Solar Powering Your Community

Addressing Soft Costs and Barriers

Powered by SunShot

U.S. Department of Energy

About the SunShot Solar Outreach Partnership

The SunShot Solar Outreach Partnership (SolarOPs) is a U.S. Department of Energy (DOE) program designed to increase the use and integration of solar energy in communities across the US.

About the SunShot Solar Outreach Partnership

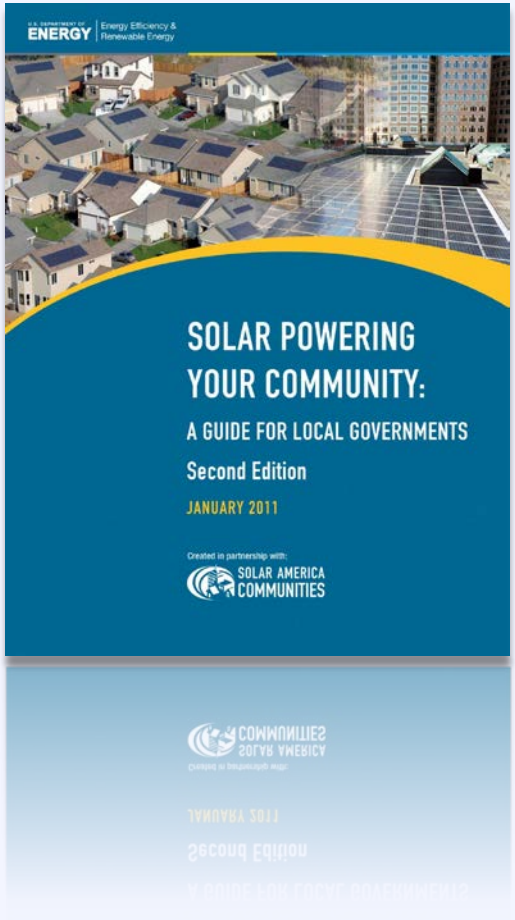
- Increase installed capacity of solar electricity in U.S. communities
- Streamline and standardize permitting and interconnection processes
- Improve planning and zoning codes/regulations for solar electric technologies
- Increase access to solar financing options

About the SunShot Solar Outreach Partnership

Resource **Solar Powering Your Community Guide**

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

www.energy.gov



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About the SunShot Solar Outreach Partnership

Resource Sunshot Resource Center

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

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

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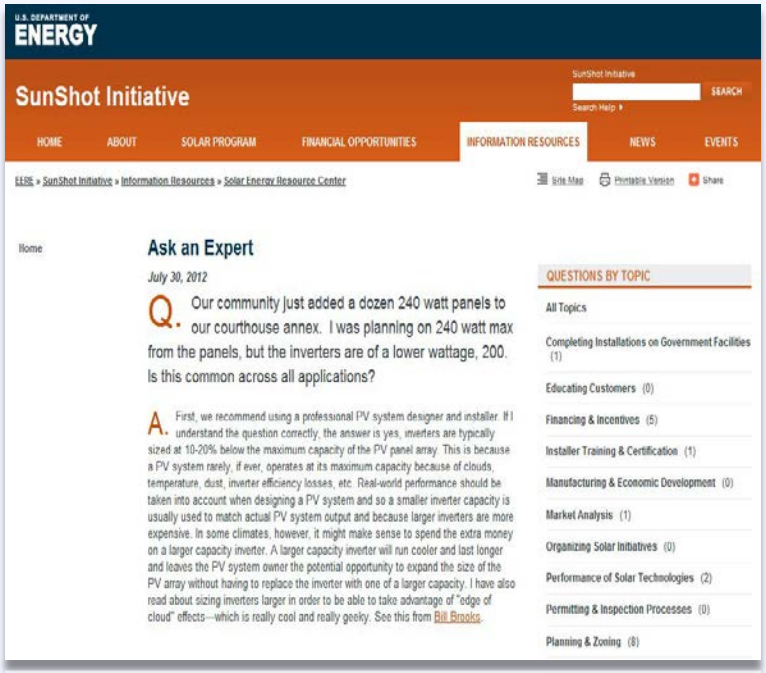
About the SunShot Solar Outreach Partnership

Technical Support

- 'Ask an Expert' Live Web Forums
- 'Ask an Expert' Web Portal
- Peer Exchange Facilitation
- In-Depth Consultations
- Customized Trainings



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

For more information email: solar-usa@iclei.org

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Agenda

08:50 – 09:10	Solar 101
09:10 – 09:40	Planning and Zoning for Solar
09:40 – 09:50	*Break*
09:50 – 10:10	Addressing Solar Barriers Activity
10:10 – 10:30	Understanding Utility Regulations
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Poll

Who's in the room?

Poll

What is your experience with solar?

Solar Technologies

Solar Photovoltaic (PV)

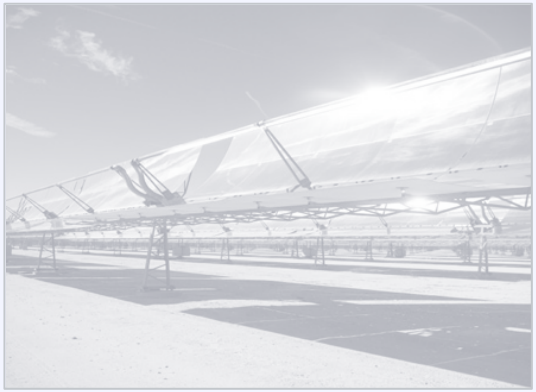
Solar Hot Water

Concentrated Solar Power

Solar Technologies

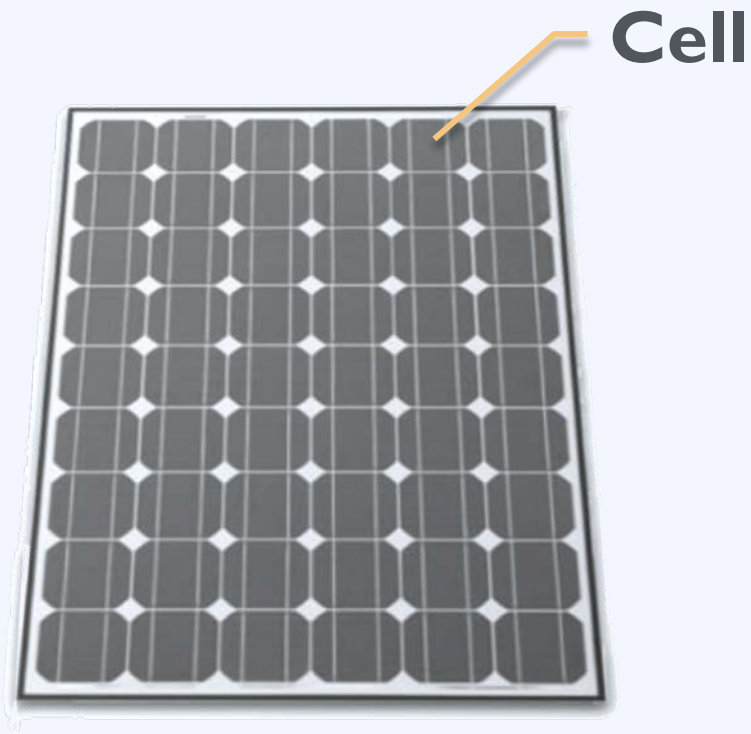
Solar Photovoltaic (PV)

