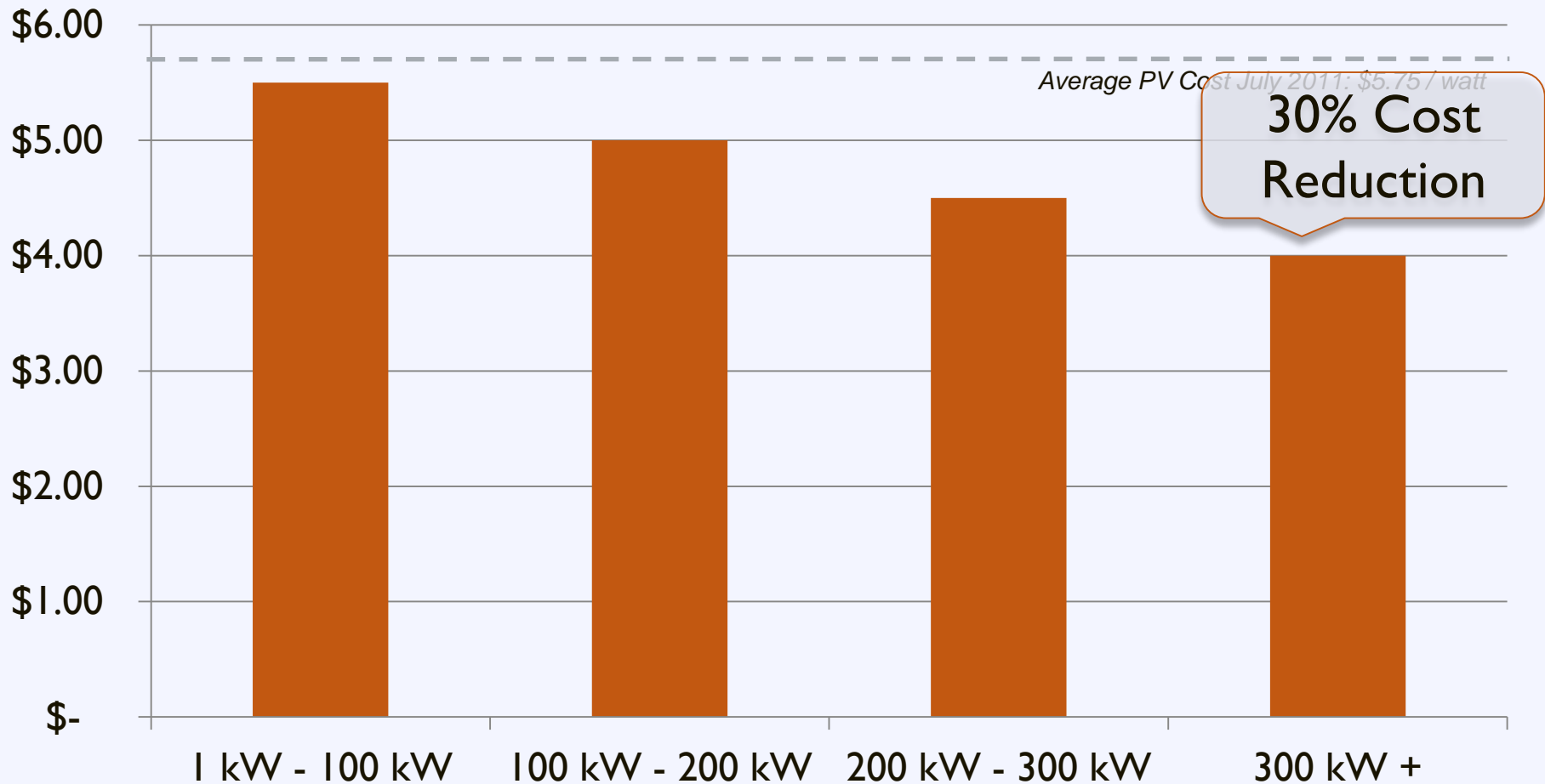
Limited-time offer

The Solarize Program



The Solarize Program

Harvard Mass Group Purchasing Tiers



The Solarize Program

A household is

more likely to adopt solar

for

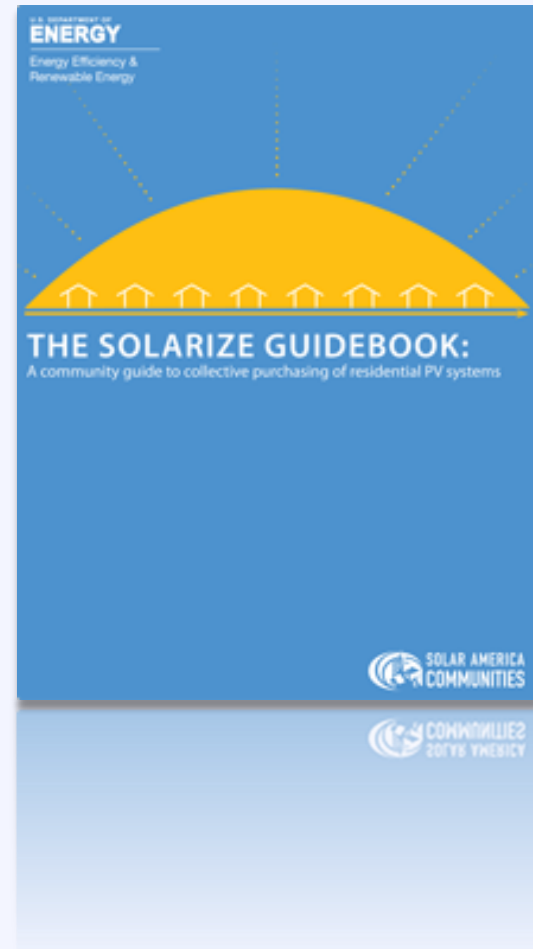
each additional installation in their zip code

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



Activity: Next Steps

What do you pledge to do when you leave today's workshop? [Orange Card]

One to One Assistance

Technical Support

Solar Outreach Partnership

Our experts can help you implement the best practices we discuss today - apply for **complementary** technical assistance

www.solaroutreach.org



Powered by

SunShot

U.S. Department of Energy

Chad Laurent

Meister Consultants Group

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(617) 209 -1986

Jayson Uppal

Meister Consultants Group

jayson.uppal@mc-group.com

(617) 209 -1990

Becoming Solar Ready

Solar Powering Your Community Workshop

January 23, 2014



bridging needs. advancing change.

What We Do



Mission

Clean Energy Coalition is a non-profit, non-partisan organization dedicated to promoting clean energy technologies as a way to create healthier, energy independent communities.

How We Accomplish Our Mission

Clean Energy Coalition implements, manages, and evaluates cost-effective, market transformation projects and programs in the building and transportation sectors.



Mobility

- Michigan Green Fleets
- Michigan Fuel Forward
- Clean Cities –
Ann Arbor, Detroit,
West Michigan
- Ann Arbor Bike Share

Structures

- Rebuild Michigan
- BetterBuildings for
Michigan
- Commercial Energy
Assessments
- Xseed Energy
- Solar Site Assessments

Communities

- a2energy and PACE
- HEAL
- Michigan Renewable
Energy Tools
- Advancing Solar in
Saginaw Bay Region
- Ann Arbor Climate
Action Plan
- Greenhouse Gas
Inventories

The Project : *Michigan Renewable Energy Tools*



Project Partners



Project Purpose



Problem

Many townships, cities, and villages are interested, but lack the information and the encouragement needed to readily address renewable energy. However, doing nothing drives up “soft costs” and perpetuates the status quo *regardless of our changing energy needs.....*

