

# Everything About Solar

## A Strategic Training Session for Local Governments – Part I



 Powered by  
**SunShot**  
U.S. Department of Energy

October 6<sup>th</sup>, 2014



Powered by

**SunShot**

U.S. Department of Energy

## **Ryan Cook**

Meister Consultants Group

[ryan.cook@mc-group.com](mailto:ryan.cook@mc-group.com)



## **Philip Haddix**

The Solar Foundation

[phaddix@solarfound.org](mailto:phaddix@solarfound.org)



# 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

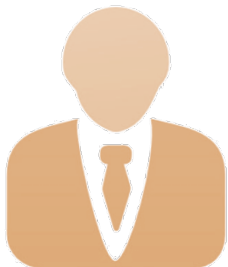


## Technical Resources

Helping Policymakers Understand Best Practices:

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

[www.solaroutreach.org](http://www.solaroutreach.org)



## One to One Assistance

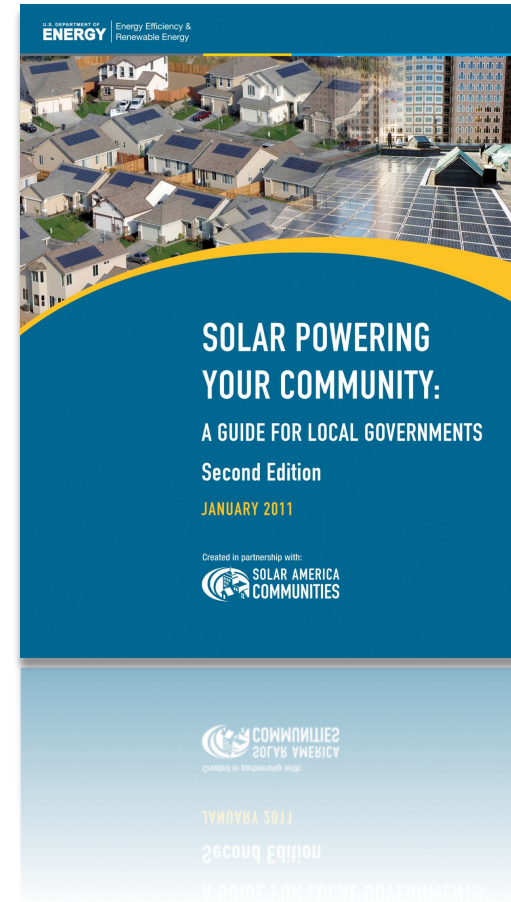
# Technical Resources

Resource

## Solar Powering Your Community Guide

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

[www.energy.gov](http://www.energy.gov)



# Complimentary Services

Quickly get up to speed on key solar policy issues:

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



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!

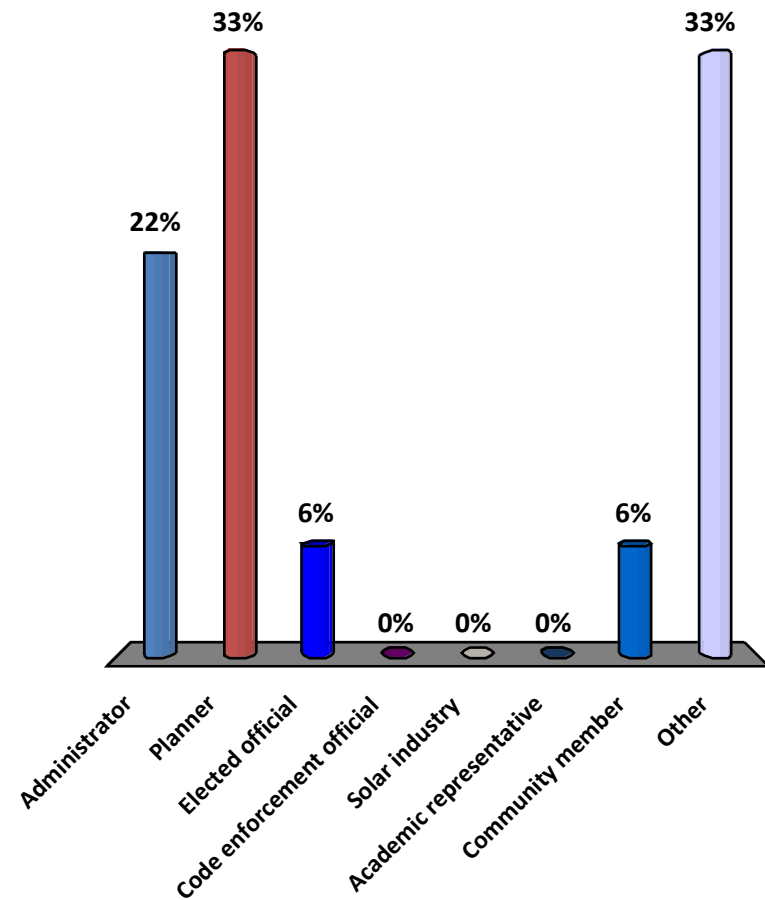
Sign up for a 20 minute  
consultation to learn more about  
our **free** services

See **Riana Ackley** to sign up.

We want to get to know you better

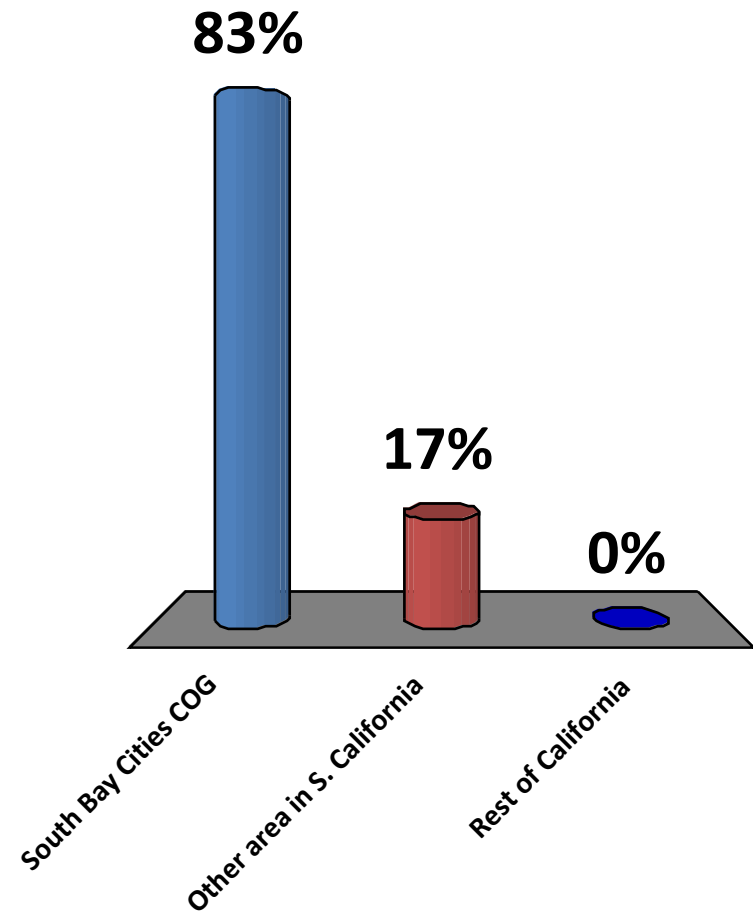
# Who are you?

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



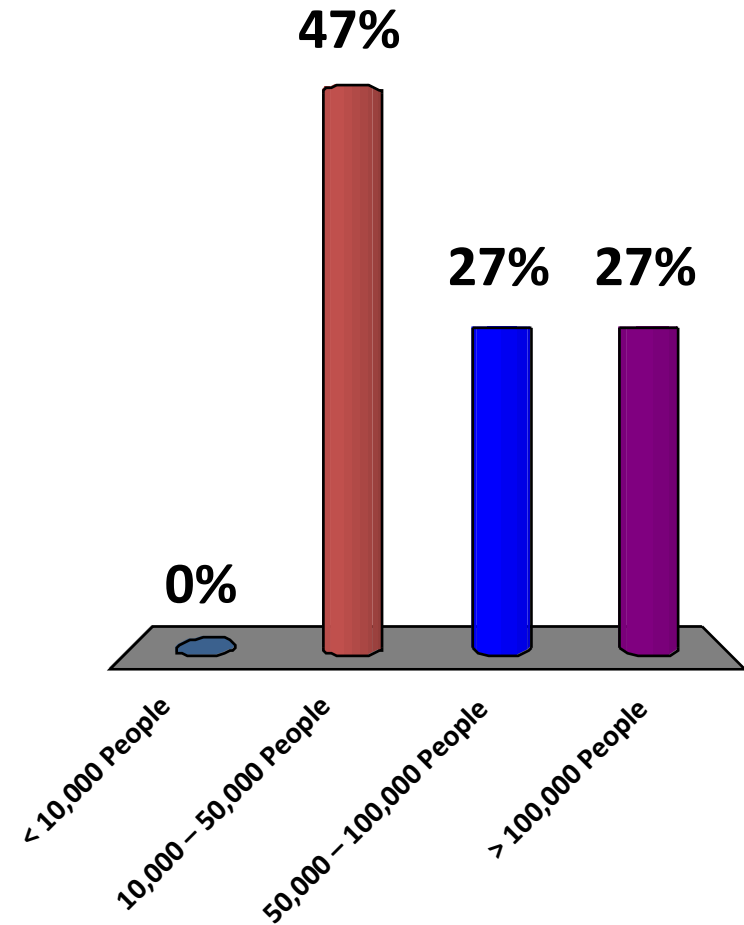
# Where are you coming from?

- A. South Bay Cities COG
- B. Other area in S. California
- C. Rest of California



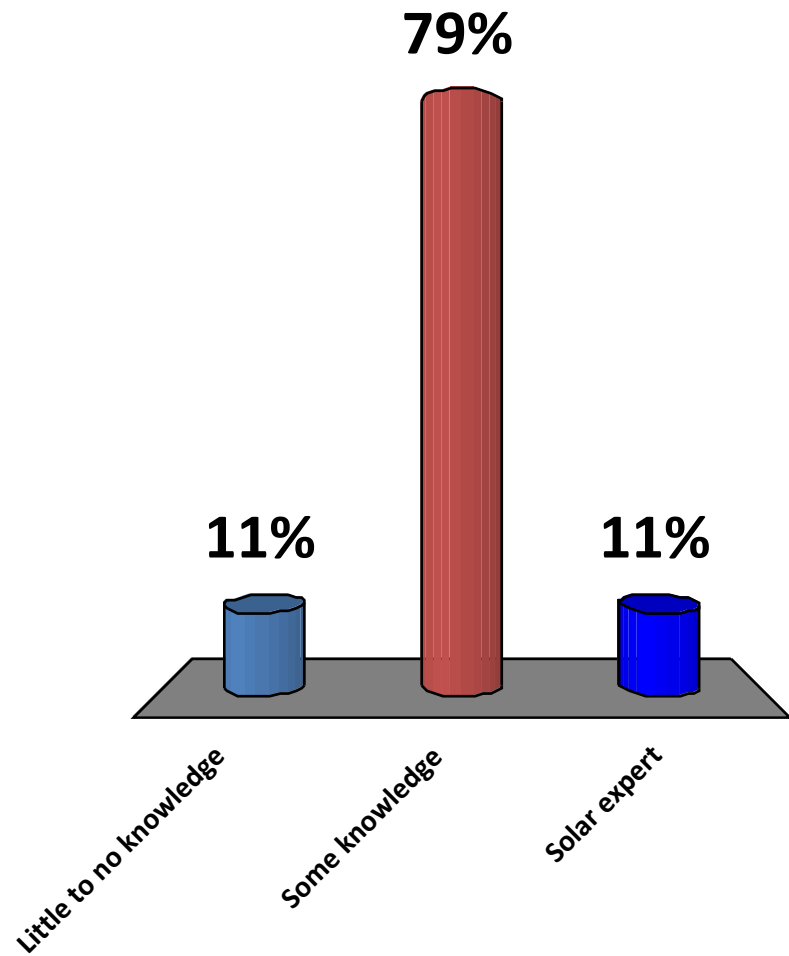
# What size is your community?