Solar Hot Water



Concentrated Solar Power

Some Basic Terminology



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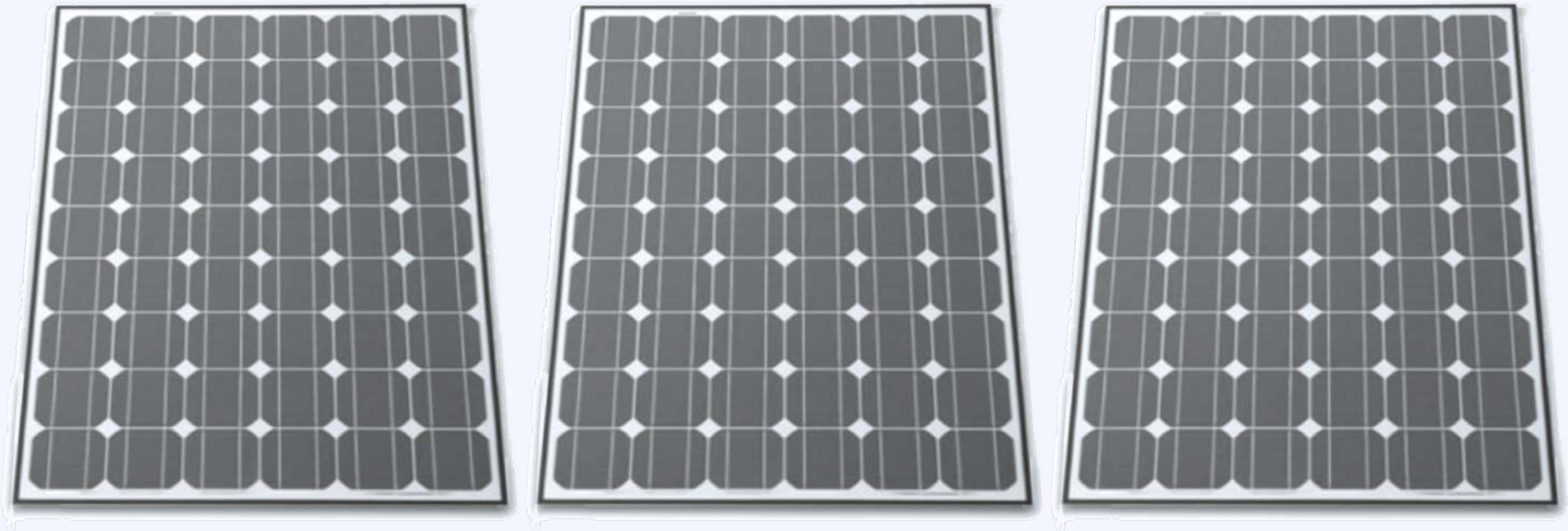
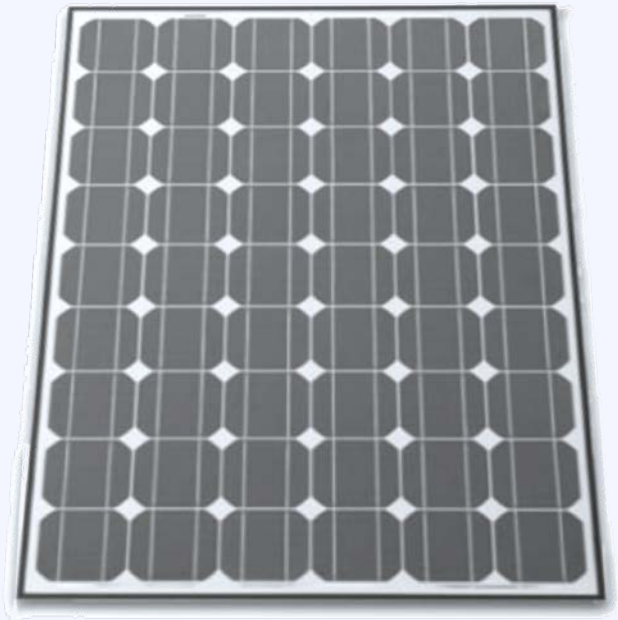


Array

Some Basic Terminology



Capacity / Power

kilowatt (kW)

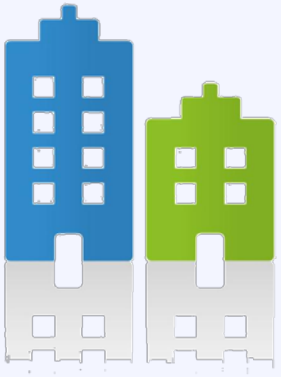
Production

Kilowatt-hour (kWh)