Project Purpose



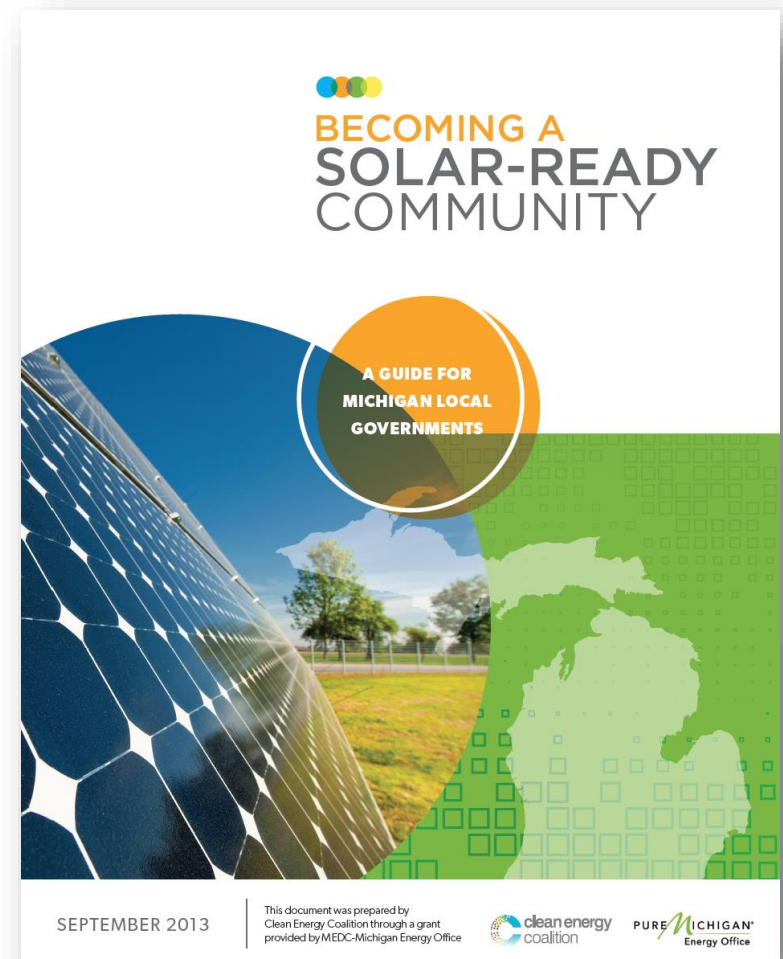
Response

...Help local jurisdictions receive the information they need to adopt new policies and procedures that will advance renewable energy.

....Offer a resource for the public and other parties interested in renewable energy options.

Anticipated Impacts

- Reduced barriers adoption of renewable energies
- Improved customer and municipal experience
- Provide a platform for future expansion in the region and state
- Reduced “soft costs” - **Lowered installed cost per watt for renewable energy in Michigan communities.**

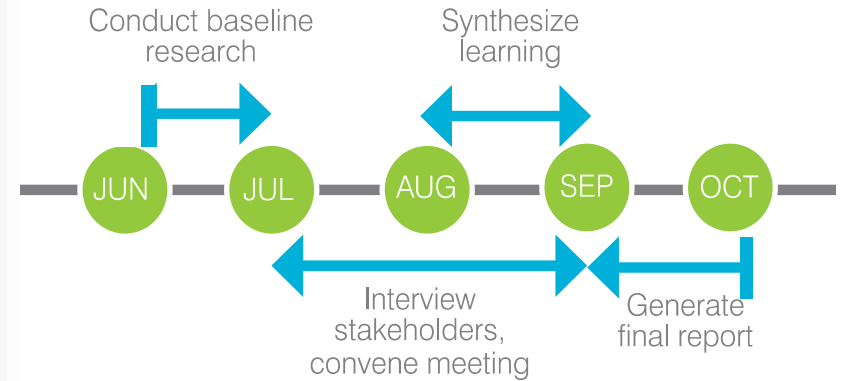
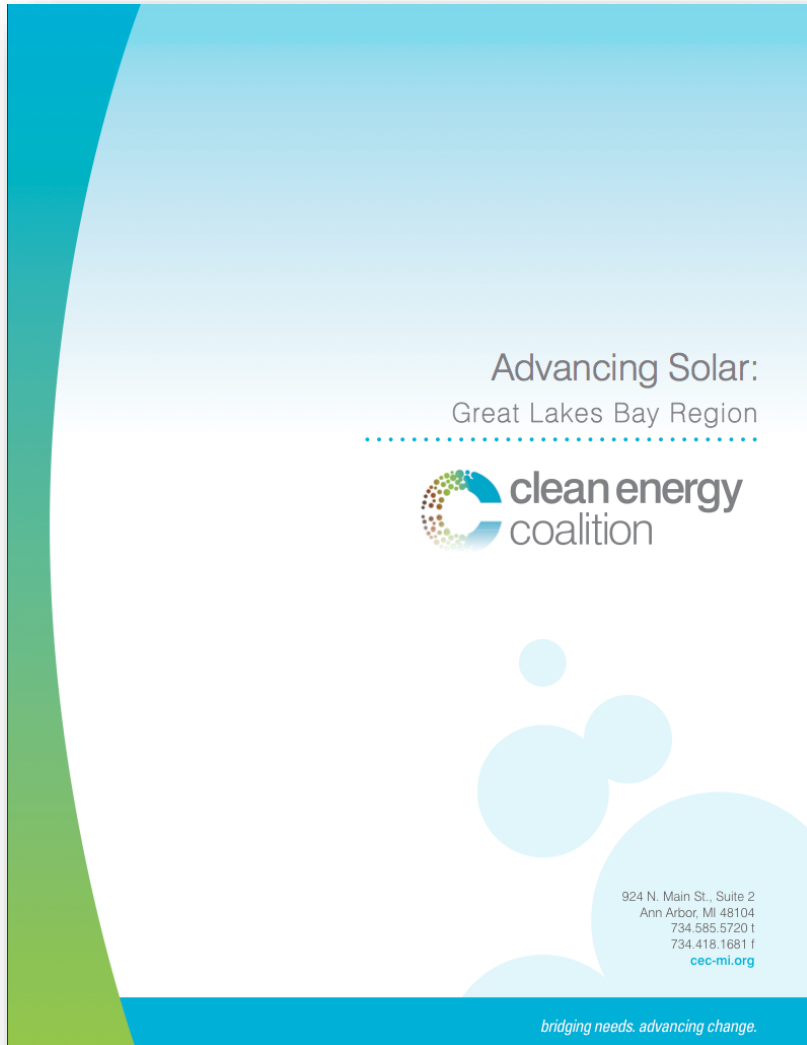