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



# How familiar are you with solar?

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

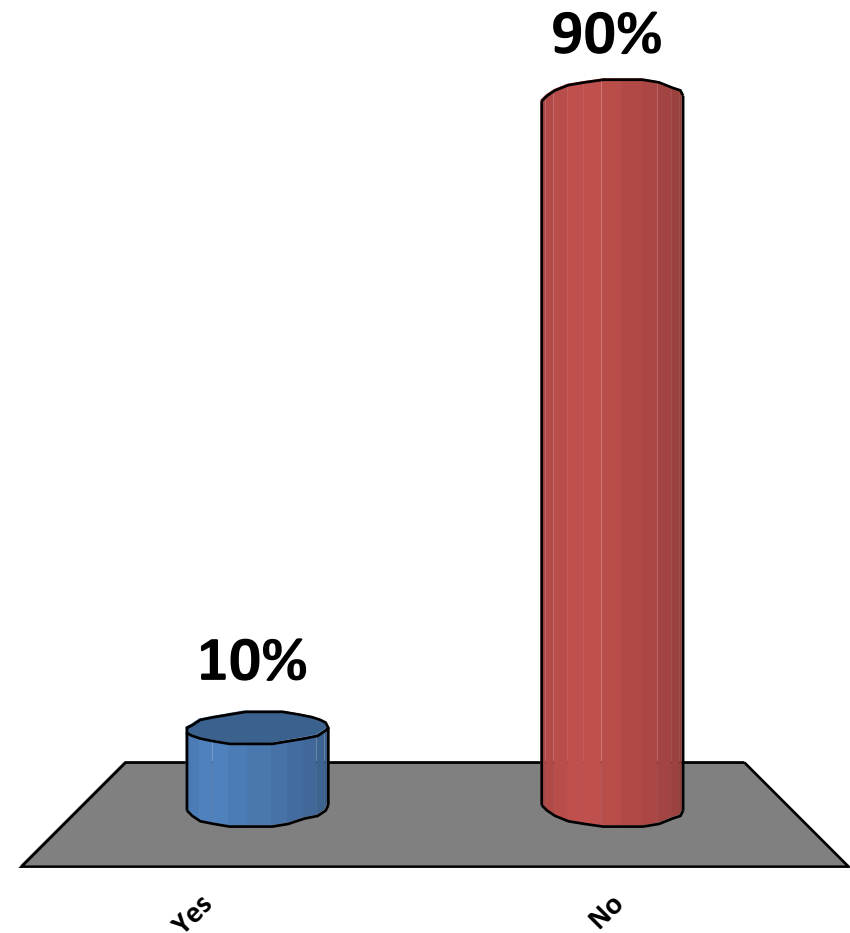




# Do you have solar on your home?

A. Yes

B. No



# Solar Development in the US

In 2013, the US solar industry installed

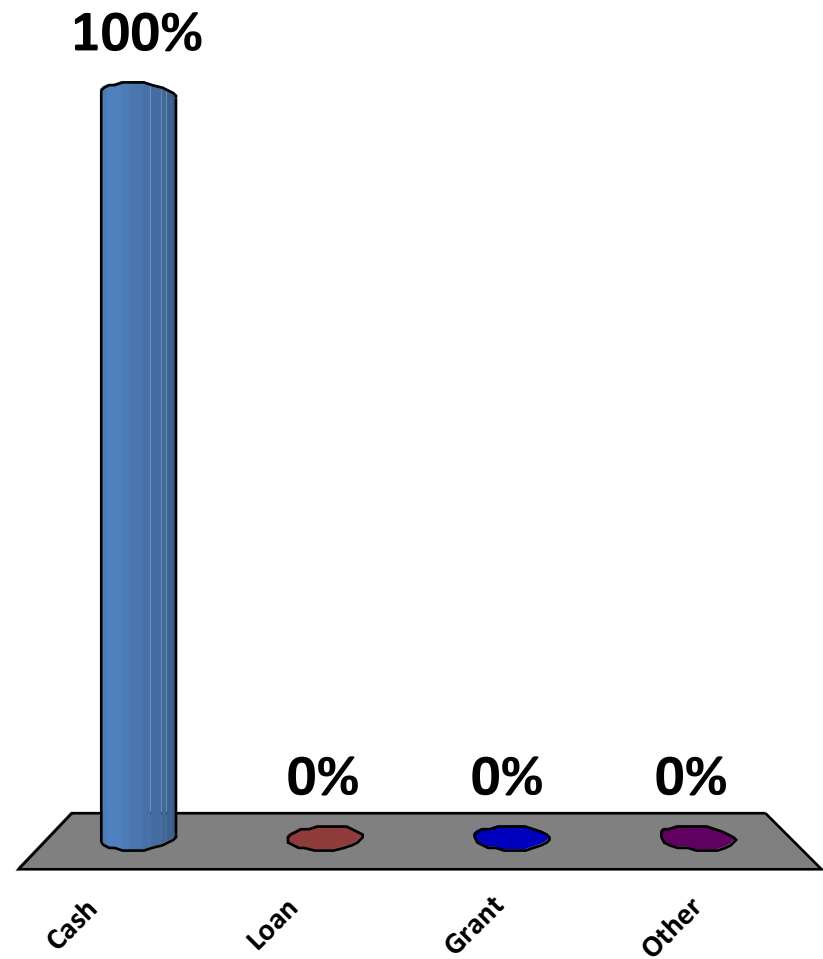
**131,000** new solar installations

*of which*

**94%** were residential projects

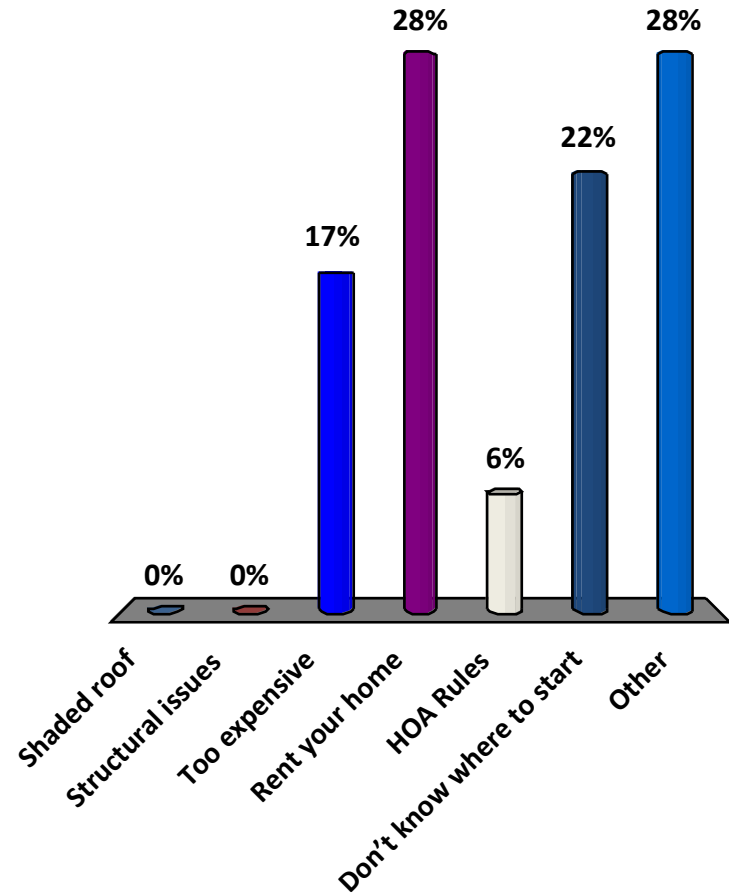
# If you do have solar on your home: How did you finance it?

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



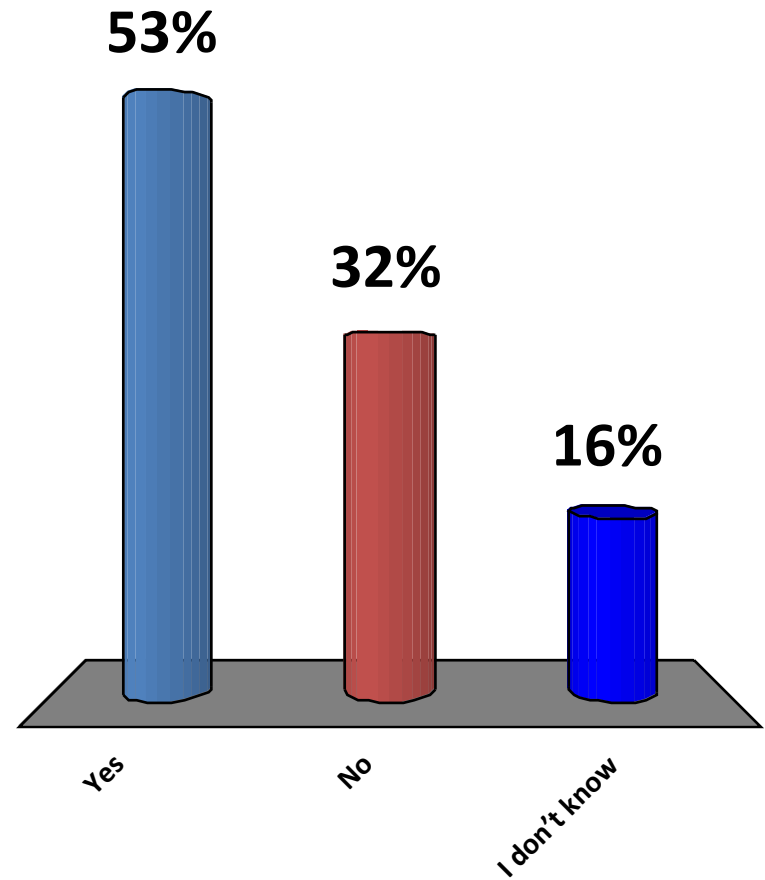
# If you don't have solar on your home: Why not?

- A. Shaded roof
- B. Structural issues
- C. Too expensive
- D. Rent your home
- E. HOA Rules
- F. Don't know where to start
- G. Other



# Does your local government have solar on public properties?

- A. Yes
- B. No
- C. I don't know



# Agenda

09:30 – 09:45	Putting Solar Energy on the Local Policy Agenda
09:45 – 10:00	State of the Local Solar Market
10:00 – 10:30	Federal, State, and Utility Policy Drivers
10:30 – 11:15	Solar in Development Regulations (then Break)
11:15– 12:15	Local Speaker on Permitting and Q&A
12:15– 1:00	<i>Lunch Break</i>
1:00 – 1:20	Installing Solar on Municipal Facilities
1:20 – 2:00	Solar Financing
2:00 – 3:00	Local Speakers on Solar Financing and Q&A

# Agenda

09:30 – 09:45	Putting Solar Energy on the Local Policy Agenda
09:45 – 10:00	State of the Local Solar Market
10:00 – 10:30	Federal, State, and Utility Policy Drivers
10:30 – 11:15	Solar in Development Regulations (then Break)
11:15– 12:15	Local Speaker on Permitting and Q&A
12:15– 1:00	<i>Lunch Break</i>
1:00 – 1:20	Installing Solar on Municipal Facilities
1:20 – 2:00	Solar Financing
2:00 – 3:00	Local Speakers on Solar Financing and Q&A

# Solar Technologies



**Solar Photovoltaic (PV)**



**Solar Hot Water**



**Concentrated Solar Power**



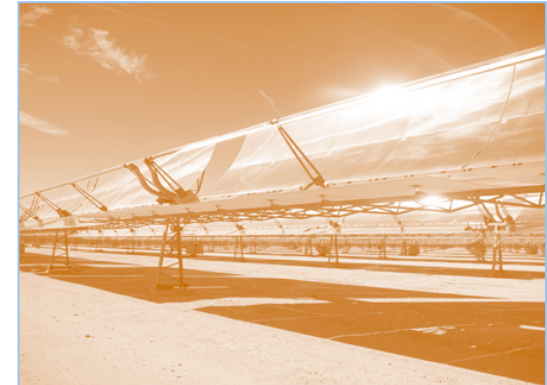
# Solar Technologies



**Solar Photovoltaic (PV)**

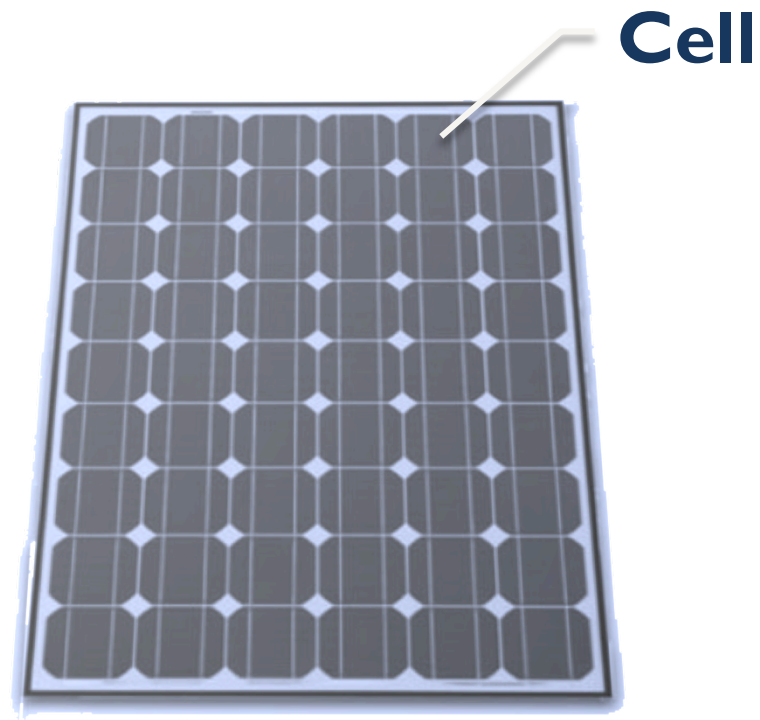


**Solar Hot Water**



**Concentrated Solar Power**

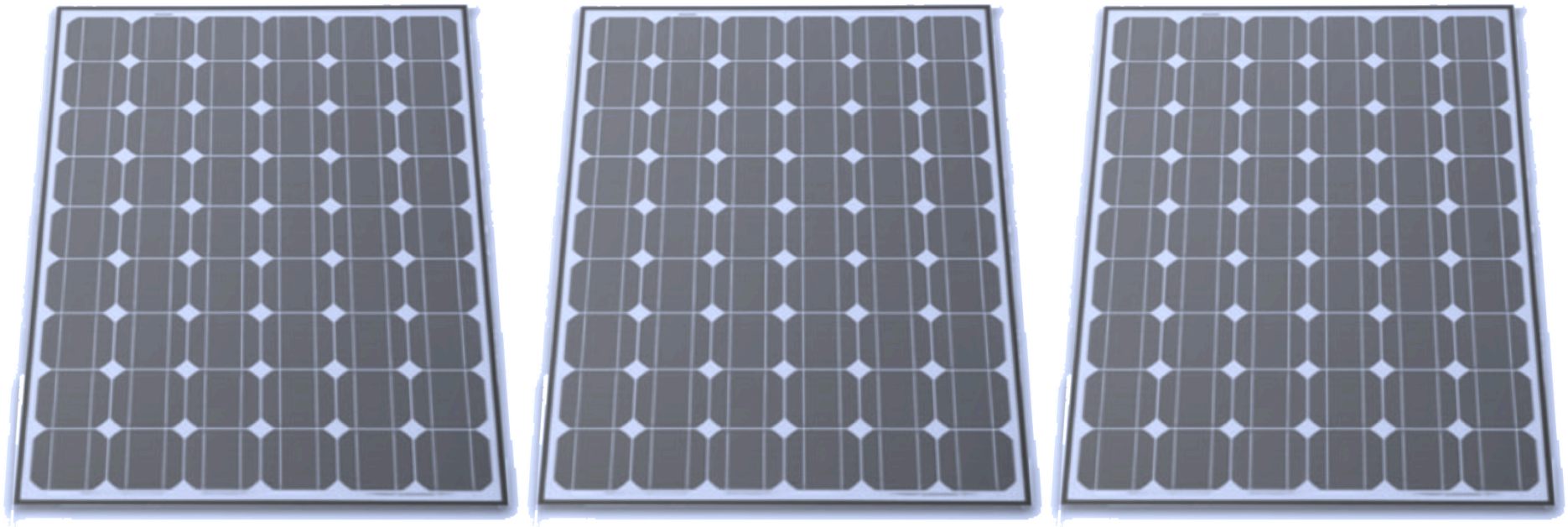
# Some Basic Terminology



**Cell**

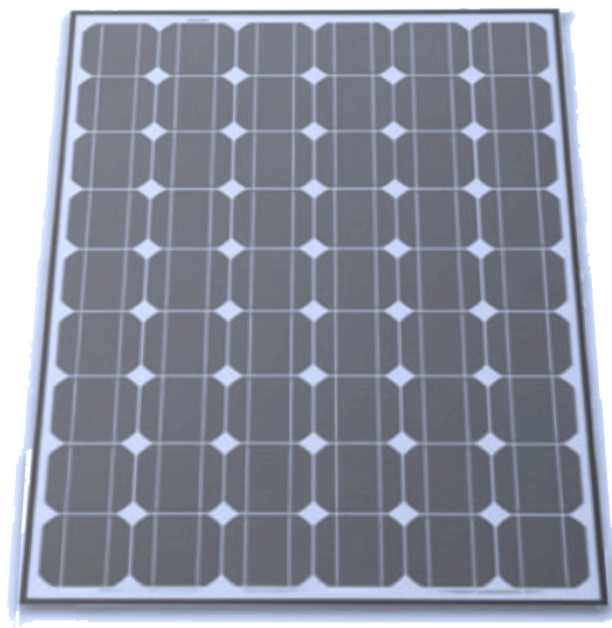
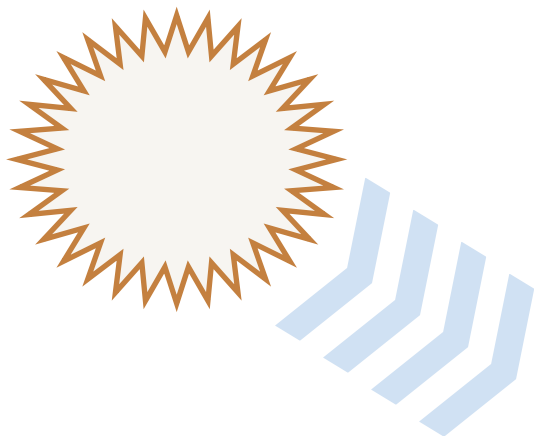
**Panel / Module**