Some Basic Terminology

Residence
5 kW

Factory
1 MW+



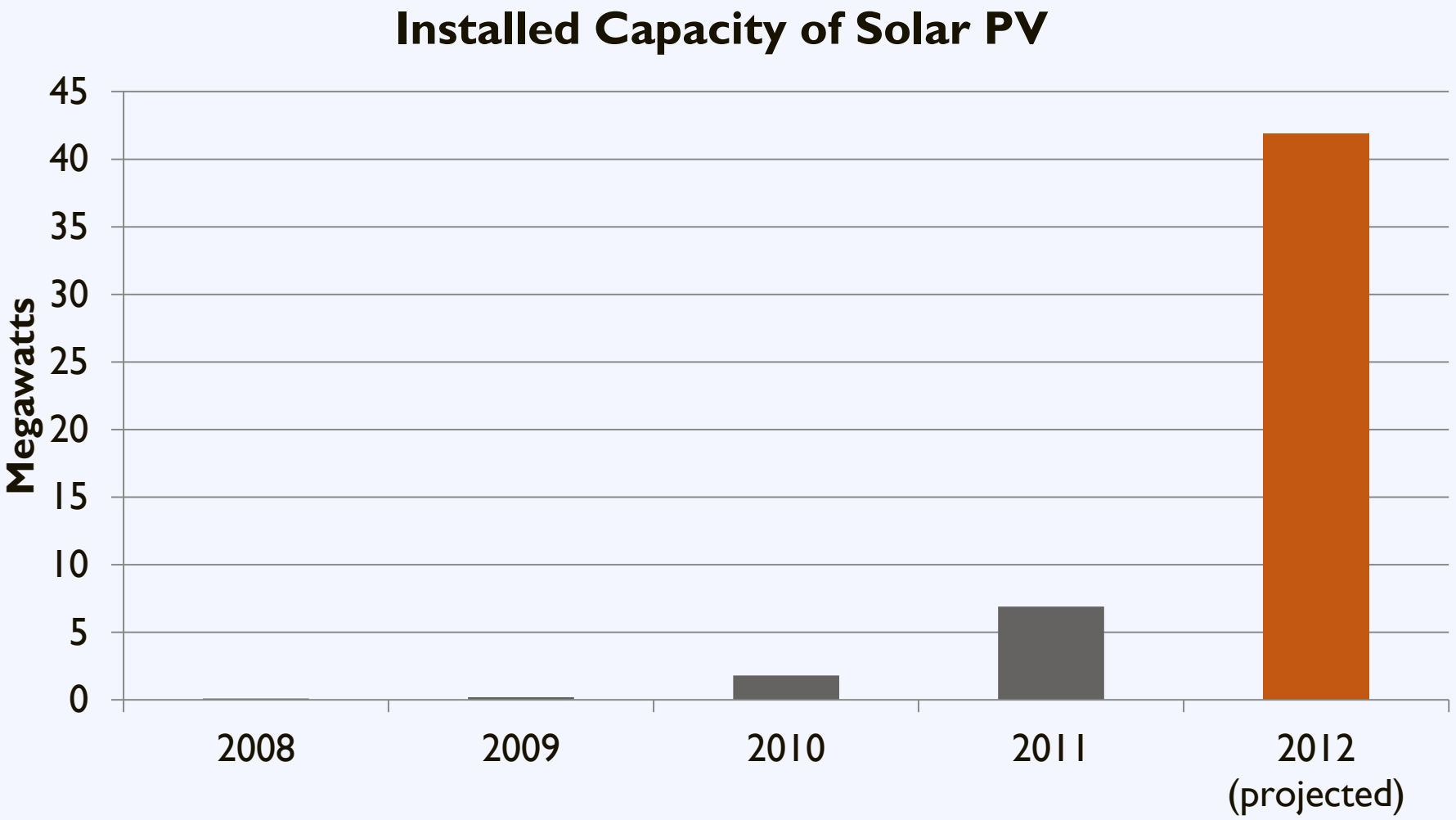
Office
50 – 500 kW

Utility
2 MW+

Workshop Goal

Enable local governments to replicate successful solar practices and expand local adoption of solar energy