Pilot Communities



bridging needs. advancing change.

Piloting the Tools



Report Explores:

- Best Practices
- What's Currently Happening
- Recommendations

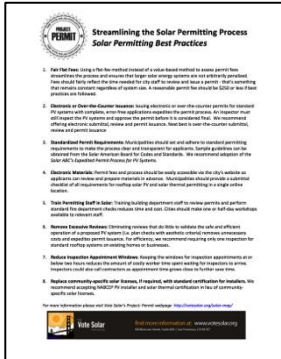
Piloting the Tools

- Thomas Township, Williams Charter Township, City of Saginaw, City of Midland
- Provide support to four communities associated with *Advancing Solar* project
- Get feedback on draft Tools (fact sheets, guidebooks, etc.)
- Develop approach for promoting statewide adoption of Tools – *Solar Ready Community*

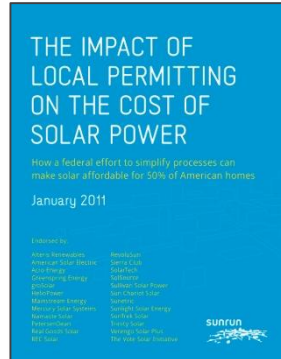


Great Lakes Bay Region
Midland • Bay City • Saginaw
Where Innovation Flows

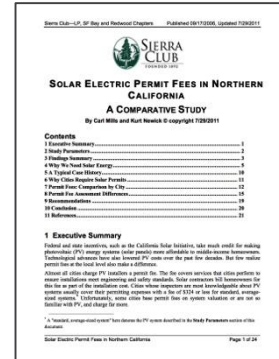
National, State, and Local Research



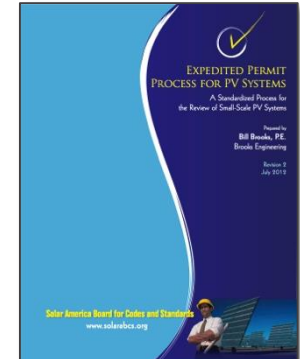
Solar Permitting Best Practices



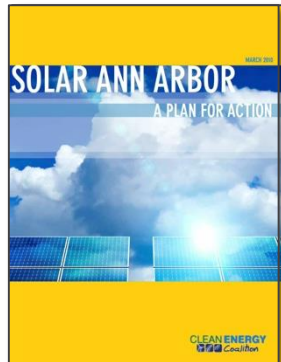
The Impact of Local Permitting on the Cost of Solar Power



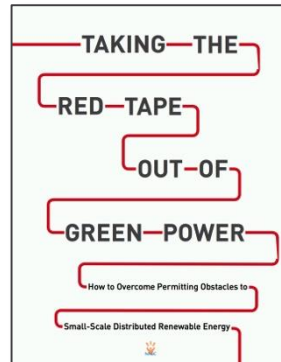
Solar Electric Permit Fees in Northern California



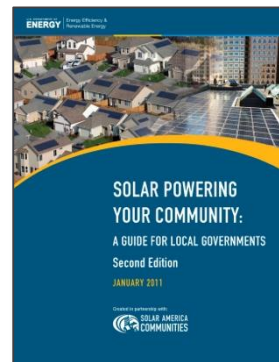
Expedited Permit Process for PV Systems



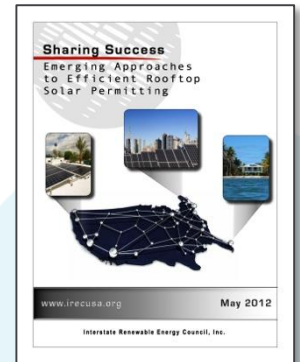
Solar Ann Arbor



Taking the Red Tape out of Green Power



Solar Powering Your Community: A Guide for Local Governments



Sharing Success: Emerging Approaches to Efficient Rooftop Solar Permitting

What We've Learned

- The process for installing solar PV varies widely between jurisdictions
- Hypothetical 5 kW residential rooftop PV installation:

Required Permits	Jurisdiction 1	Jurisdiction 2	Jurisdiction 3	Jurisdiction 4
Permits Required	electrical	building electrical	building electrical	electrical

Permit Fees	Jurisdiction 1	Jurisdiction 2	Jurisdiction 3	Jurisdiction 4
Building permit fee	N/A	\$75	\$135	N/A
Electrical permit fee	\$35	\$60	\$155	\$90
Total	\$35	\$135	\$290	\$90

Inspections	Jurisdiction 1	Jurisdiction 2	Jurisdiction 3	Jurisdiction 4
Building inspections	N/A	2+	1	N/A
Electrical inspections	1-2	2+	1	2
Total	1-2	4+	2	2

Top Recommendations – *Advancing Solar*



- Information access
 - ✓ Ample information for those interested in installing solar
- Permitting process
 - ✓ Common practices, policies across all jurisdictions
 - ✓ Expedited permitting process for “prescriptive” systems
 - ✓ Shortened permitting time, streamlined inspections
- Planning and zoning
 - ✓ Common planning document and zoning ordinance language

Becoming a *Solar Ready Community*



bridging needs. advancing change.

Taking the Lead



What is a Solar Ready Community?



Vision

Being a *Solar Ready Community* means that we have chosen to be a leader in Michigan and have proactively addressed solar in our local policies and procedures. We are prepared for this emerging technology and supportive of the solar industry in this state – Michigan has thousands of jobs in the solar industry and we want to help this number grow. Developers, homeowners, and businesses know that as a *Solar Ready Community*, they can rely on us to help them through a successful, cost-effective installation process.

Solar Ready Steps

read·i·ness

/'redēnis/

noun

1. The state of being fully prepared.

Readiness helps local governments direct their own future by proactively determining how something will best fit into your community.

Step 1: Begin the Discussion

- ✓ Introduce concept to key people
- ✓ Reach out to neighboring jurisdictions
- ✓ Engage utility provider
- ✓ Identify champions
- ✓ Develop taskforce

Solar Ready Steps

Step 2: Adopt a Resolution

- ✓ Support & attract local companies in the solar industry
- ✓ How solar brings positive recognition
- ✓ Benefits of reducing dependency on imported energy sources
- ✓ Health & environmental benefits
- ✓ Supports local goals

Tool: Sample resolution

TOOL B: SAMPLE RESOLUTION

RESOLUTION NO. _____

AUTHORIZING A COMMITMENT TO THE ADVANCEMENT OF SOLAR ADOPTION WITHIN THE REGION AND COOPERATIVE EFFORTS BETWEEN _____ IN PURSUIT OF THIS GOAL.

WHEREAS, Because Michigan (or local government if applicable) is home to key solar companies, the community wishes to take leadership on promoting solar energy generation and views supporting advancement in solar adoption an essential contributor to the region's economic prosperity; and

WHEREAS, Becoming a statewide leader in solar adoption will bring positive recognition to _____; and

WHEREAS, The United States, Michigan, and this region import sources of energy, adoption of solar helps localize the energy source, thereby helping our country, state, and region reduce its dependence on imported energy sources; and

WHEREAS, Solar installations help preserve our natural resources and reduce greenhouse gas and other harmful emissions; and

WHEREAS Michigan has reached its 10 percent goal for renewable energy and is well positioned to set higher goals in this area; and

WHEREAS renewable energy resources, such as community solar, offer many potential community, economic, environmental, national security, and societal benefits for the state; and

WHEREAS communities that become *Solar Ready* benefit from enhanced Community Vitality and new Business Investment; and

WHEREAS, Solar is proving to be a viable energy source in Michigan, and

WHEREAS, Encouraging solar adoption helps support the several goals found in local planning documents.

NOW, THEREFORE, BE IT RESOLVED THAT _____ supports the continued exploration of reducing barriers to solar adoption and earnest consideration of new policies and processes that help support solar adoption and becoming a *Solar Ready Community*.

BE IT FURTHER RESOLVED THAT _____ (will work cooperatively with *neighboring jurisdiction name(s)* if applicable) to explore policy and process change and engage in an exchange of information regarding solar adoption in the region.