# Some Basic Terminology



**Array**

# Some Basic Terminology



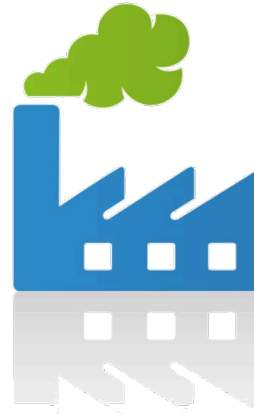
**Production**  
*Kilowatt-hour (kWh)*

**Capacity / Power**  
*kilowatt (kW)*

# Some Basic Terminology



**Residence**  
5 kW



**Factory**  
1 MW+



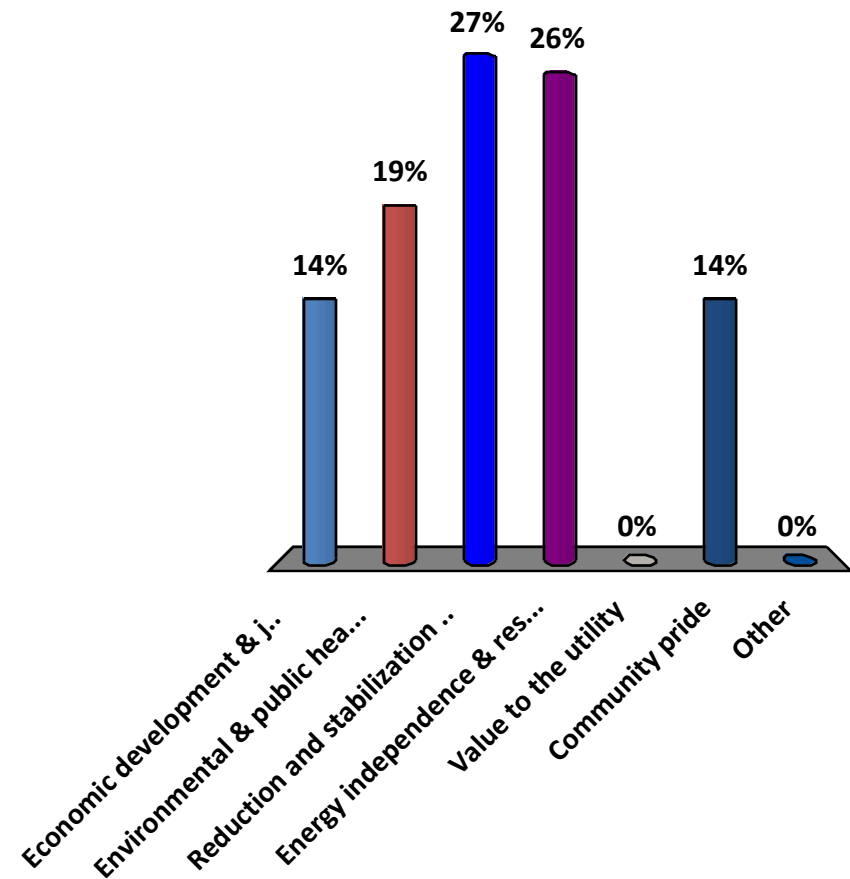
**Office**  
50 – 500 kW



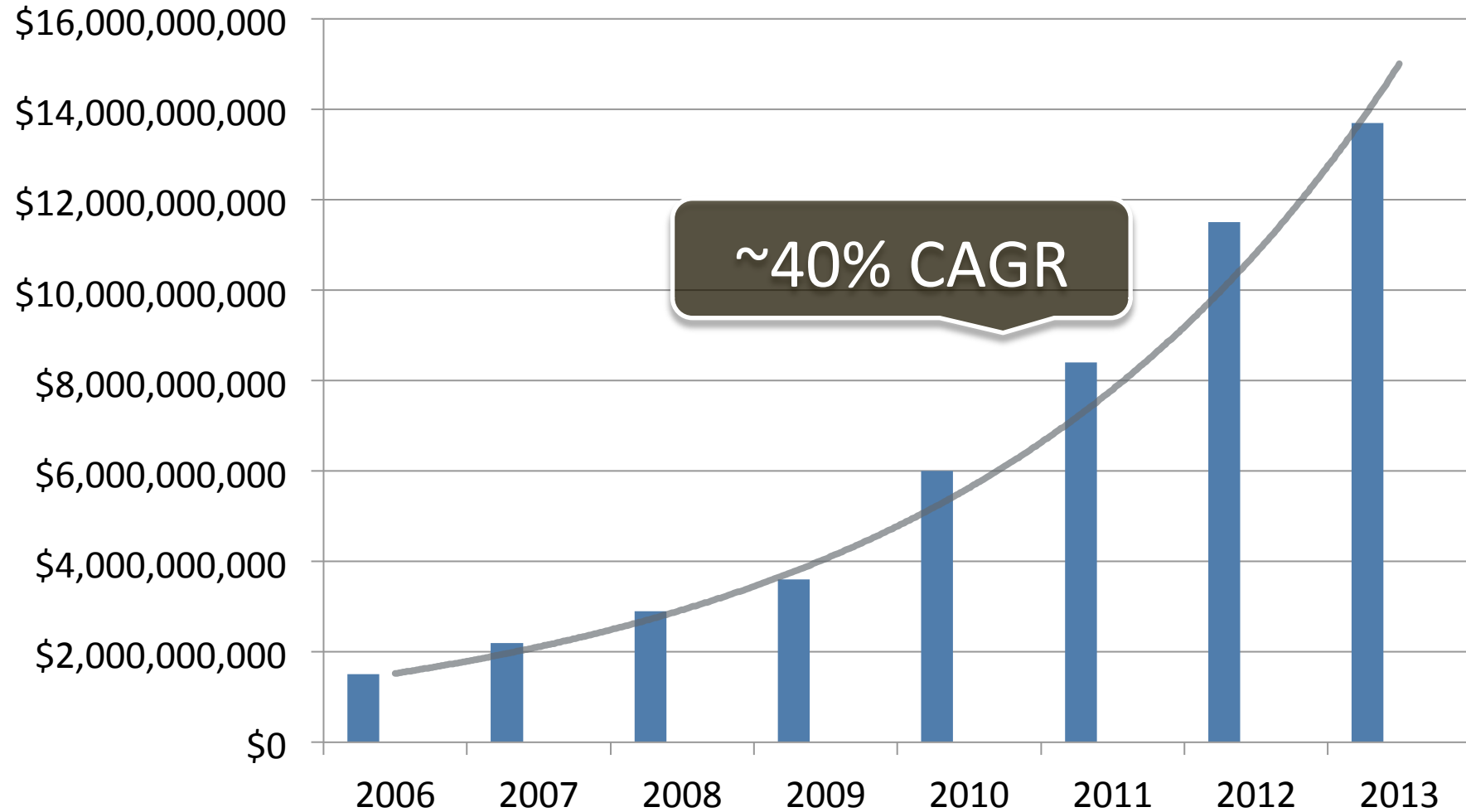
**Utility**  
2 MW+

# What are the top 3 benefits solar can bring to your community?

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

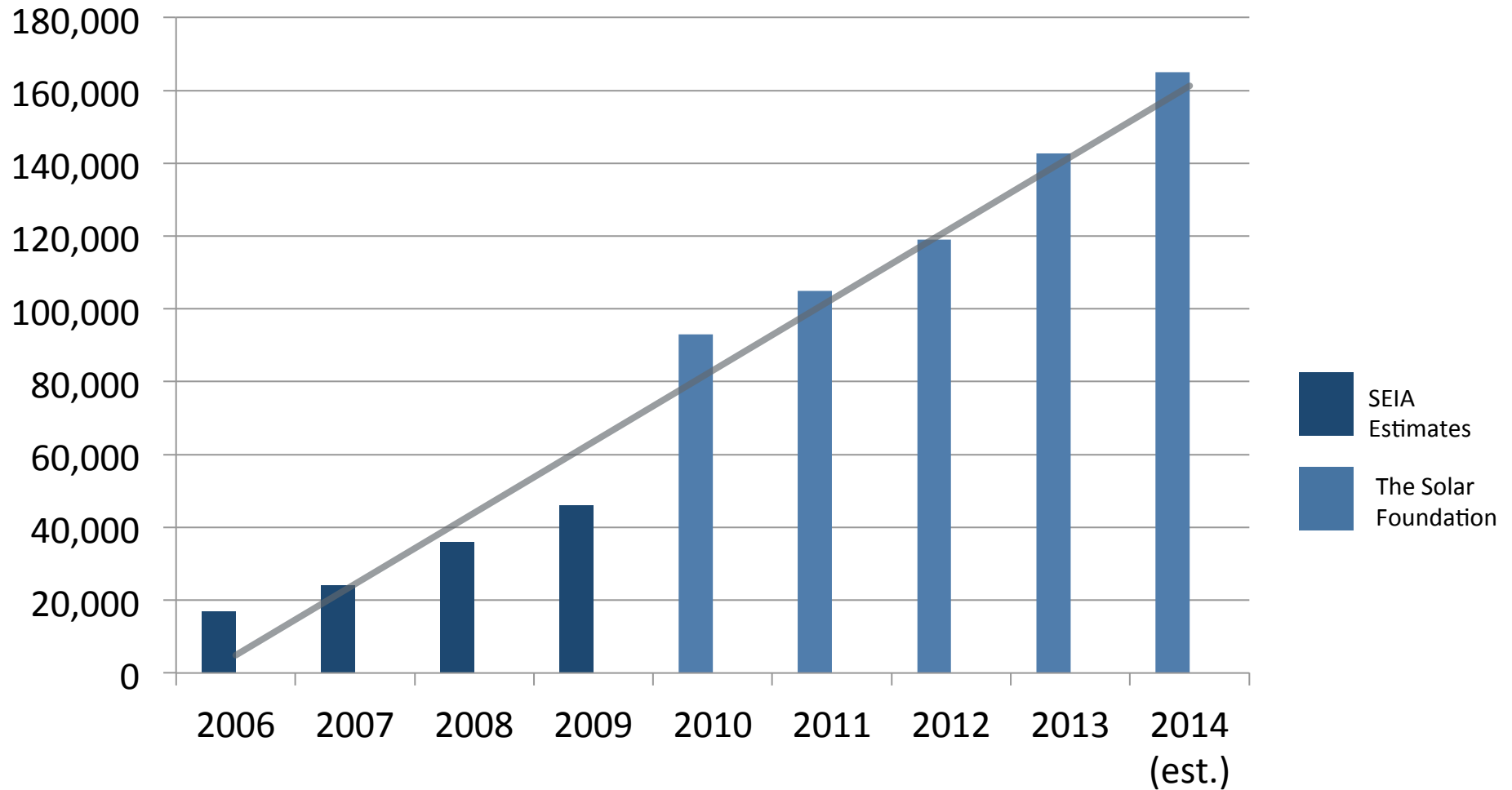


# Solar Economic Growth



# Solar Job Growth

Solar Job Growth in the US





# The Local Economic Opportunity

1 Megawatt of Residential Solar  
Development in California:



**39 Jobs** *and* **\$5.3 Million**  
In economic output

# Economic Development in California

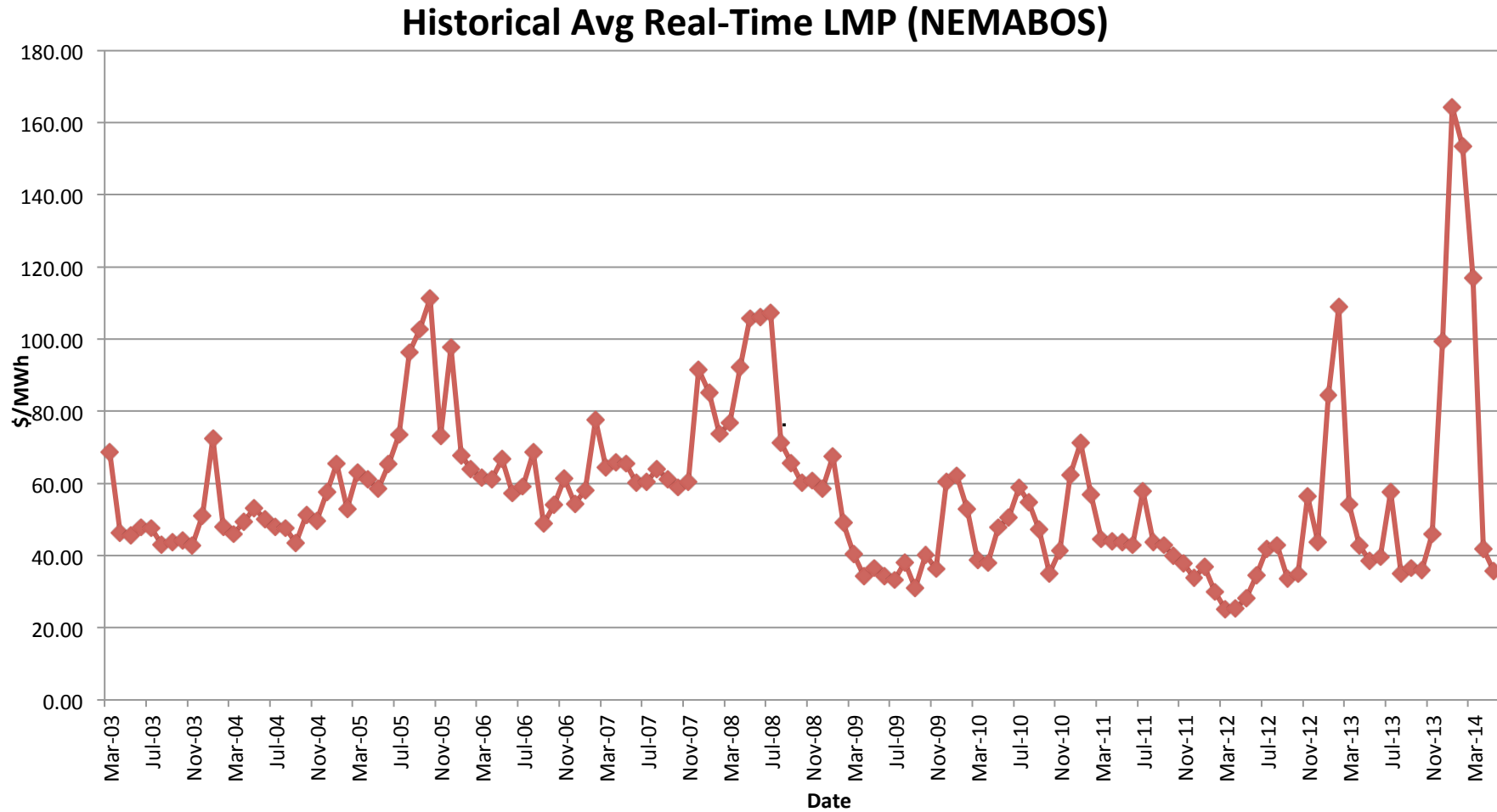
*There are currently*

1,672 solar companies