Georgia Solar PV Market



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U.S. Department of Energy

Source: IREC, Photon Magazine

Explore benefits

and

Overcome barriers

Activity: Identifying Benefits

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

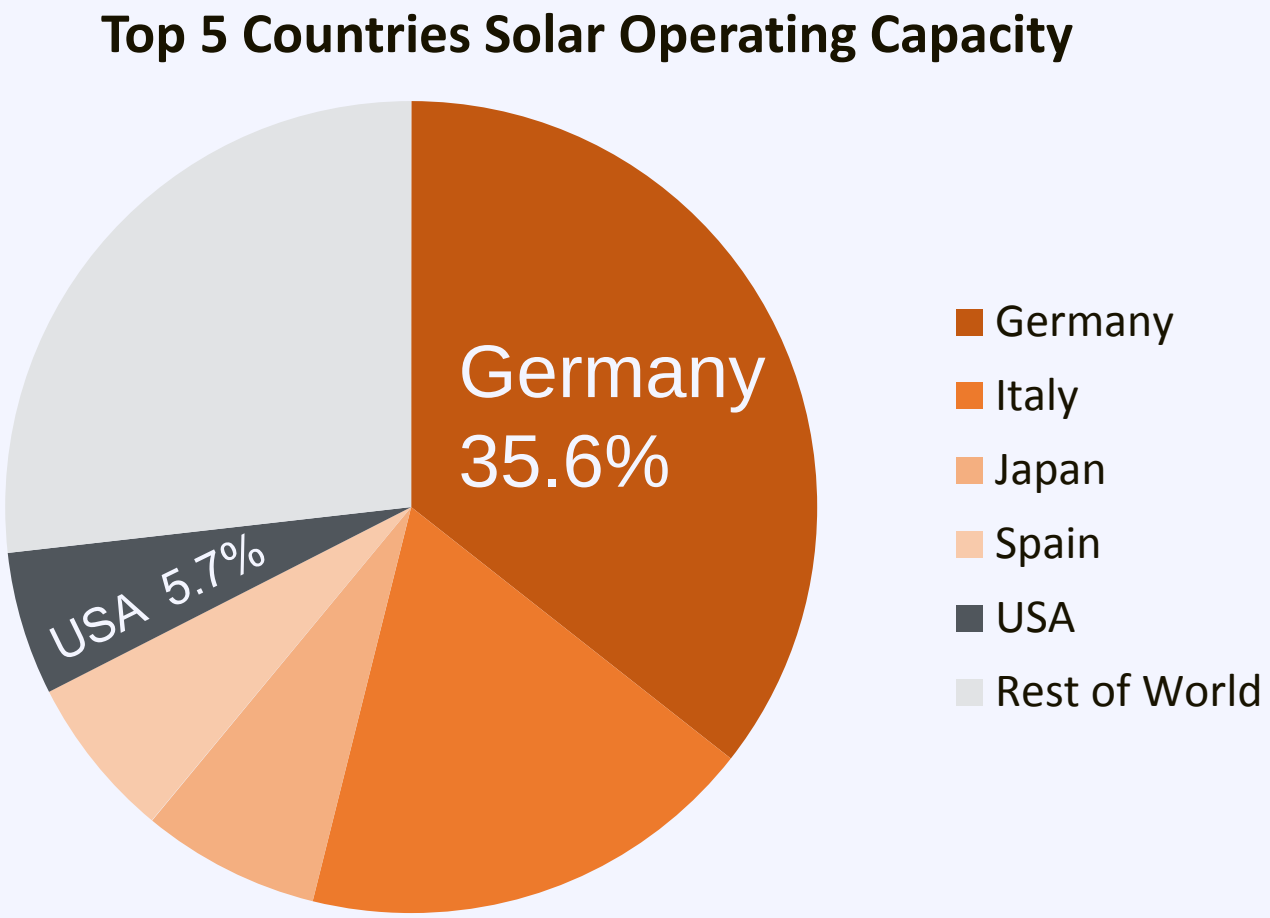
Right Now	During Session	After Break
		
Write answer on card	Compile results	Group discussion

Activity: Addressing Barriers

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

Right Now	During Session	After Break
		
Write answer on card	Compile results	Group discussion

Installed Capacity



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U.S. Department of Energy

http://www.map.ren21.net/GSR/GSR2012.pdf

Installed Capacity

Total installed solar capacity in the US

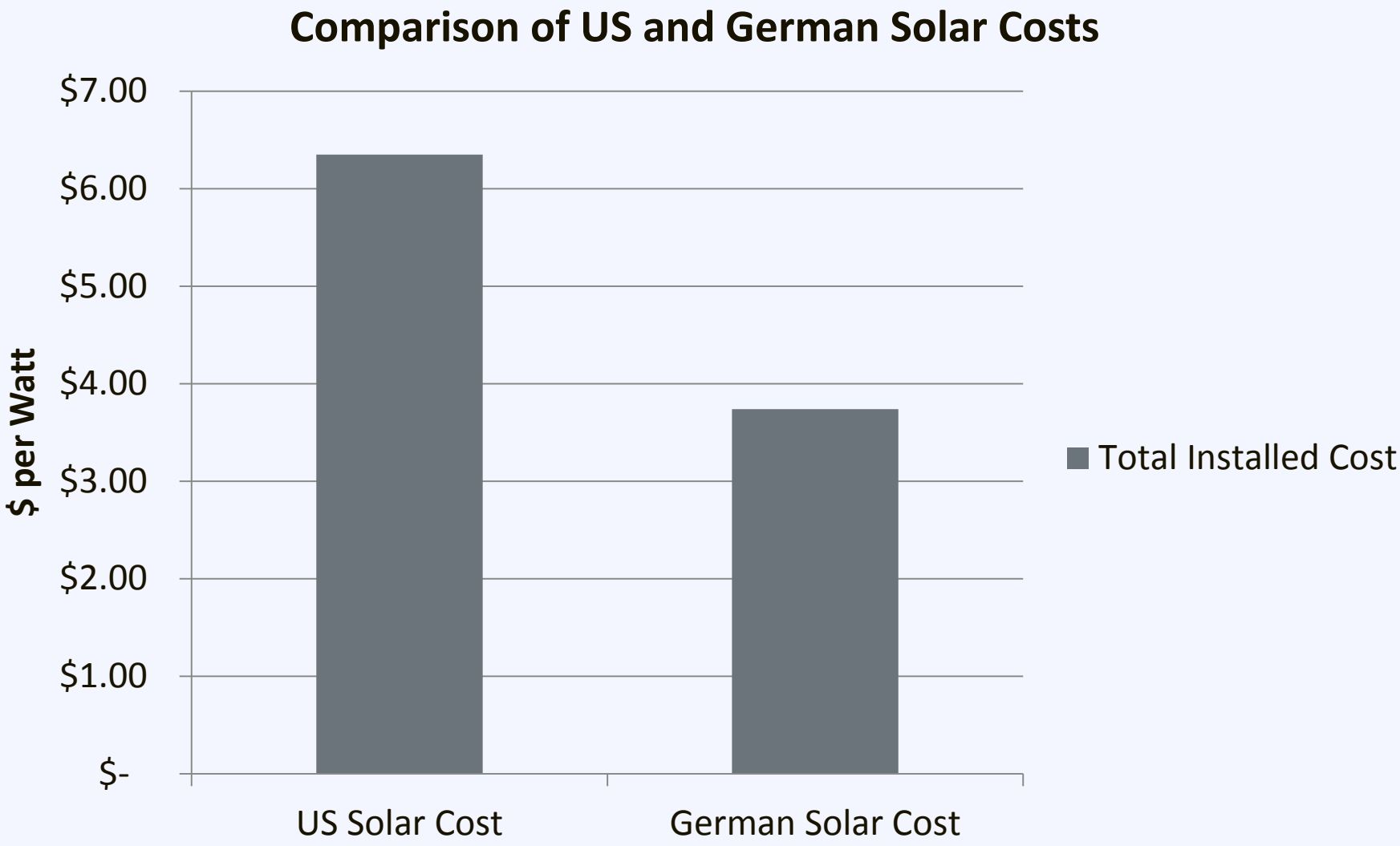
4 GW

Capacity installed in Germany in Dec 2011

4 GW

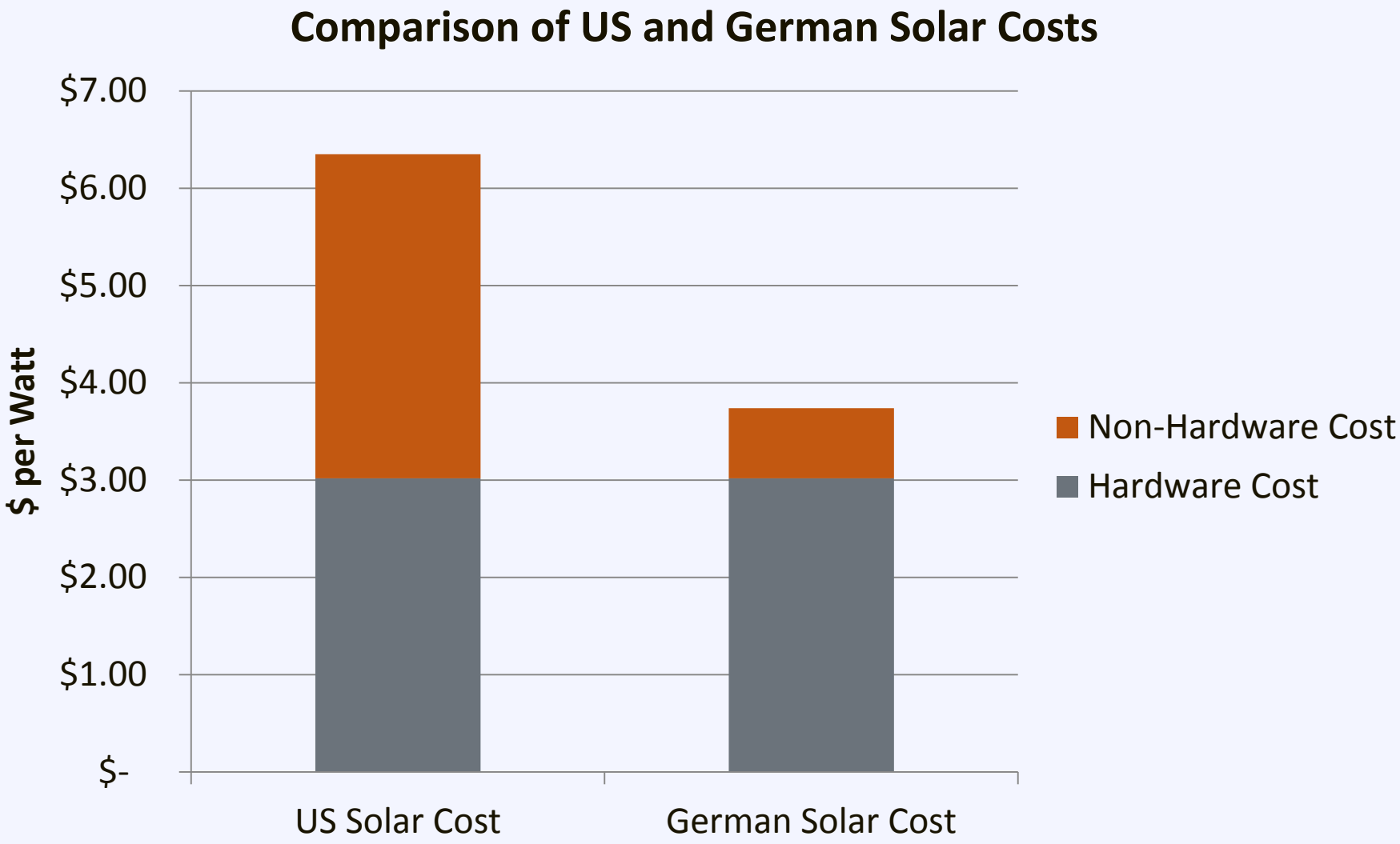
http://www.map.ren21.net/GSR/GSR2012.pdf