Solar Ready Steps

TOOL C: SAMPLE PLANNING LANGUAGE

The character of planning documents varies among jurisdictions. The text below provides local governments with sample language that each jurisdiction can tailor to suit local needs. Additional language can also be drawn from the main body of this text (see Introduction). Please consult your local legal counsel for advice on the appropriateness and applicability to your jurisdiction's Master Plan.

SAMPLE REASONING AND BACKGROUND LANGUAGE

1 Secure Energy Supply:

A solar-electric infrastructure helps protect the power supply during brownouts, blackouts, power interruptions and price fluctuations.

2 Stimulate Jobs and Industries: Support for and adoption of solar infrastructure will create economic opportunities for Michigan-based manufacturers and suppliers.

3 Save Our Fresh Water Resources: In contrast to other forms of energy, solar installations use no water in the generation of clean, renewable electricity.

4 Reduce Operating and Maintenance Costs: Many rooftop solar-electric installations actually act to insulate the building below. In addition, large photovoltaic installations can shade and protect a rooftop from damaging ultraviolet radiation, slowing the need for rooftop maintenance or replacement.

5 Reduce Emissions: Solar energy does not contribute to greenhouse gas emissions and will help reduce emissions by replacing polluting sources of power.

SAMPLE GOAL LANGUAGE

1 Demonstrate Leadership in Public Buildings by holding building public facilities to a higher energy efficient standard and by using on-site renewable energy in new buildings and facilities where technically and economically practical.

2 Protect Unobstructed Sunlight in planning and development processes to promote the use of solar energy.

3 Work with Developers to consider renewable energy resources in the layout and construction of new development.

4 Provide Information and Education to help property owners easily navigate permitting processes as they relate to solar.

5 Update Regulations to help support solar adoption and keep current with technologies.

6 Share Information to help other local governments interested in supporting solar successfully prepare for future demand.

7 Become a Solar Ready Community to send the message to developers, homeowners, and businesses that they can rely on us to help them through a successful, cost-effective installation process.

Step 3: Establish a Guiding Policy that Supports Solar

Do you have a planning document that supports solar

If yes:

- ✓ Determine strength of policy
- ✓ Raise awareness of policy
- ✓ Find out what has been done

If no:

- ✓ Take opportunity to include solar during next update cycle

Tool: Sample planning language

Solar Ready Steps

Step 4: Update Code Language

- ✓ Abandonment
- ✓ Agriculture land use
- ✓ Height
- ✓ Stormwater
- ✓ Reflection/Glare
- ✓ Screening
- ✓ Setback

Tool: Sample zoning language

TOOL D: SAMPLE ZONING LANGUAGE

The character of zoning ordinances varies among jurisdictions. The text below is based on several, primarily Michigan based, existing solar ordinances, and provides local governments with sample language that each jurisdiction can customize to suit local needs. *Please consult your local legal counsel for advice on the appropriateness and applicability to your jurisdiction's zoning ordinance.*

As a guideline, the different scale of solar collection devices would be suitable for the following:

- Attached: All zoning districts
- Small Freestanding: Medium to low-density districts
- Large Freestanding: Industrial and possibly Agriculture

PURPOSE

The purpose of this ordinance is to add provisions to the Zoning Ordinance to address the permitting of small, medium, and large solar energy systems. The Ordinance recognizes the potential need for solar energy systems, while also supporting agricultural and habitat conservation. These changes are also necessary and appropriate to improve and enhance public welfare and safety, and to implement the Master Plan.

SAMPLE DEFINITIONS

GENERAL DEFINITION

Solar Collection Devices–General: Solar collection devices are designed to capture and utilize the energy of the sun to generate electrical power. A solar collection device is the actual material(s) used to collect solar rays and all associated ancillary and structural devices needed to support and convert/transmit the energy collected. These devices may be either freestanding or attached to a structure and are sized to meet the various user needs and/or utility requirements.

SMALL

Solar Collection Devices–Attached: An array of solar collection materials secured to the exterior walls or roof of a principal or accessory building and generate up to but not exceeding the manufacturer's rating of 20KW.

Solar Collection Devices–Small Freestanding: An array of freestanding (not attached to a principal or accessory structure) solar collection materials that generate up to but do not exceed the manufacturer's rating of 20KW.

Solar Ready Steps


TOOL F: SOLAR SAM EXERCISE

GOALS OF EXERCISE:

- 1 Understand what the customer experience is like now
- 2 Determine ways to improve this experience as a region

EXPLORATION OF THE CUSTOMER EXPERIENCE

Solar Sam and his three friends want to each install a 5 kW residential rooftop solar PV system (total cost approximately \$25,000) on their individual homes. Each of them lives in a different jurisdiction and has found that the levels of information vary and that the permitting processes are different. How can the jurisdictions come together to improve this experience?