*that employ*

47,223 people

# Benefit: Stabilize Energy Prices



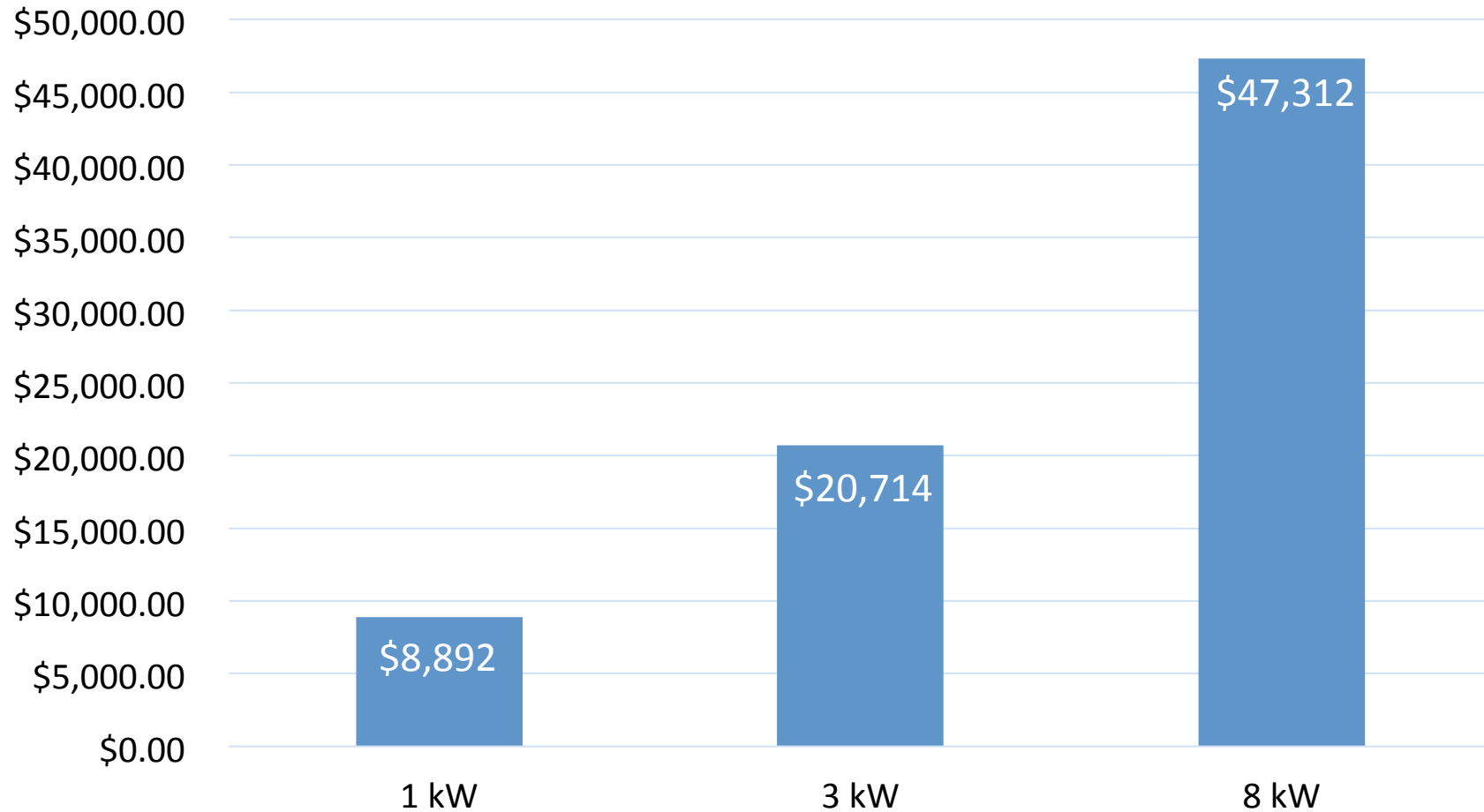
# Benefits: Valuable to Electric Grid

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



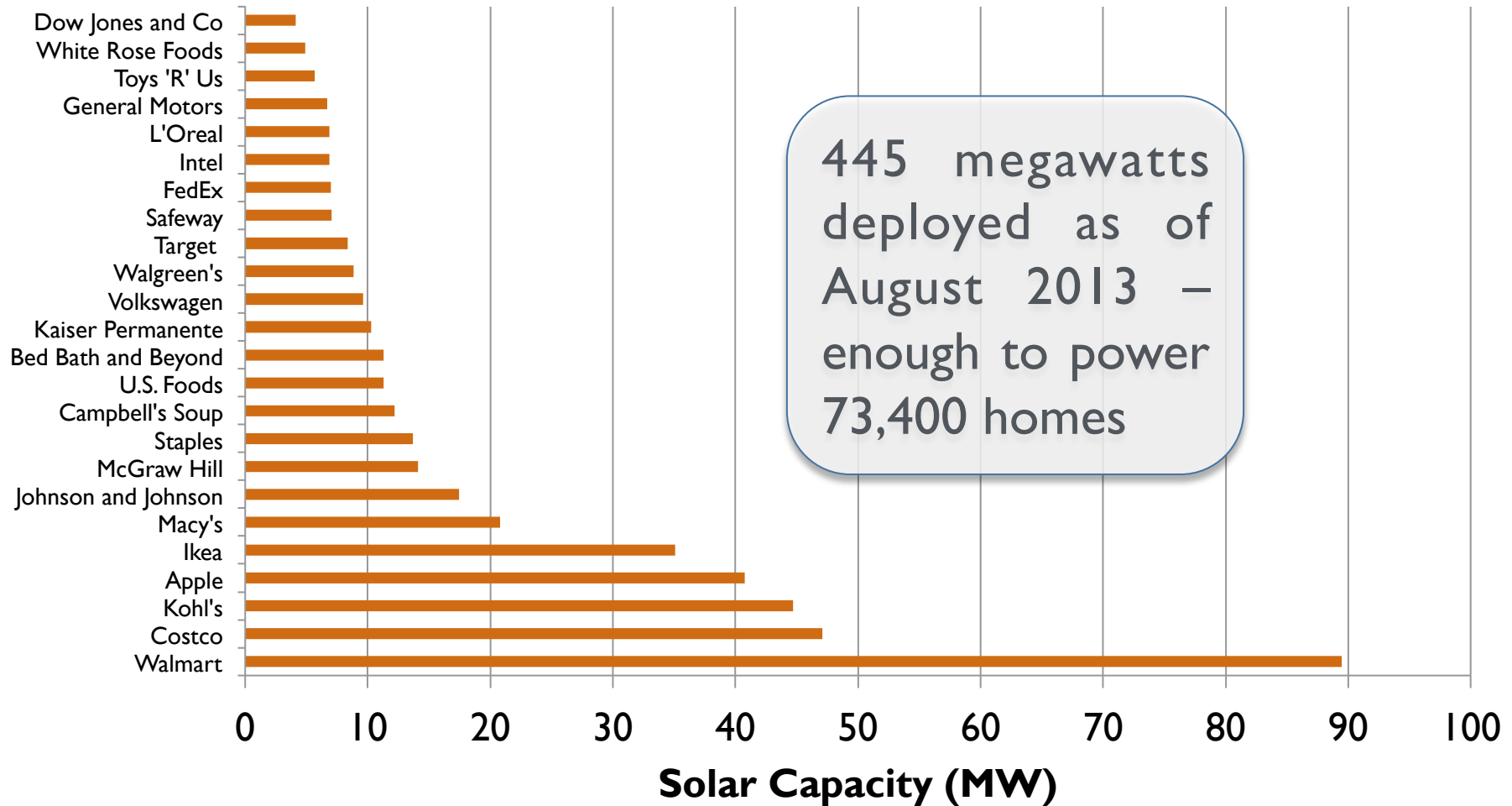
# Smart Investment for Homeowners

## Average Home Value Premium for Solar PV Systems in California



# 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

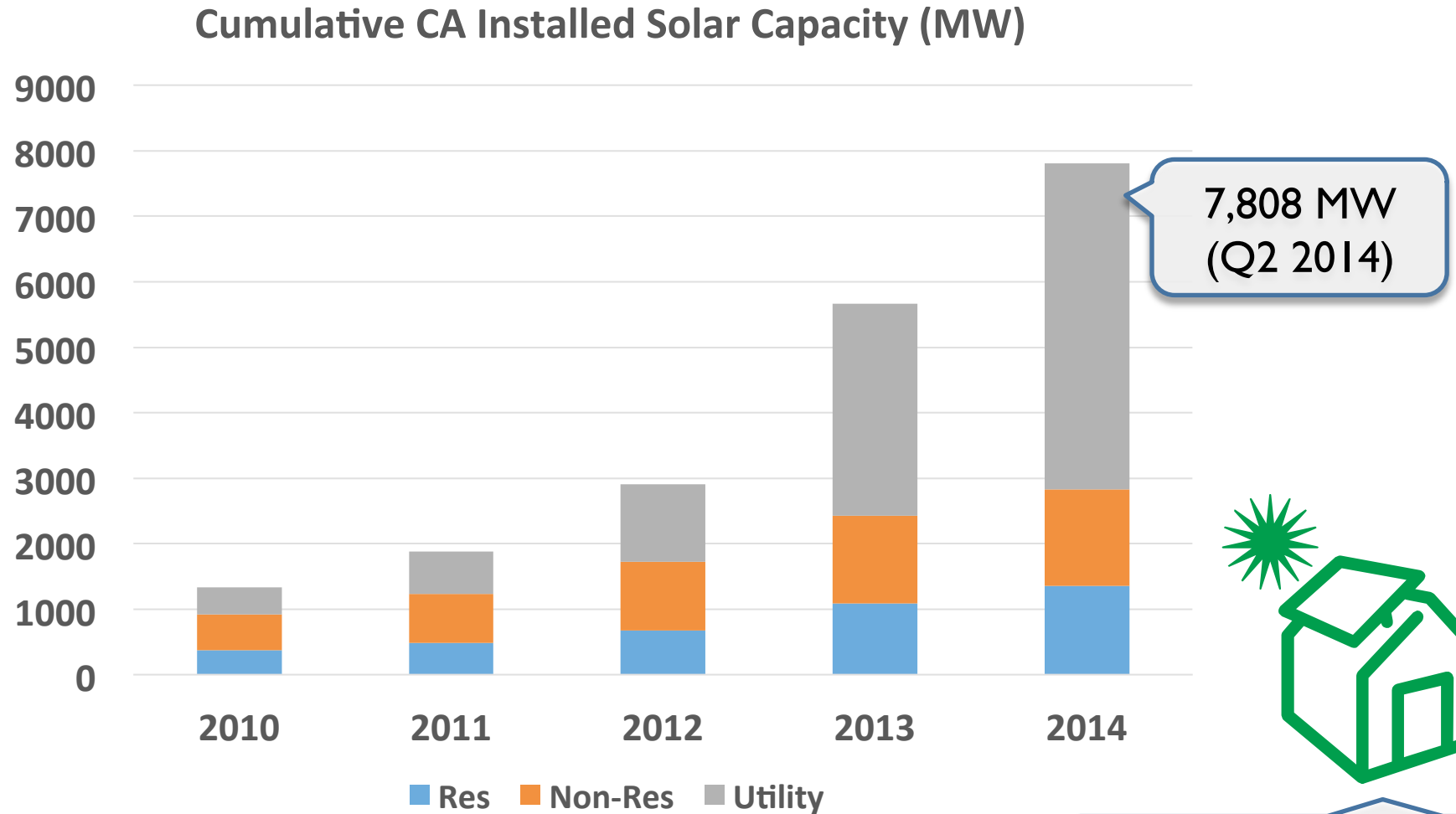




# Agenda

09:30 – 09:45	Putting Solar Energy on the Local Policy Agenda
09:45 – 10:00	State of the Local Solar Market
10:00 – 10:30	Federal, State, and Utility Policy Drivers
10:30 – 11:15	Solar in Development Regulations (then Break)
11:15– 12:15	Local Speaker on Permitting and Q&A
12:15– 1:00	<i>Lunch Break</i>
1:00 – 1:20	Installing Solar on Municipal Facilities
1:20 – 2:00	Solar Financing
2:00 – 3:00	Local Speakers on Solar Financing and Q&A