The Cost of Solar in the US



Source: NREL (http://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0599_full%20paper.pdf) (http://www.nrel.gov/docs/fy12osti/53347.pdf) (http://www.nrel.gov/docs/fy12osti/54689.pdf)

The Cost of Solar in the US



Source: NREL (http://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0599_full%20paper.pdf) (http://www.nrel.gov/docs/fy12osti/53347.pdf) (http://www.nrel.gov/docs/fy12osti/54689.pdf)

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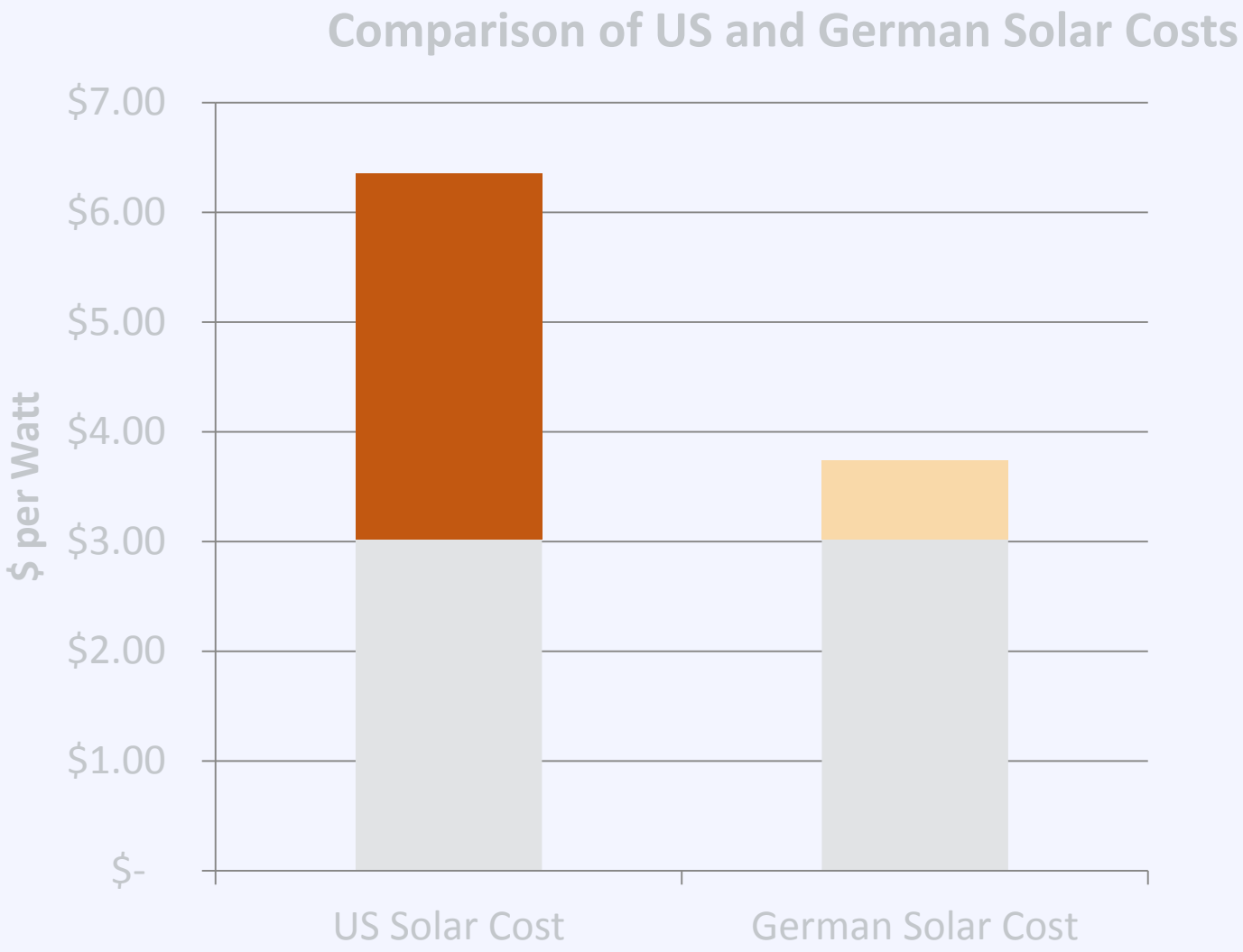

Source: NREL (http://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0599_full%20paper.pdf) (http://www.nrel.gov/docs/fy12osti/53347.pdf) (http://www.nrel.gov/docs/fy12osti/54689.pdf)