This tool is to help determine differences so that jurisdictions can find ways to move forward in coordinated, regional Solar Ready approach.

Solar Sam and his friends try to access information.

When exploring a new topic, typically the first step for anyone today is to look up information on the Internet. Sam and his friends each go to each of their jurisdiction's website. They find that there is (little/ample/competing/similar?) information that specifically addresses solar. What can be done to make this information more accessible?

STEP
1

Solar Sam and his friends begin applying for permits.

When applying for permits, Solar Sam and his friends learn that some jurisdictions require their own forms and processes. What can be done to make this more consistent?

STEP
2

Solar Sam and his friends pay for permits.

The fees vary greatly between Solar Sam and his friends. For one the cost is only \$____ for another the cost is \$____. They wonder why there is such a big difference. What can be done to help explain the differences and/or make the fees more consistent?

STEP
3

Solar Sam and his friends await approval.

For several the friends, the approval process is fairly quick, but for others it takes up to _____. What can be done to make approval process quicker?

STEP
4

Solar Sam and his friends undergo inspection for the installation.

The total number of inspections for Solar Sam and his friends ranged from _____ to _____ or more and that the inspection time window was about _____ hours. Research suggests that eliminating the requirement for in-process (or "double") inspections for basic residential PV installations along with scheduling specific inspection times saves both the inspector's time as well as the time of the resident or installer. What could be done to reduce the number of inspections and focus the time of the inspection

STEP
5

Step 5: Create an Easy-to Use Permitting Process

- ✓ Provide checklist
- ✓ Expedite small systems
- ✓ Allow for online permitting
- ✓ Reduce appointment time
- ✓ Coordinate with neighbors
- ✓ Showcase successful examples
- ✓ Consider waiving/reducing fees

Tools: Sample checklists, Solar Sam Exercise


Solar Ready Steps

Step 6: Provide Easy Access to Information

- ✓ Your stated goal as a Solar Ready Community
- ✓ A description of approval process
- ✓ Solar zoning language
- ✓ Permitting applications
- ✓ Informational resources

Tool: Outline for print and web materials

TOOL G:
SUGGESTED WEBSITE AND
BROCHURE INFORMATION



Copies of this logo can be attained from Clean Energy Coalition:
<http://cec-mi.org/>

IDENTIFY YOURSELF AS A SOLAR READY COMMUNITY

- Use the Solar Ready logo to signify that you are part of the larger Solar Ready community and that you are prepared for and welcoming of solar installations
- Post Solar Ready Vision Statement
- Provide Solar Ready definition
- Offer background on why you chose to be Solar Ready

LIST PARTNERS

- Any collaborating jurisdictions
- All supporting/collaborating organizations
- Taskforce team members (if established)

PROVIDE WHO TO CONTACT

- Solar Coordinator (if established)
- Other relevant staff

EXPLAIN WHAT TO EXPECT DURING THE PERMITTING PROCESS


- Overview of process
- Application requirements
- Fees
- Timing
- Number and timing of inspections
- How to qualify for expedited permitting

DIRECT WHERE TO FIND AND SUBMIT APPLICATIONS

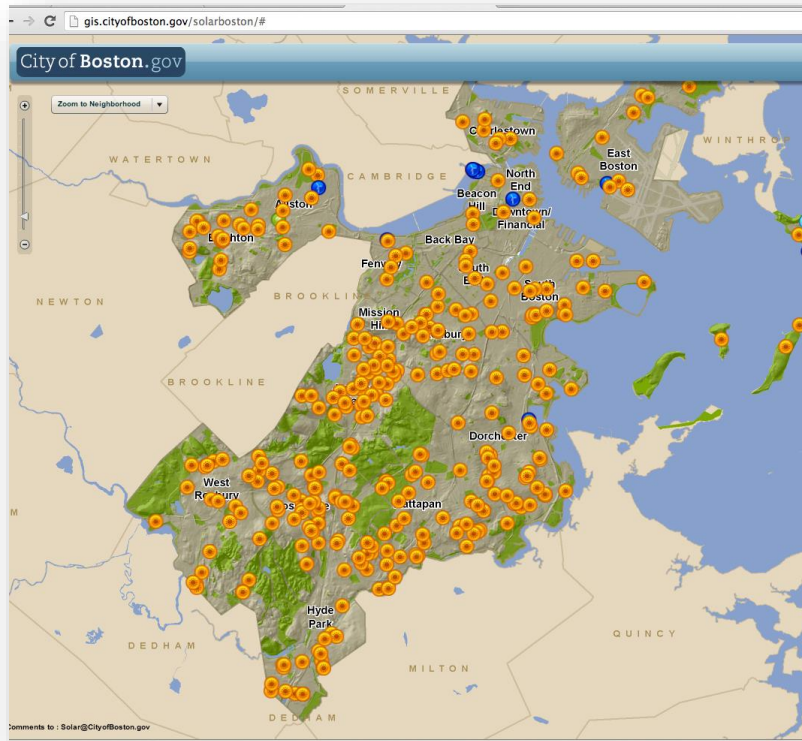
- Links to all application materials
- How to submit online, if available