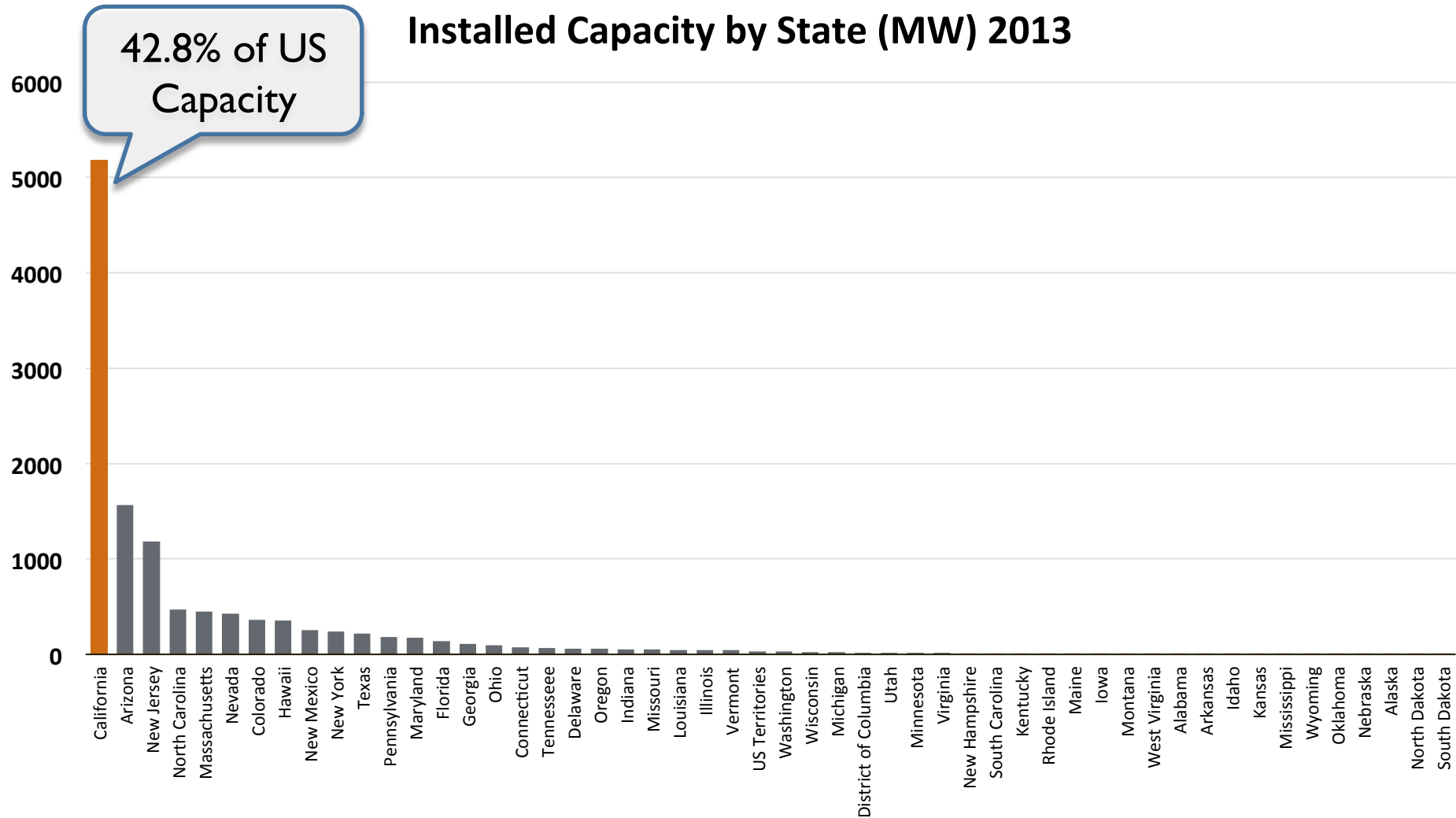
# California Solar Market



Enough to power over 1.6 million CA homes

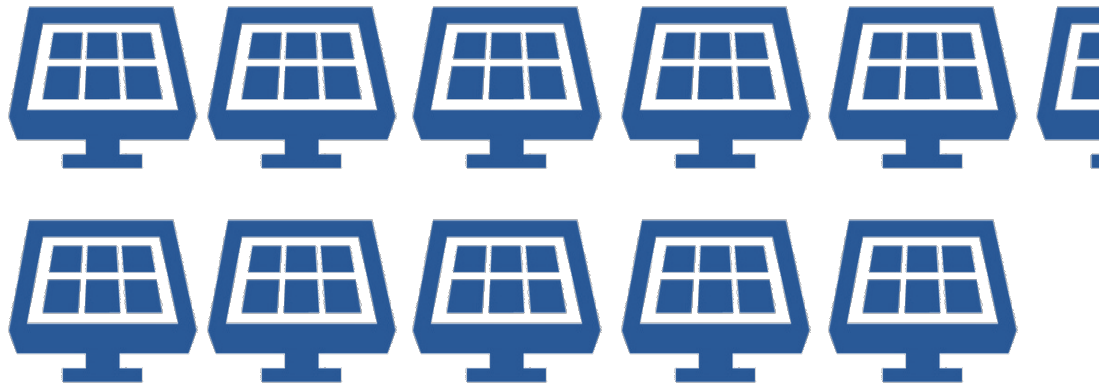
# US Solar Market

## Installed Capacity by State (MW) 2013



# California Solar Market

## California



**205**

*watts per person*

## US

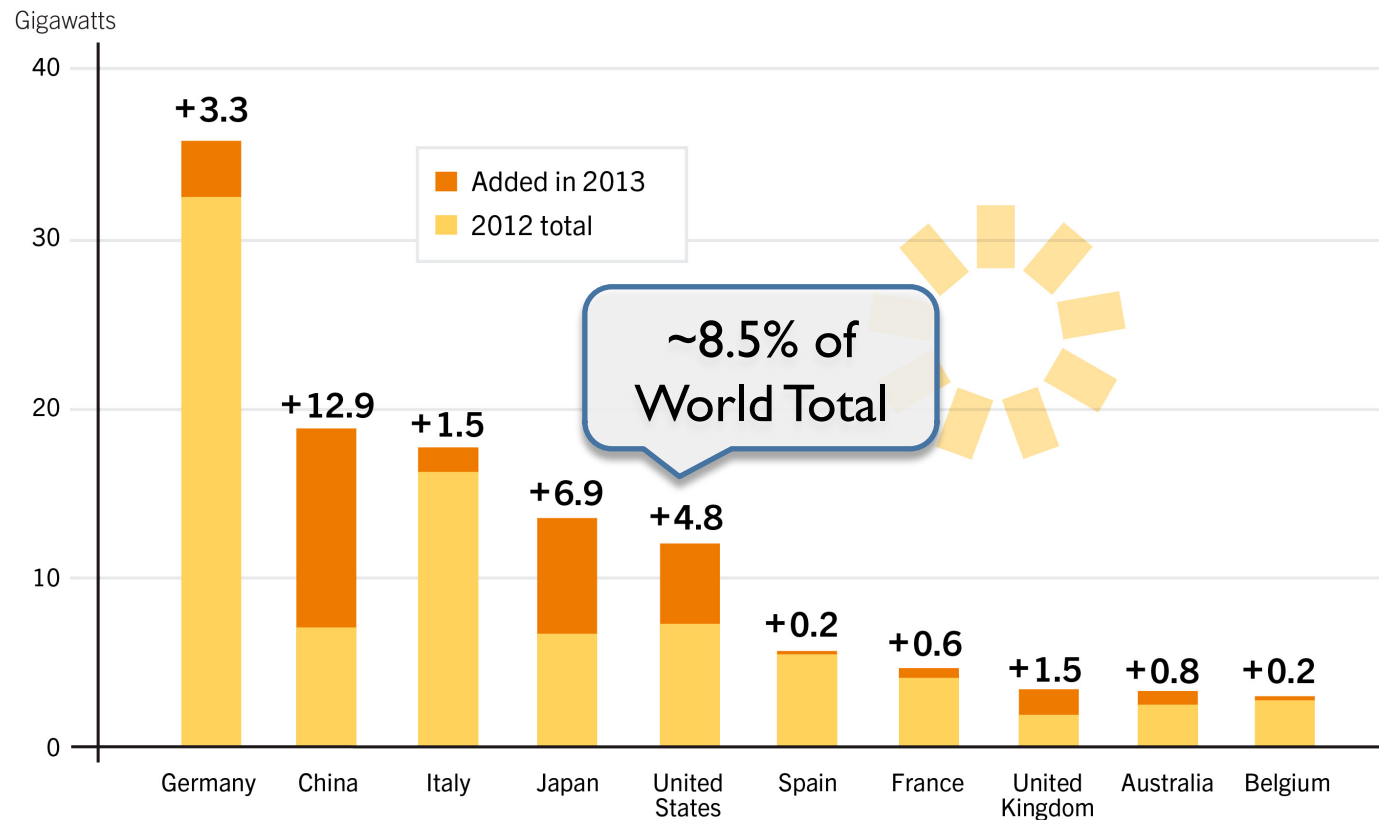


**39**

*watts per person*

# World Solar Market

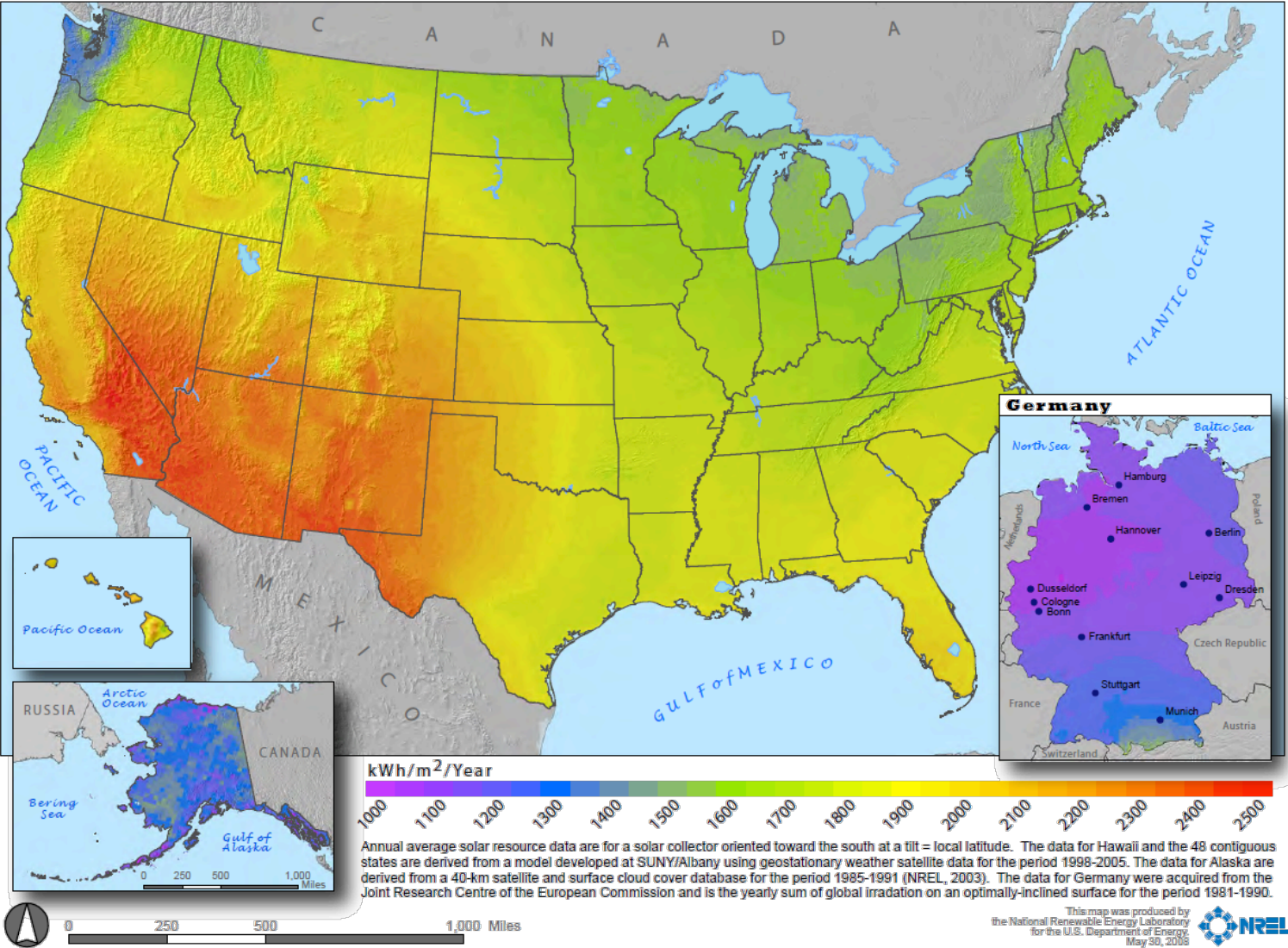
Solar PV Capacity and Additions, Top 10 Countries, 2013



REN21. 2014. *Renewables 2014 Global Status Report* (Paris: REN21 Secretariat).

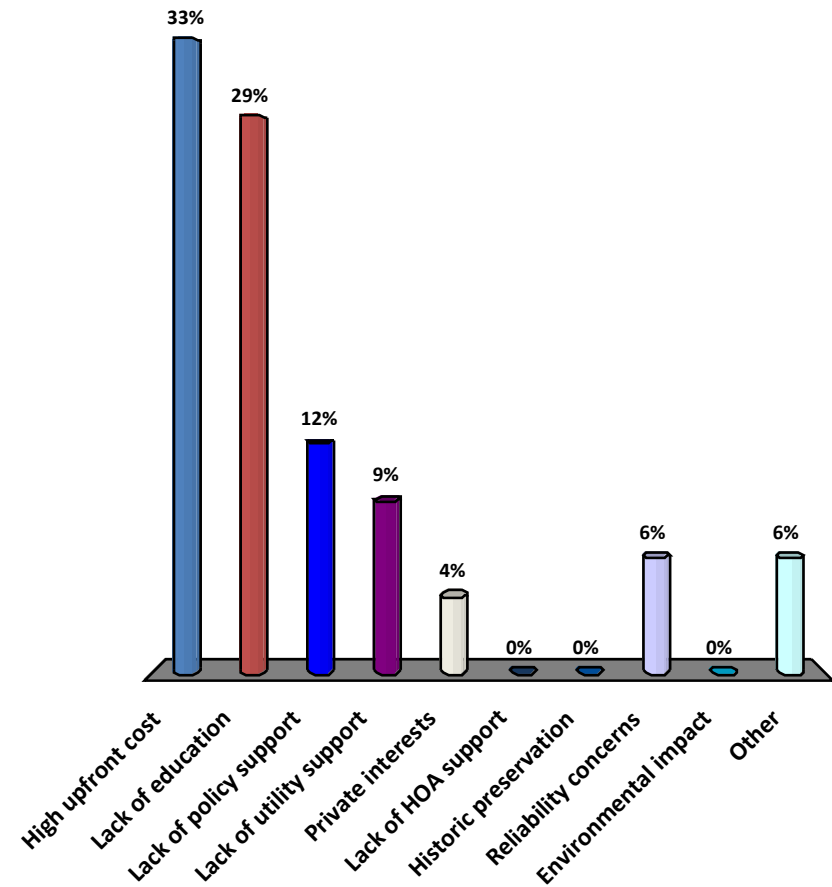


# US Solar Resource



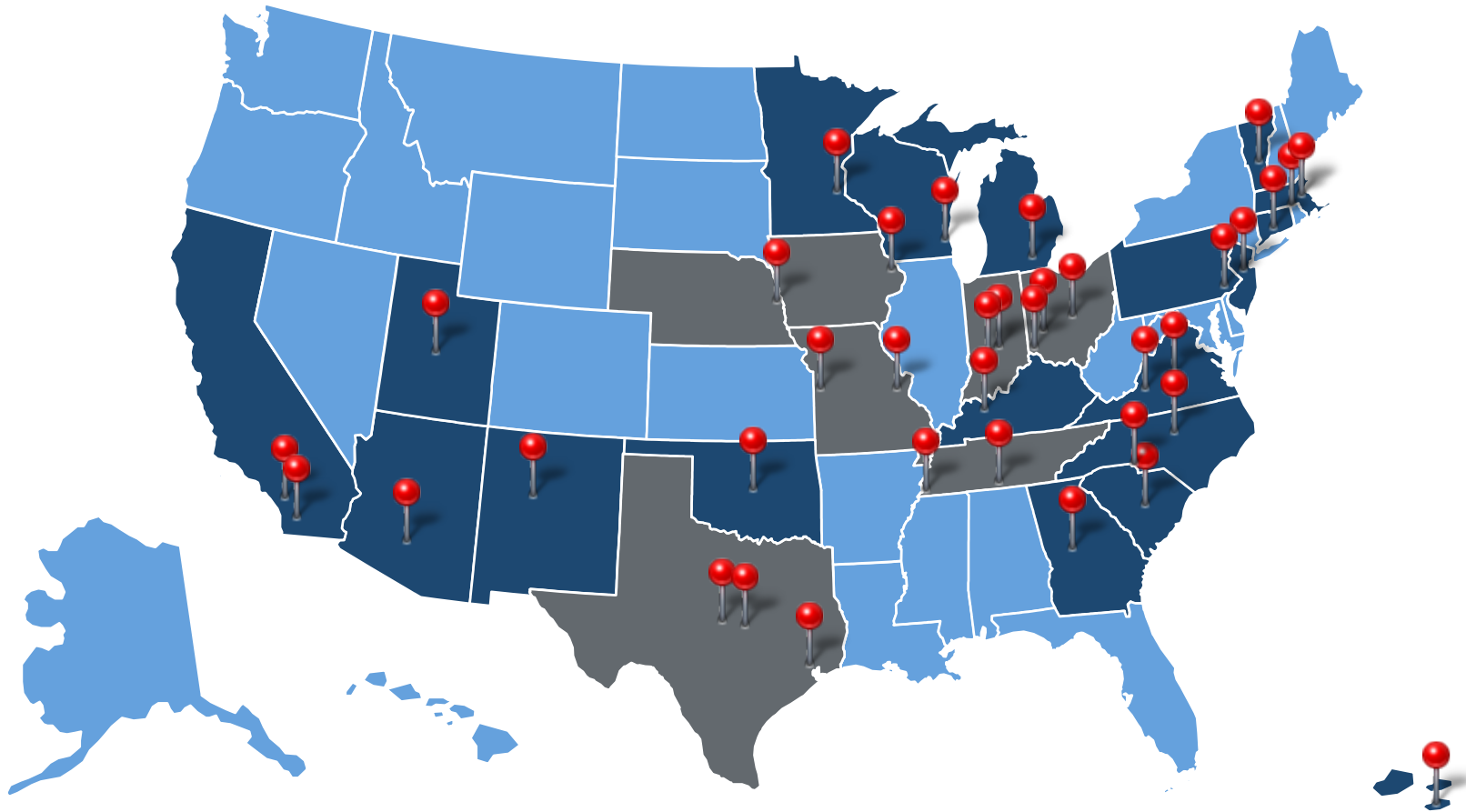
# What are the top 3 barriers to solar adoption in your community?