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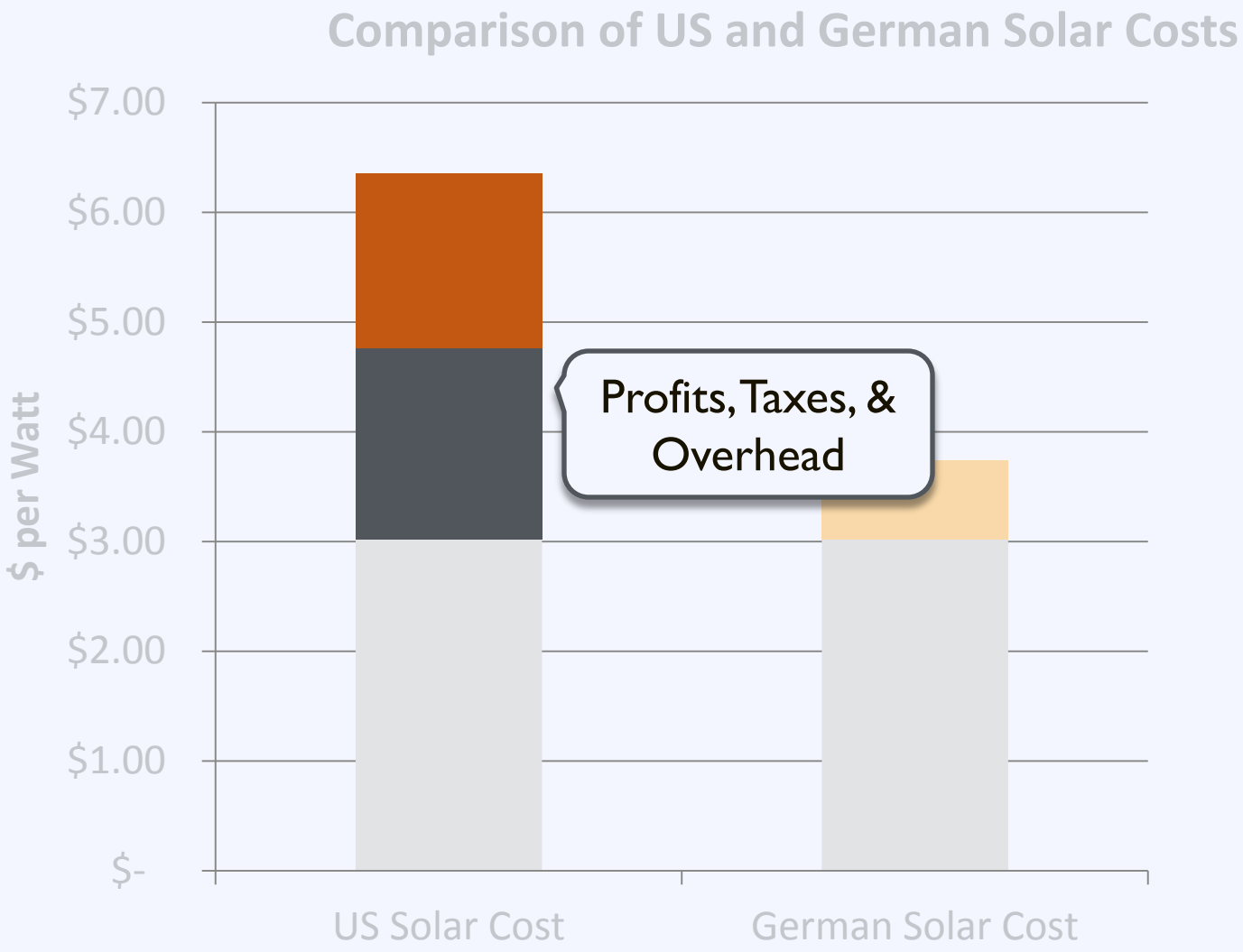

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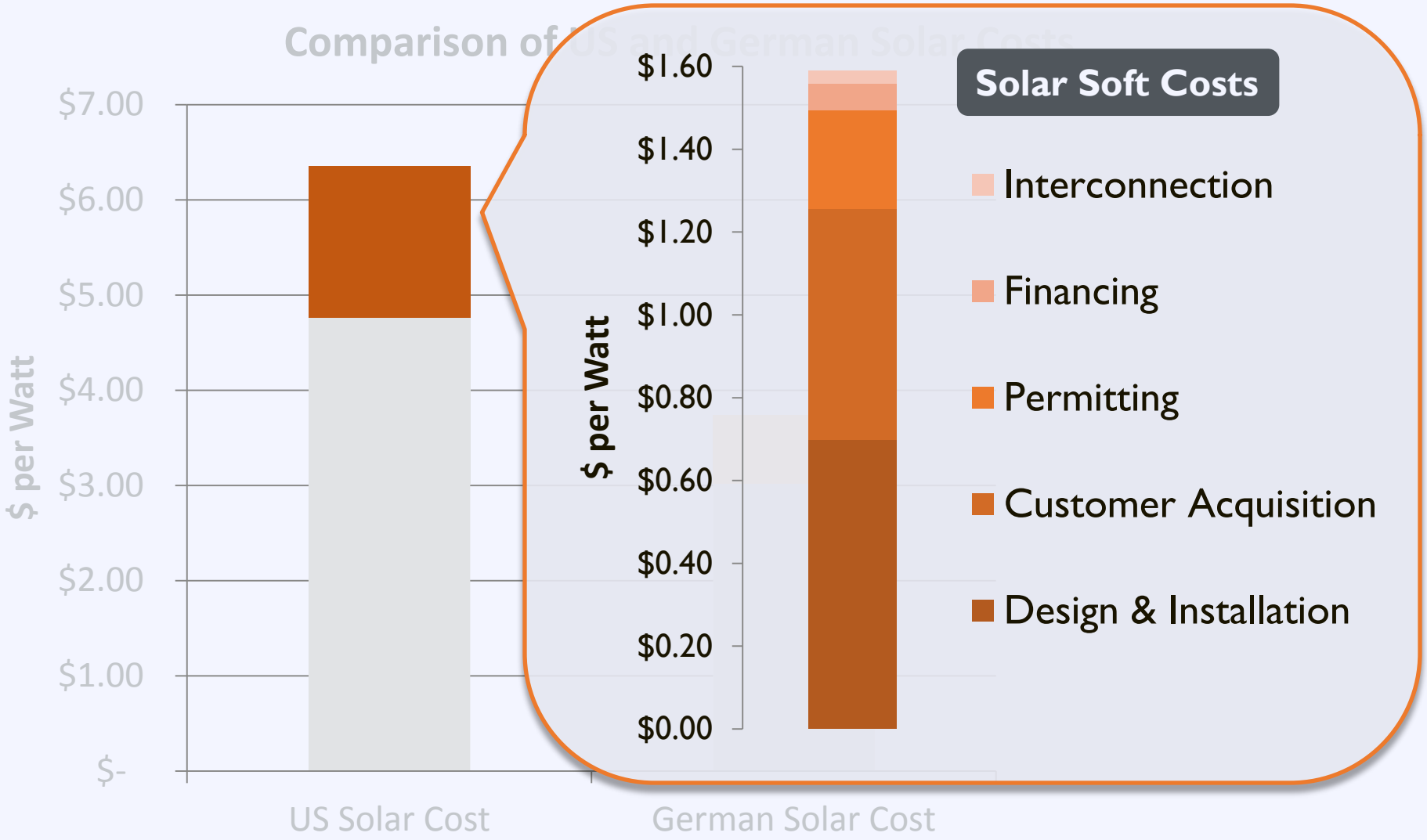

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Time to Installation

New York City's Goal

100 days

from inception to completion

Germany Today

8 days

from inception to completion

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Photon Magazine

Germany's Success

Consistency and Transparency

through

Standardized Processes

Germany's Success

Removing Barriers

↓

Creating Incentives

↓

Enacting Standards

Agenda

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What is Planning
&
What Do Planners Do?