INCLUDE EXTRA MILE ACTIVITIES AND ONLINE RESOURCES

- Information on Extra Mile Initiatives
- Solar calculators and other tools that will be useful to the public

 BECOMING A SOLAR-READY COMMUNITY

Solar Ready Steps



Step 7: Establish Solar Installation Targets

- ✓ Conduct an inventory
- ✓ Determine realistic target

Example: Boston

Solar Ready Steps

Step 8: Train Staff

- ✓ Planning, permitting, zoning, safety
- ✓ Work with existing institutions



Solar Ready Steps

Step 9: Pursue Solar Business Development Opportunities

- ✓ Manufacturers
- ✓ Installers
- ✓ Partnerships



Solar Ready Steps

TOOL H: ELECTRIC VEHICLE CHARGING STATIONS AND SOLAR APPLICATIONS



Increasing fuel prices, concerns about energy security, and air quality improvement goals have spurred an interest in pairing automotive technology with renewable energy sources. Plug-in electric vehicles (PEVs) offer this opportunity.

As the automotive capital, Michigan has a high interest in PEVs. A 2012 study by Pike Research showed that Michigan is ranked 7th in the nation in PEV adoption. In addition, numerous automotive suppliers that develop PEV charging stations and advanced vehicle battery technology are calling Michigan home. However, as Michigan residents take to the adoption PEVs, our state's energy sources remain primarily imported and emissions producing, which negates many of the benefits that PEVs have to offer.

To help move away from imported energy and capitalize on the clean mobility potential that PEVs provide, charging stations can be coupled with a renewable energy source. The following case studies provide two successful examples of a renewable energy/charging station application in Michigan.

Western Michigan University

In an effort to green its fleet, Western Michigan University (WMU) purchased five electric vans, a hybrid-hydraulic bucket truck, and a 50-kilowatt (kW) photovoltaic (PV) array with 15 charging stations in 2012. WMU's purchase was made possible through a grant by the U.S. Department of Energy's Clean Cities program.

The PV system at WMU consists of 18 adjustable arrays that are each made up of 12 230-Watt panels (totaling 50 kW). The PV system converts the sun's energy into electricity and sends this electricity to the WMU electric grid. WMU receives this energy and provides electricity to the vehicle charging stations 24 hours a day.

The University's electric vehicles currently operate on WMU's campus and wherever the University conducts business. To date, the vehicles have traveled 31,631 miles total. The solar panels generate enough energy each day, on average, to fully charge approximately 11 Chevrolet Volts, 7 Nissan Leafs, or 6 Azure Ford Battery Electric Transit Connects. The 15 WMU charging stations are available for any electric vehicle owner to use.

To learn more, visit: <http://www.wmich.edu/sustainability/projects/electric-vehicles>

Lansing Board of Water and Light

In April 2013, the Lansing Board of Water and Light (LBWL) installed a solar carport as a demonstration project to study charging electric vehicles via a solar array. The carport consists of a 5-kW grid-tied solar array with two publicly available electric vehicle charging stations. The carport, located at the riverside City Market, is a modular aluminum structure designed to be waterproof and fully wind, snow and seismic code compliant. The project was funded through the U.S. Department of Energy.

As the
electrical
grid in
Michigan
becomes
cleaner, so
will the
miles driven
by a PEV.

Step 10: Go the Extra Mile

- ✓ Bulk purchasing programs
- ✓ Collaborate with organizations & jurisdictions
- ✓ Community solar
- ✓ Education
- ✓ Lead – install on public buildings

Tool: Partners in this room

Your Future



<http://www.95405.org/>

For more information on the Renewable Energy Tools Program:

visit cec-mi.org/MIrenewable.

Join the Twitter conversation about renewable energy in Michigan by searching for #MIrenewable.

Contact Heather Seyfarth, Program Supervisor at heather@cec-mi.org or 734-585-5720 ext. 21