- 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



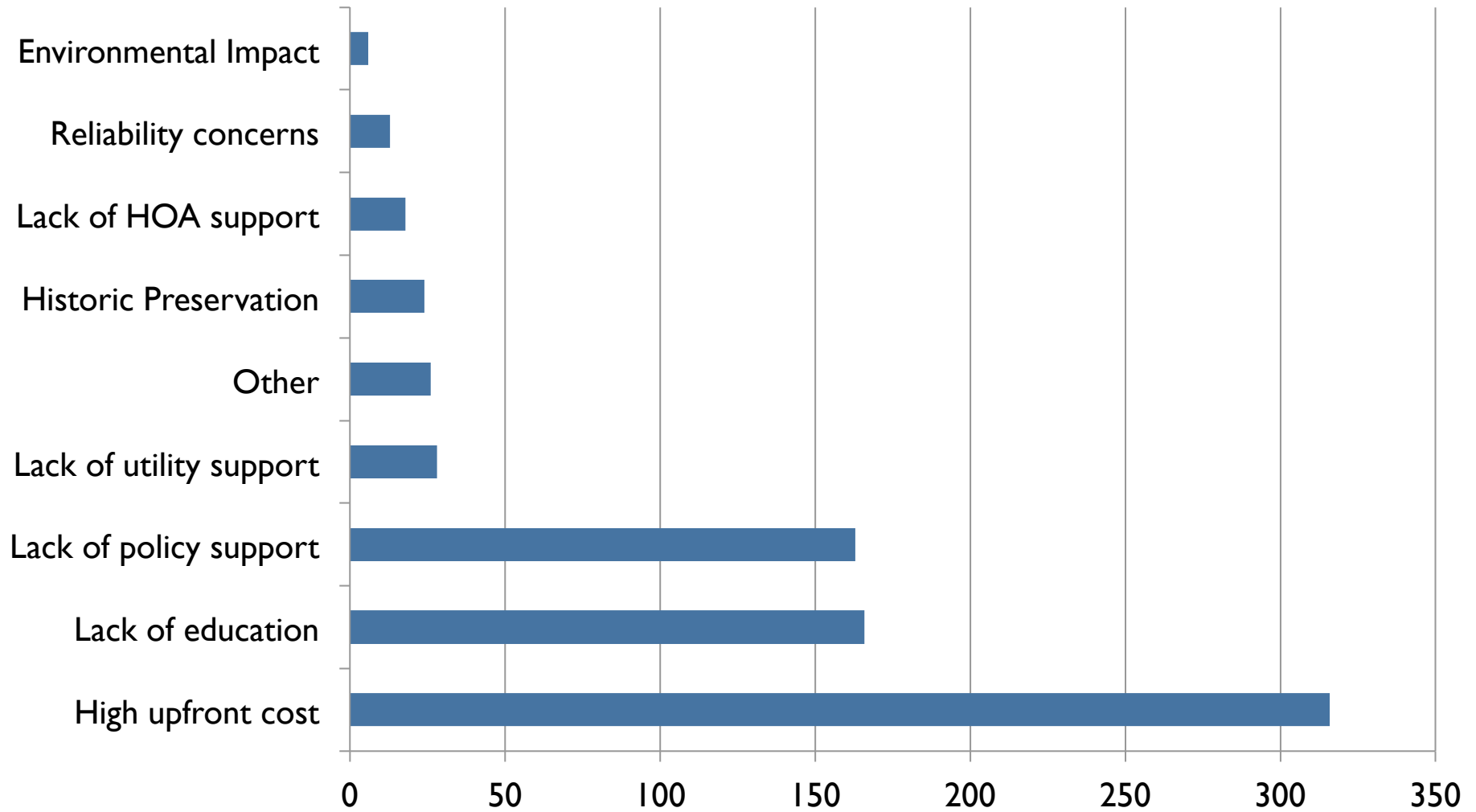
# Regional Workshop Surveys

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



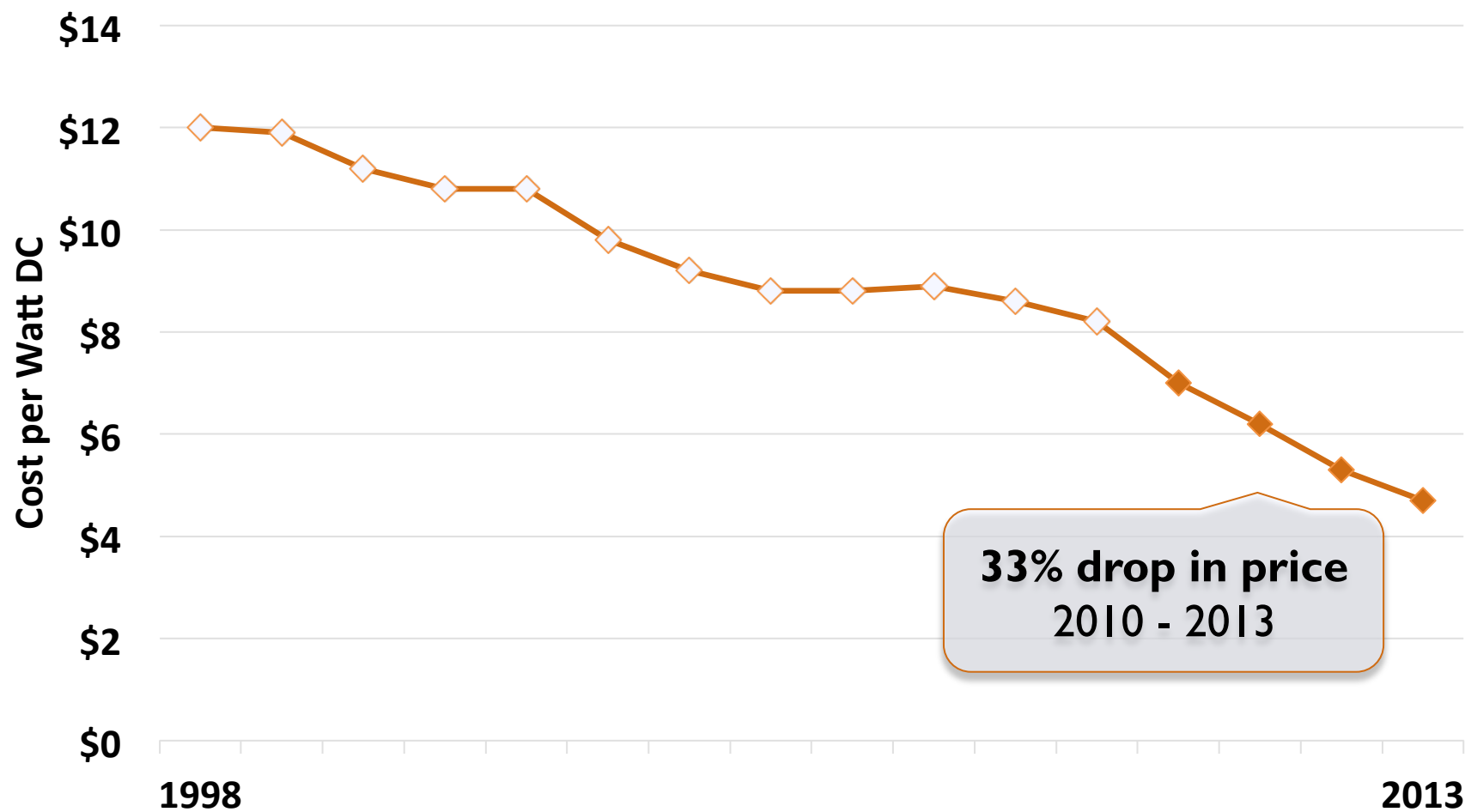


# Activity: Addressing Barriers

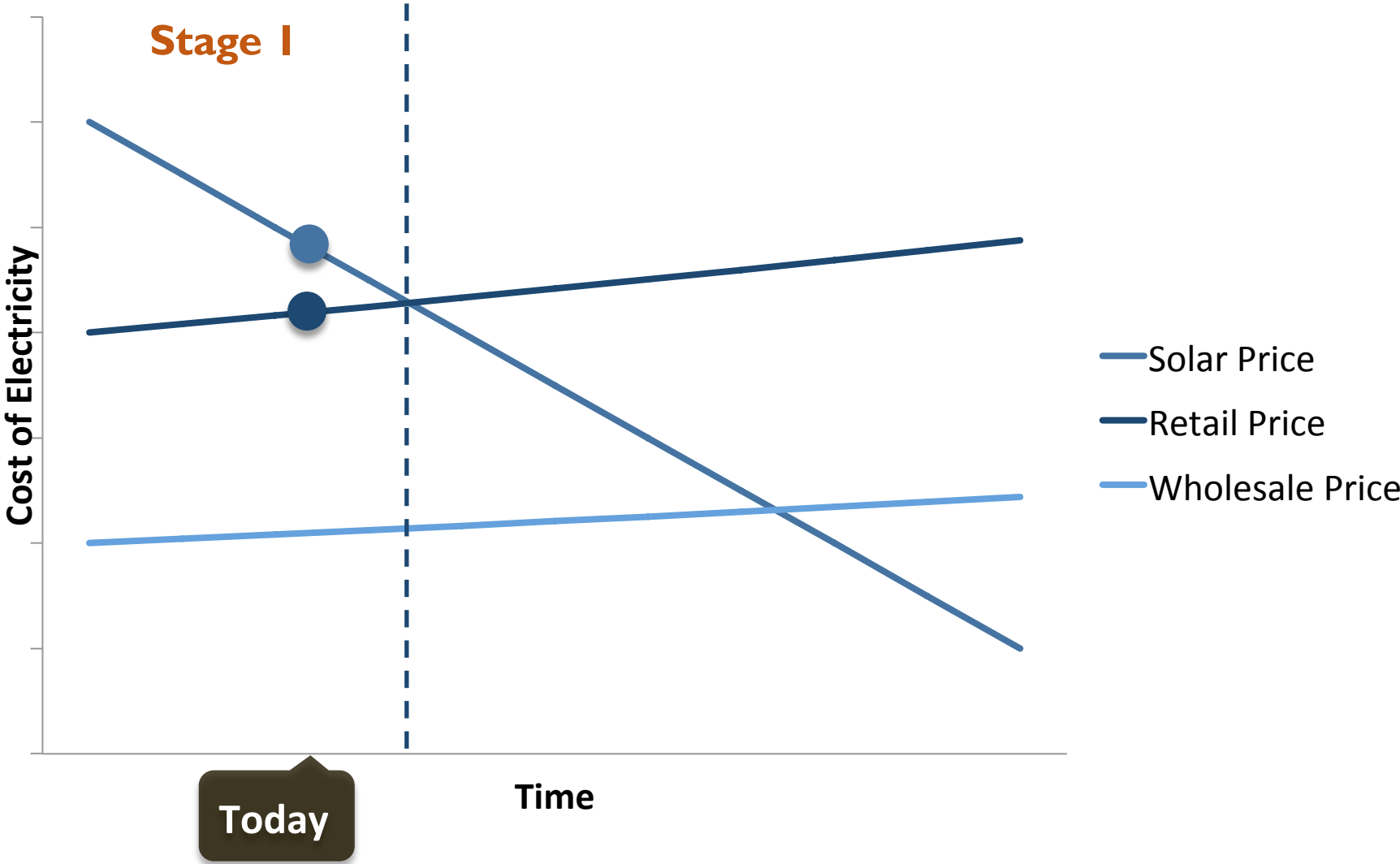


# The Cost of Solar PV

## US Average Installed Cost for Behind-the-Meter PV

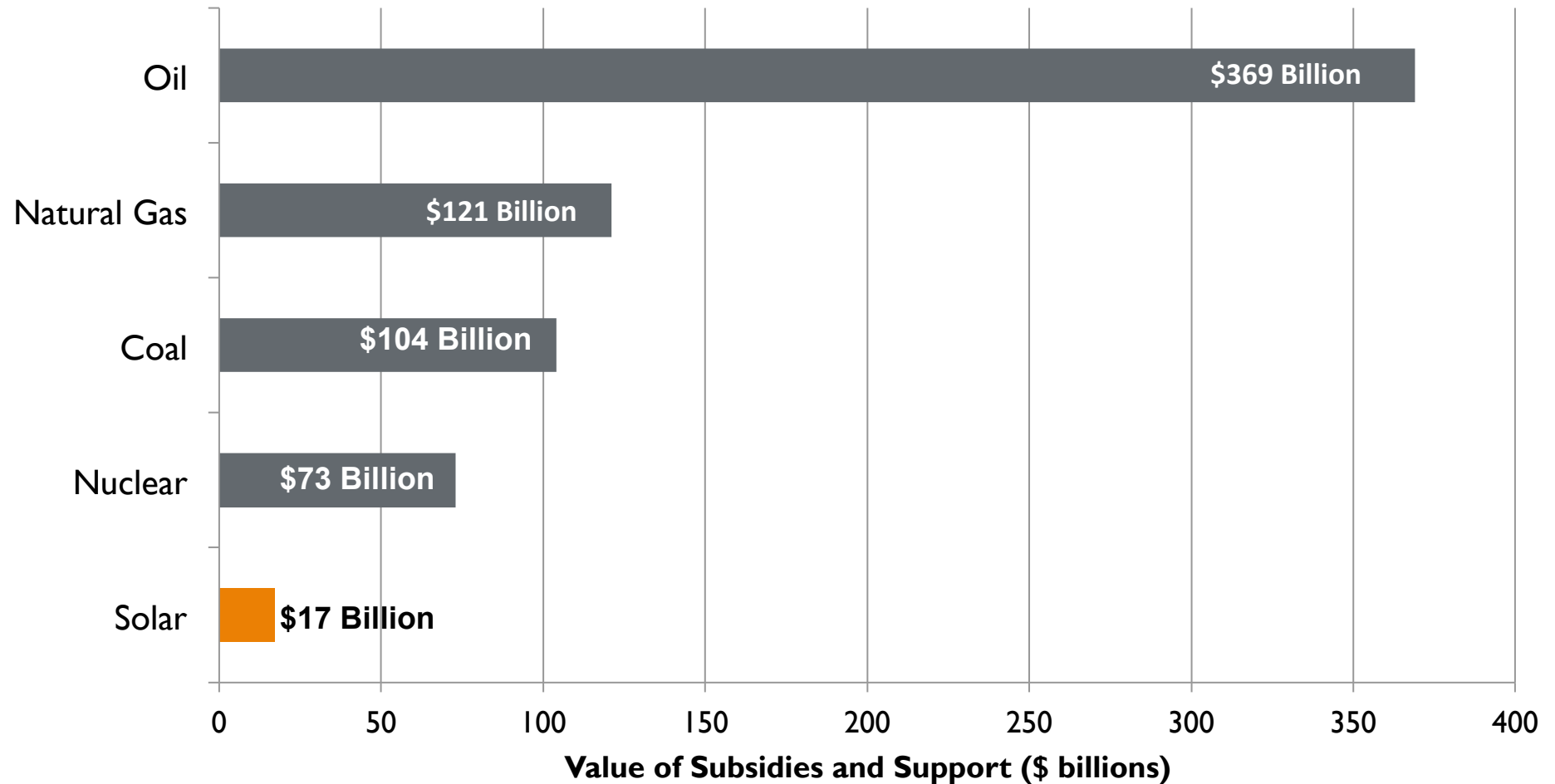


# The Cost of Solar PV

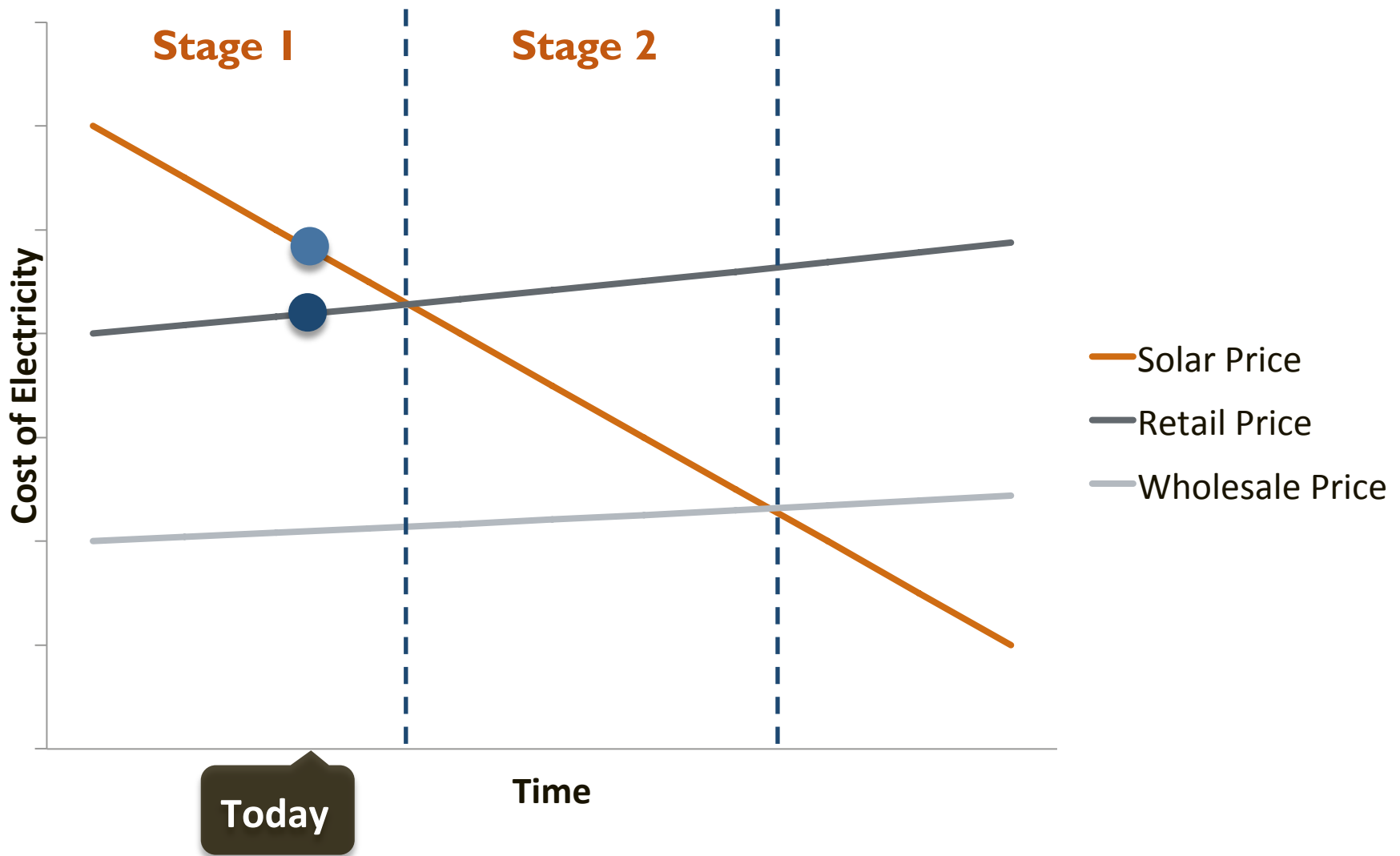


# Subsidies and Support

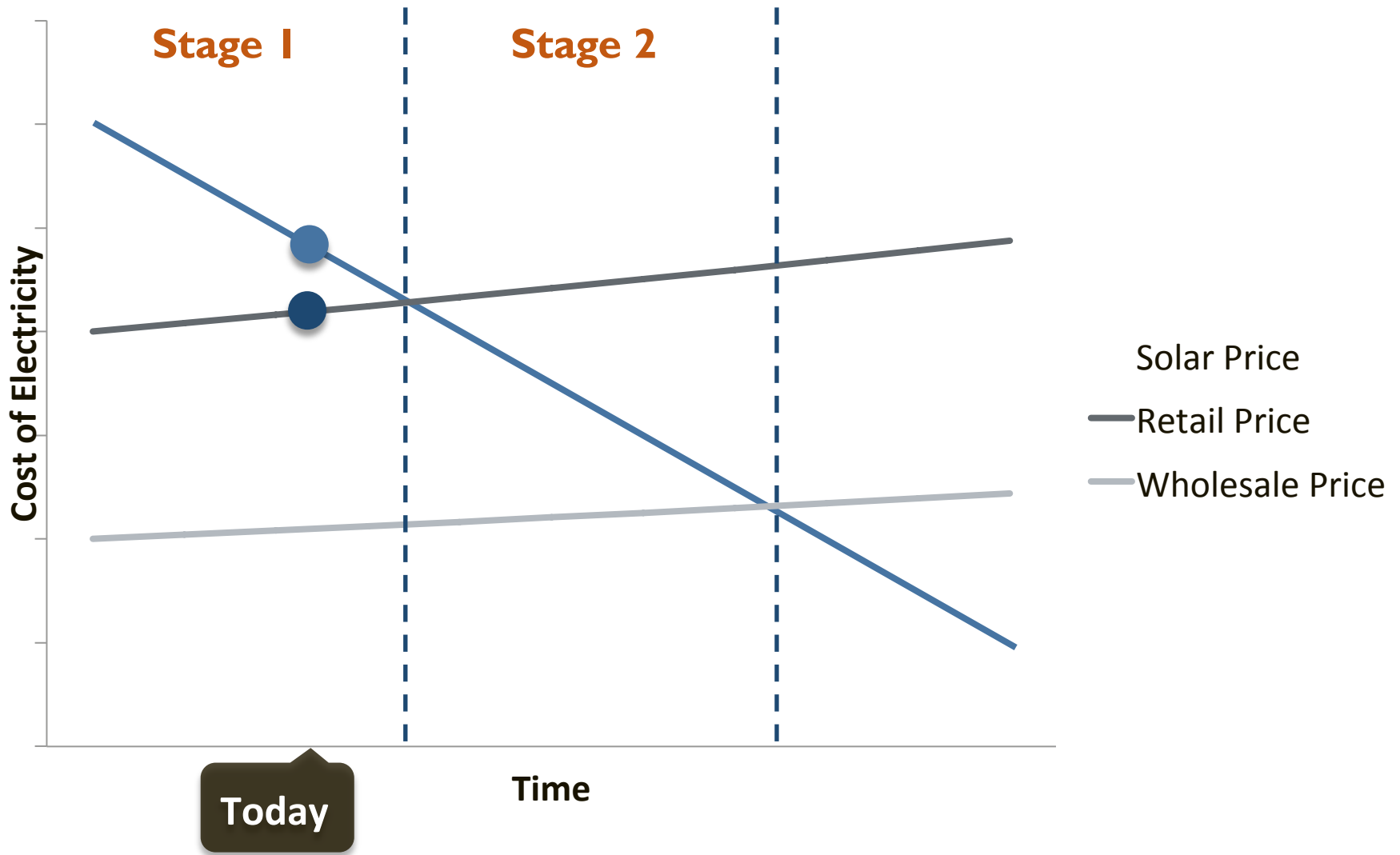
## Subsidies for Conventional and Solar Energy, 1950-2010