Strategic Points of Intervention

Visioning and long-range goal setting

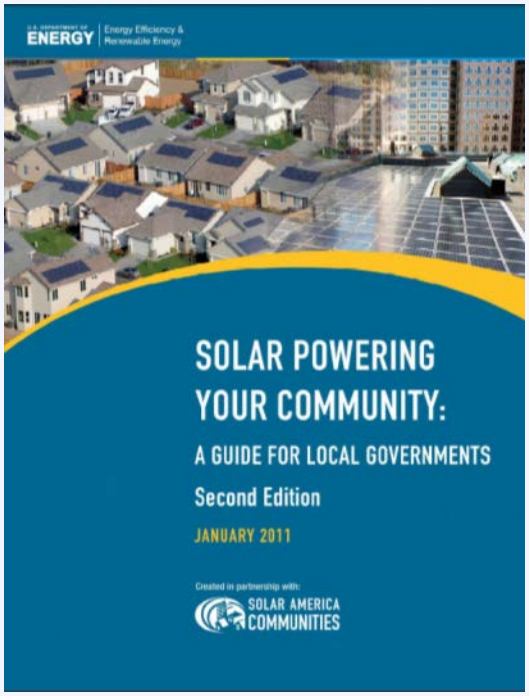
- Does solar play a role in the future vision for your community?
- How does solar connect to other goals such as greenhouse gas reduction targets or renewable energy portfolio standards?
- Opportunity to gage the level of awareness and support in the community.

Photo: NREL

Photo: www.solar.calfinder.com

Plan Making

- Comprehensive plans
- Sub-area plans
- Functional plans



Regulations and Incentives

- Zoning ordinances
- Subdivision ordinances or regulations
- Form based codes
- Planned unit development/ planned residential development ordinances
- Transit oriented development regulations and guidelines
- Historic district architectural or design guidelines
- Transfer of development rights
- Wetlands ordinances
- Tree ordinances

Development Work

Source: www.urbanmilwaukee.com

- Review and approval of development projects
- Public-private development and redevelopment projects
- Development agreements

Public Investment

Infrastructure

- Parking Meters
- Crosswalk Signals
- Street Lights
- Roads

Community Facilities

- Town/City Halls
- Libraries
- Schools
- Police & Fire Stations

Source: solaramericacommunities.gov

Source: NREL

Solar in the Comprehensive Plan

Solar in the Comprehensive Plan

Why focus on the Comprehensive Plan?

- Foundational policy document (vision, goals, objectives/policies ,and recommendations)
- Statutory priority given to comprehensive plans not necessarily given to other plans
- Sets the stage for how the community will maximize opportunities and minimize risks in public and private sector development
- Don't create silos – integrate recommendations from other types of plans in the comprehensive plan (identify synergies and conflicts with other local resources)

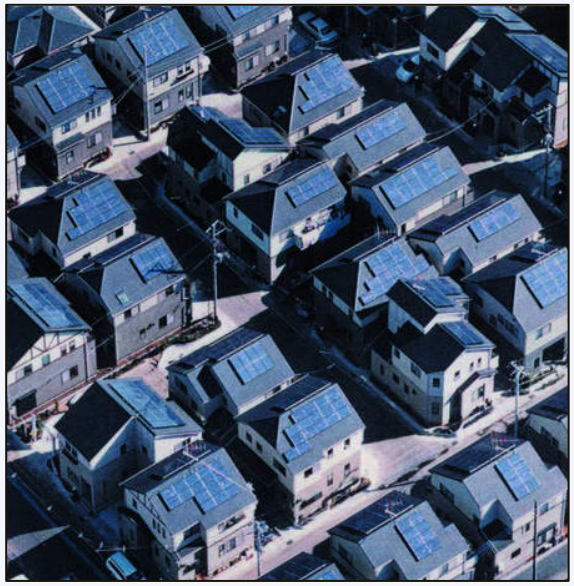
Solar in the Comprehensive Plan

- Existing Conditions
- Goals, Policies, & Objectives
- Action Steps
- Framework for Implementation
  - Standards, Policies, & Incentives
  - Future Public & Private Investment