# The Cost of Solar PV

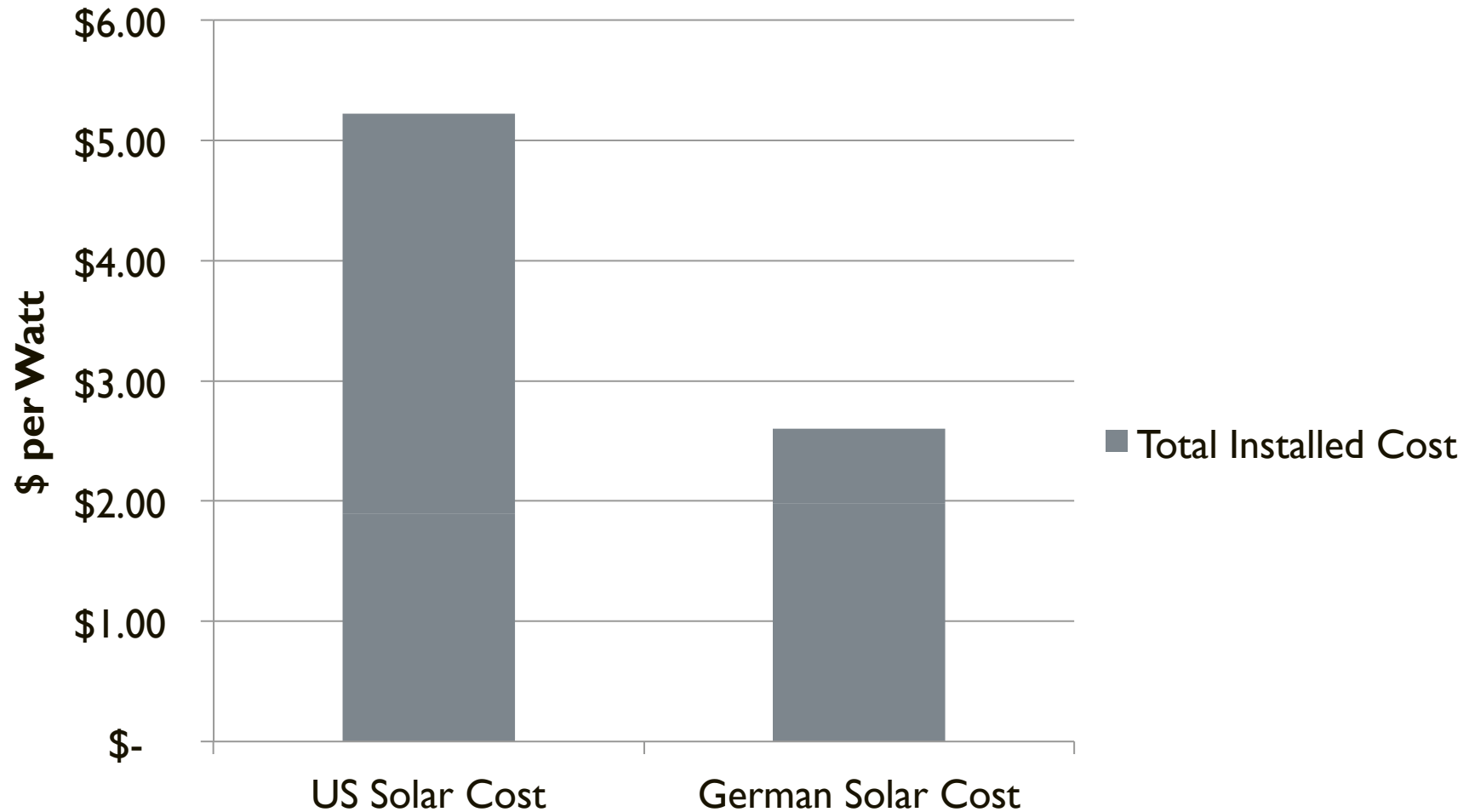


# The Cost of Solar PV



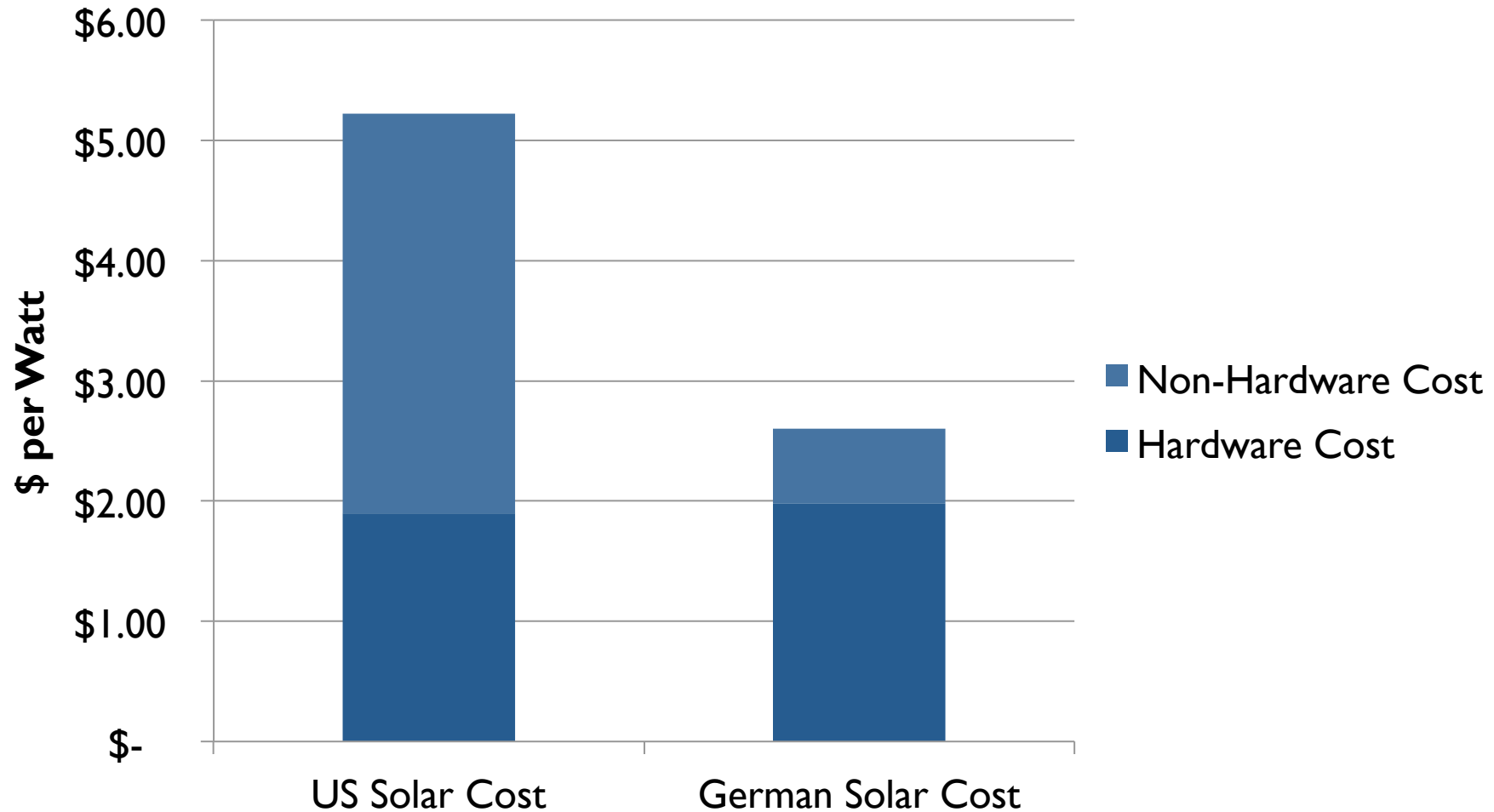
# The Cost of Solar in the US

## Comparison of US and German Solar Costs



# The Cost of Solar in the US

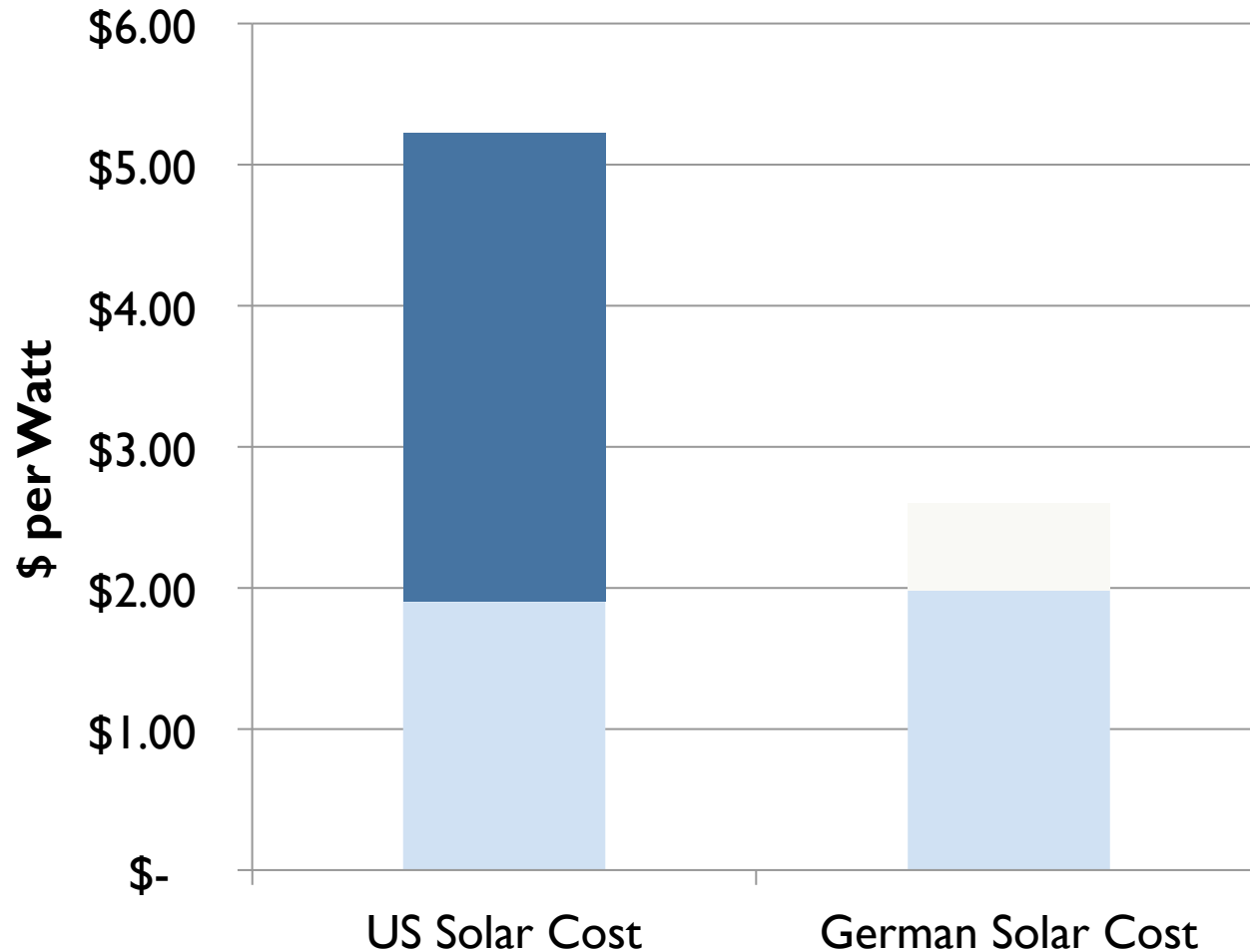
## Comparison of US and German Solar Costs





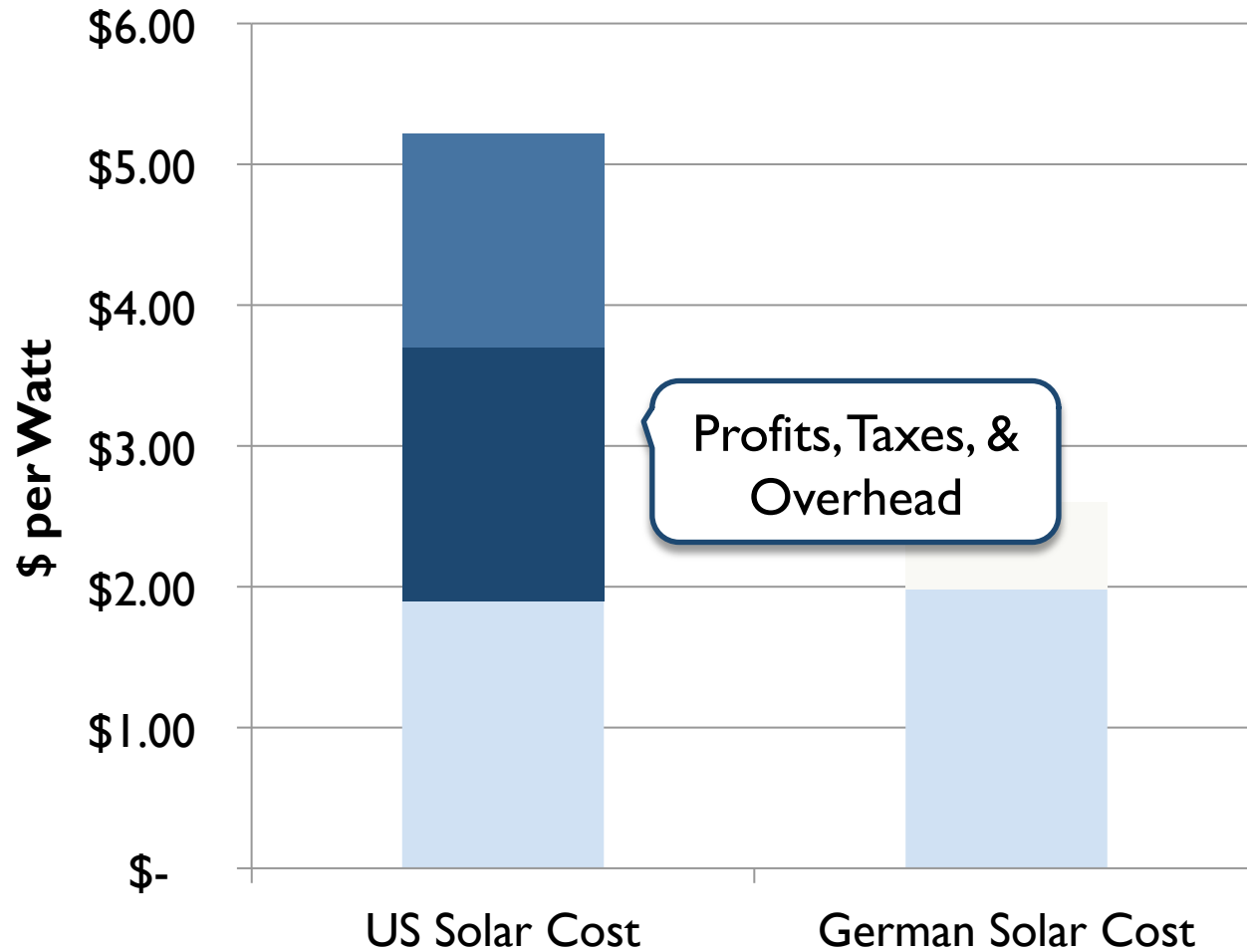
# The Cost of Solar in the US

## Comparison of US and German Solar Costs

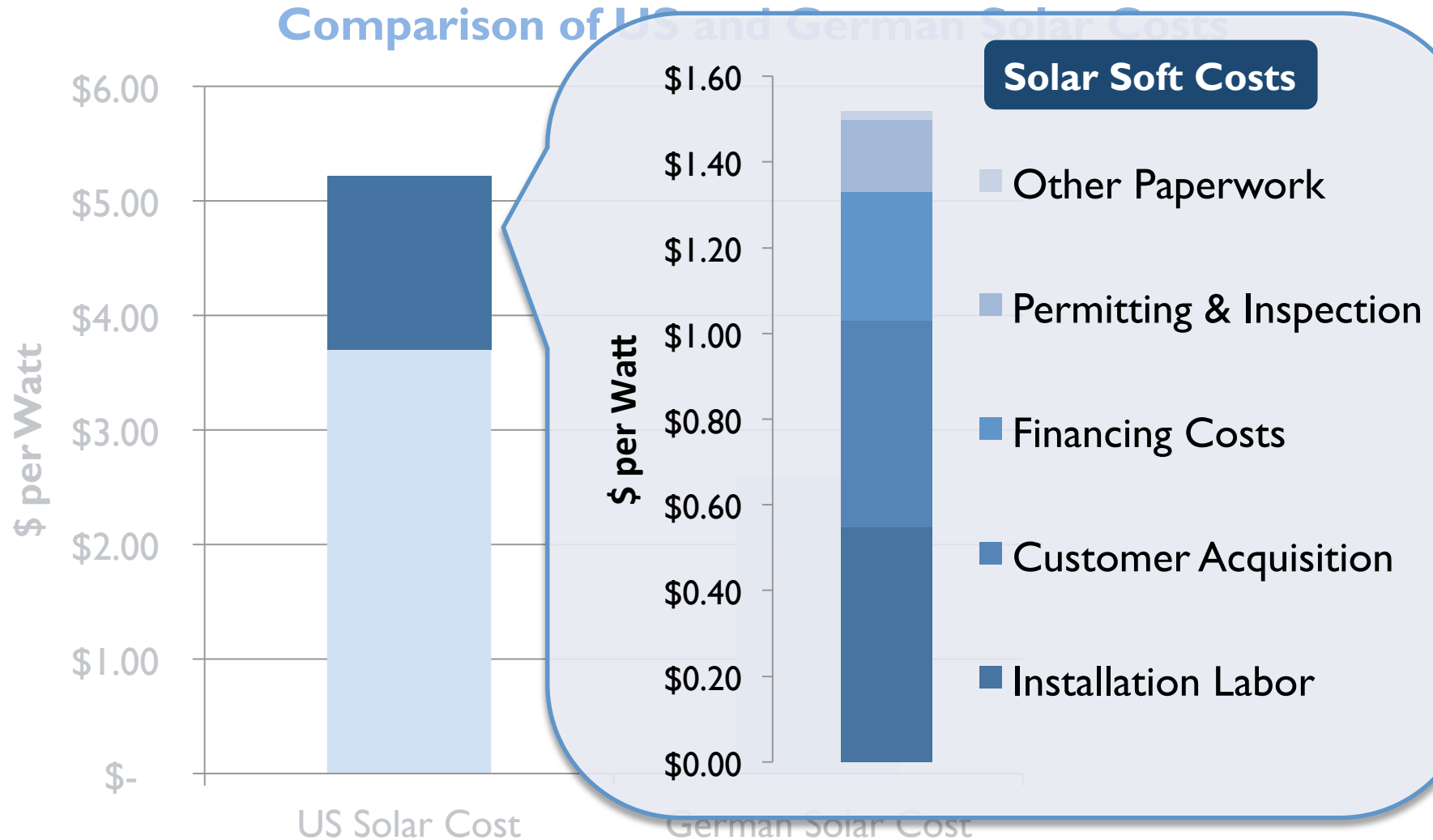


# The Cost of Solar in the US

## Comparison of US and German Solar Costs



# The Cost of Solar in the US



# Challenge: Installation Time



**New York City's  
Goal**

**100 days**  
from inception to completion

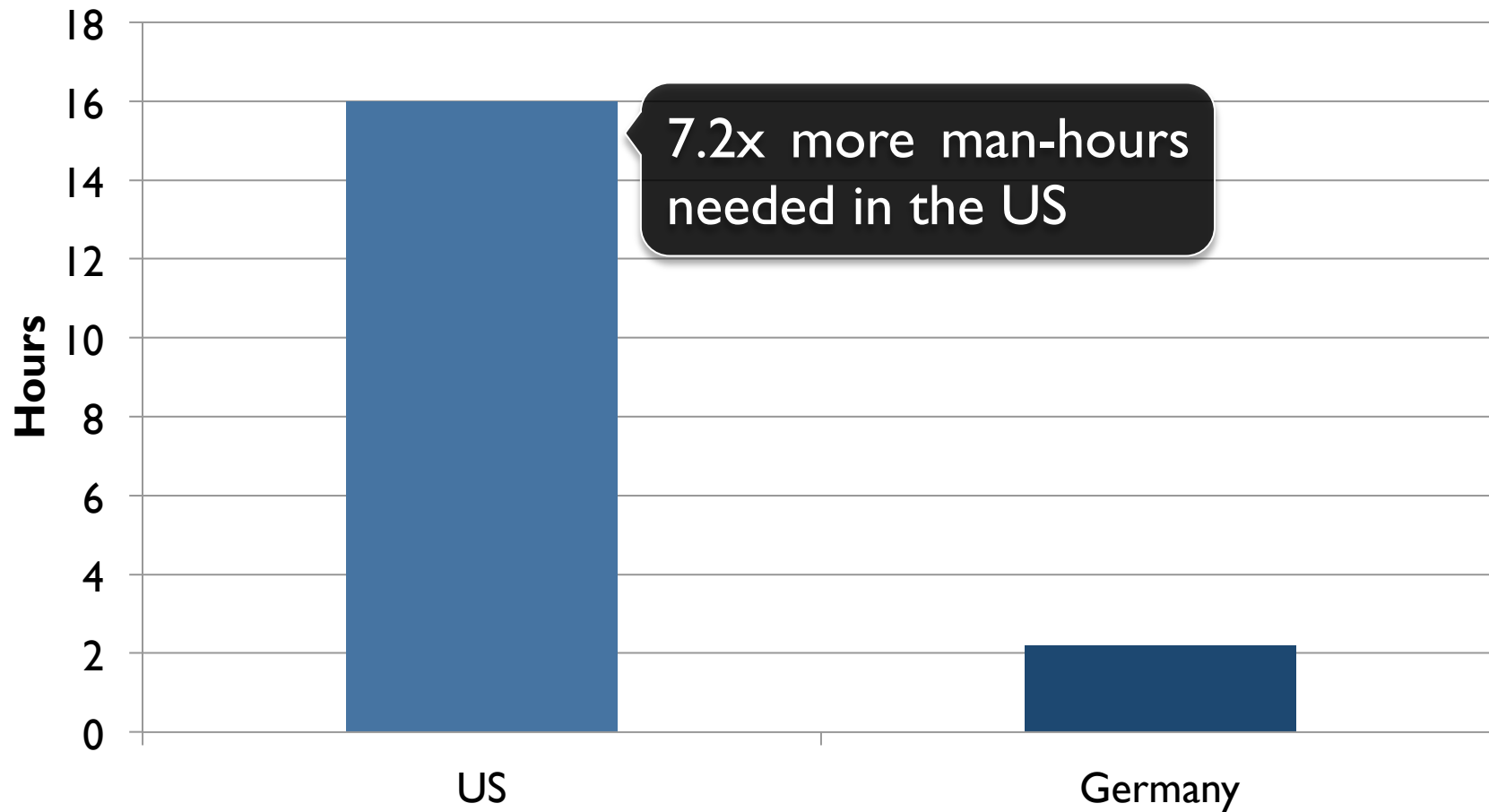


**Germany  
Today**

**8 days**  
from inception to completion

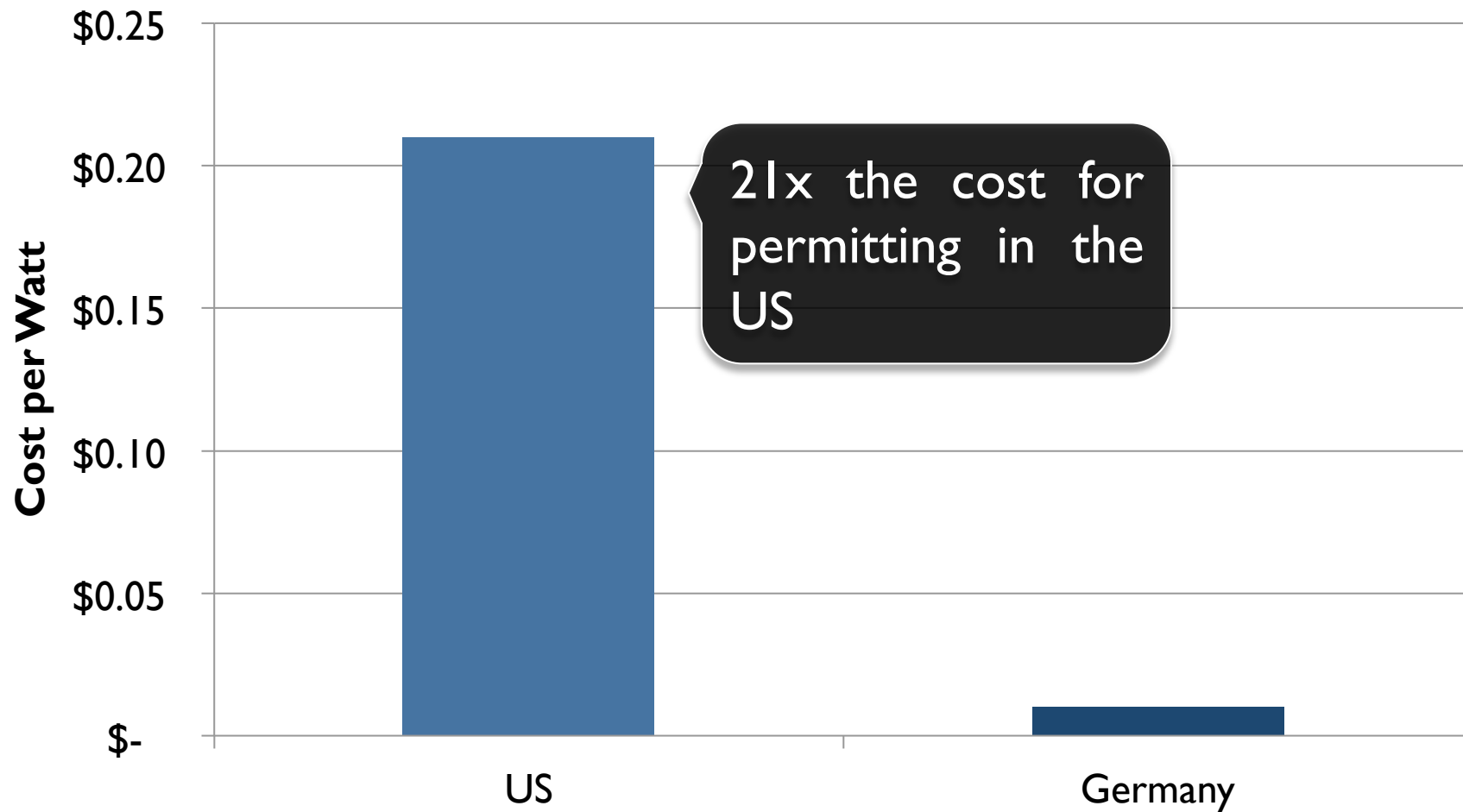
# Time to Installation

## Average Time to Permit a Solar Installation



# Permitting Costs

## Average Cost of Permitting in the US and Germany



# Germany's Success

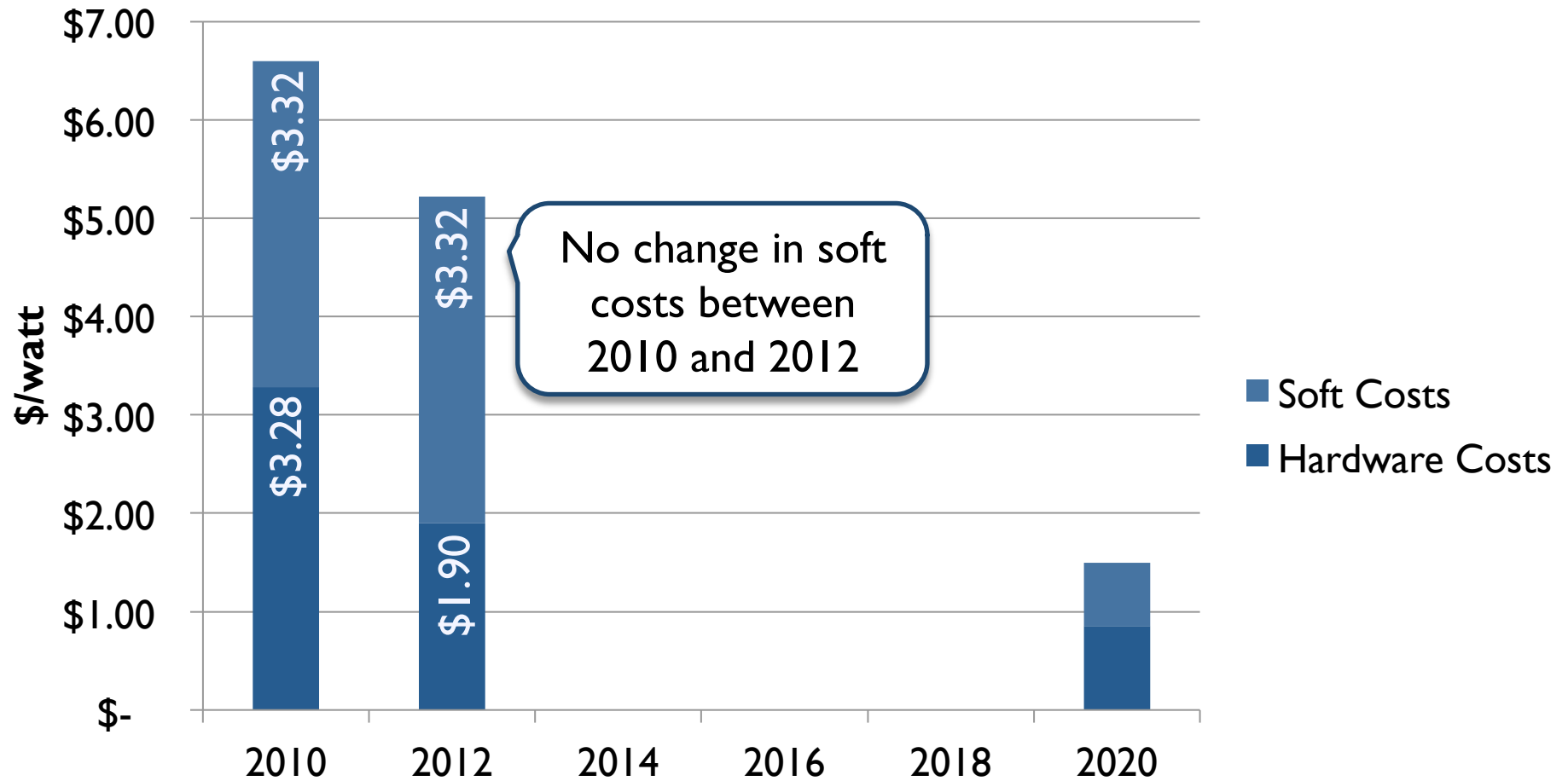
Consistency and Transparency

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



Powered by

**SunShot**

U.S. Department of Energy

[Solaroutreach.org](http://Solaroutreach.org)

[Solar-usa@iclei.org](mailto:Solar-usa@iclei.org)