Solar in Local Development Regulations

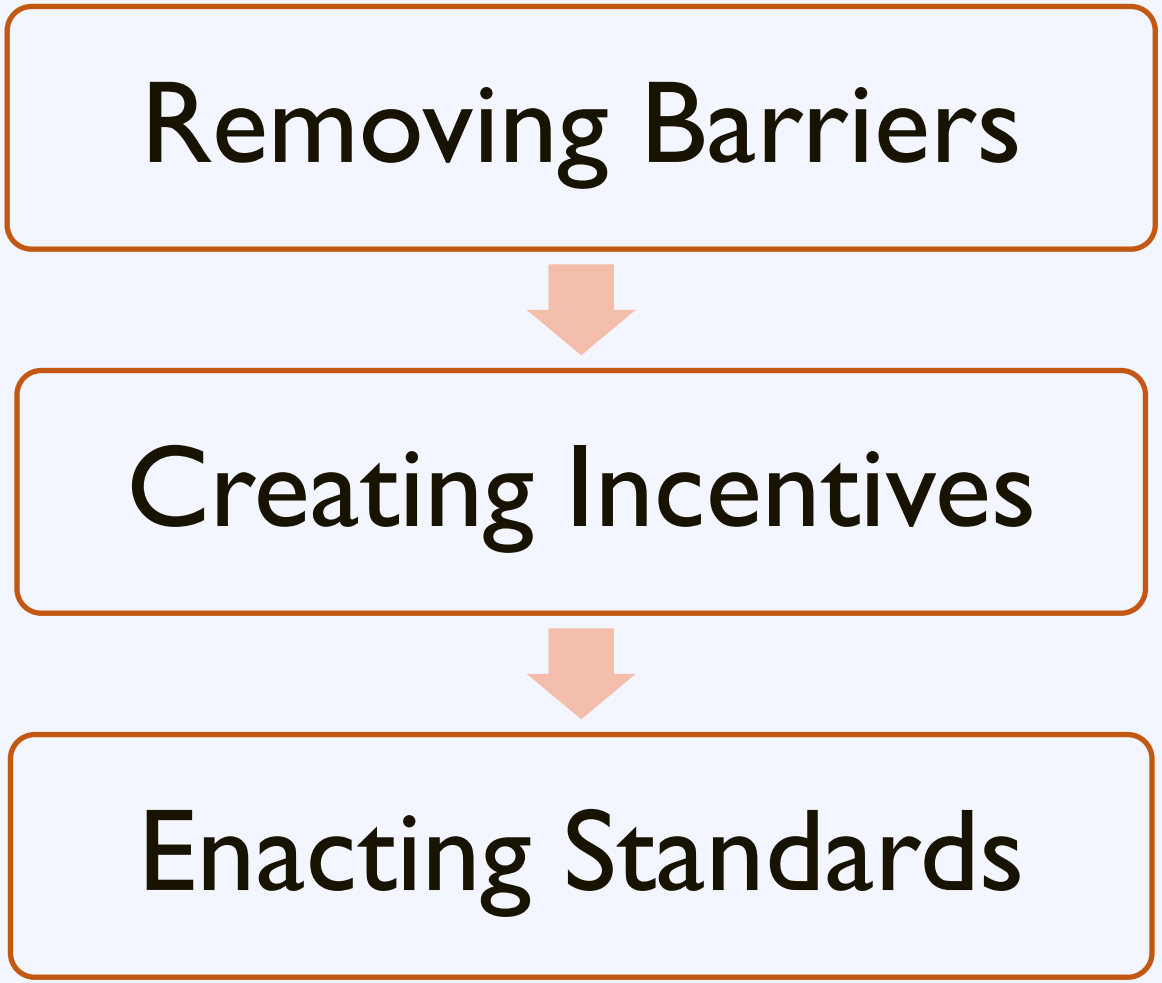
Why is this Important?

- Establish a framework for making decisions about solar
- Mitigate potential nuisances
- Create a safe harbor for property owners to use their solar resources
- Encourage solar energy investment and production in the community



Source: www.heatingoil.com

Regulatory Framework



Removing Barriers

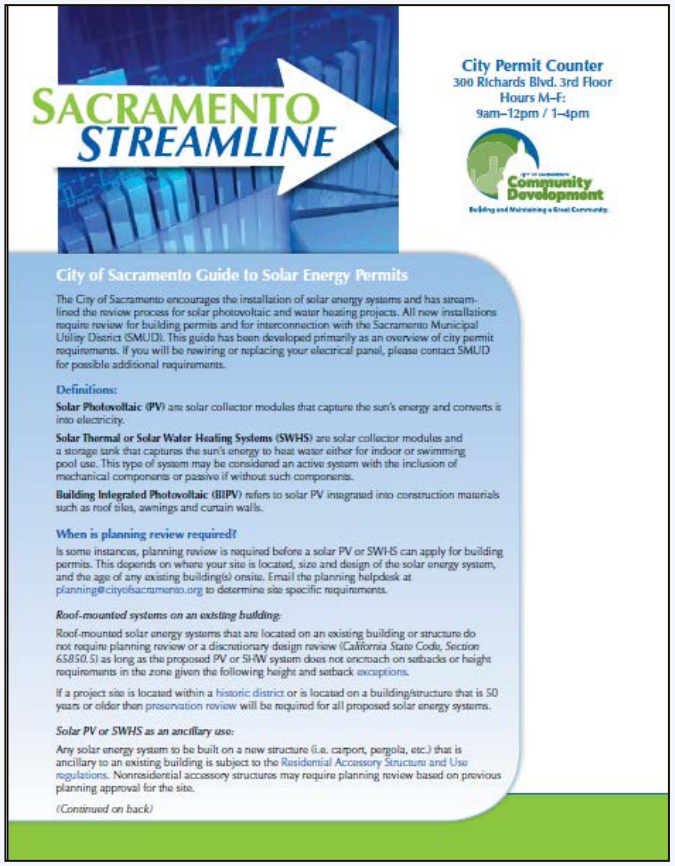
Removing Barriers

- Override / prohibit private covenants
- Make solar a by-right accessory use
- Allow modest adjustments to regulations (e.g., setbacks) to allow applicants to meet solar access requirements
- Craft exceptions to permit solar in special districts (e.g., historic districts)
- Streamline the approval process and reduce permitting costs
- Adopt solar access laws

Removing Barriers

Solar Permitting Best Practices

- Create solar permitting "checklist"
- Make solar approvals a "one-stop shop" to reduce overall timeline
- Expedite processing for solar applications
- Reduce inspection appointment windows
- Appoint a solar ombudsman


SACRAMENTO STREAMLINE

City Permit Counter
300 Richards Blvd. 3rd Floor
Hours M–F:
9am–12pm / 1–4pm

Community Development

City of Sacramento Guide to Solar Energy Permits

The City of Sacramento encourages the installation of solar energy systems and has streamlined the review process for solar photovoltaic and water heating projects. All new installations require review for building permits and for interconnection with the Sacramento Municipal Utility District (SMUD). This guide has been developed primarily as an overview of city permit requirements. If you will be rewiring or replacing your electrical panel, please contact SMUD for possible additional requirements.

Definitions:

Solar Photovoltaic (PV) are solar collector modules that capture the sun's energy and converts it into electricity.

Solar Thermal or Solar Water Heating Systems (SWHS) are solar collector modules and a storage tank that captures the sun's energy to heat water either for indoor or swimming pool use. This type of system may be considered an active system with the inclusion of mechanical components or passive if without such components.

Building Integrated Photovoltaic (BIPV) refers to solar PV integrated into construction materials such as roof tiles, awnings and curtain walls.

When is planning review required?

In some instances, planning review is required before a solar PV or SWHS can apply for building permits. This depends on where your site is located, size and design of the solar energy system, and the age of any existing building(s) onsite. Email the planning helpdesk at planning@cityofsacramento.org to determine site specific requirements.

Roof-mounted systems on an existing building:

Roof-mounted solar energy systems that are located on an existing building or structure do not require planning review or a discretionary design review (*California State Code, Section 65850.5*) as long as the proposed PV or SHW system does not encroach on setbacks or height requirements in the zone given the following height and setback exceptions.

If a project site is located within a historic district or is located on a building/structure that is 50 years or older then preservation review will be required for all proposed solar energy systems.

Solar PV or SWHS as an ancillary use:

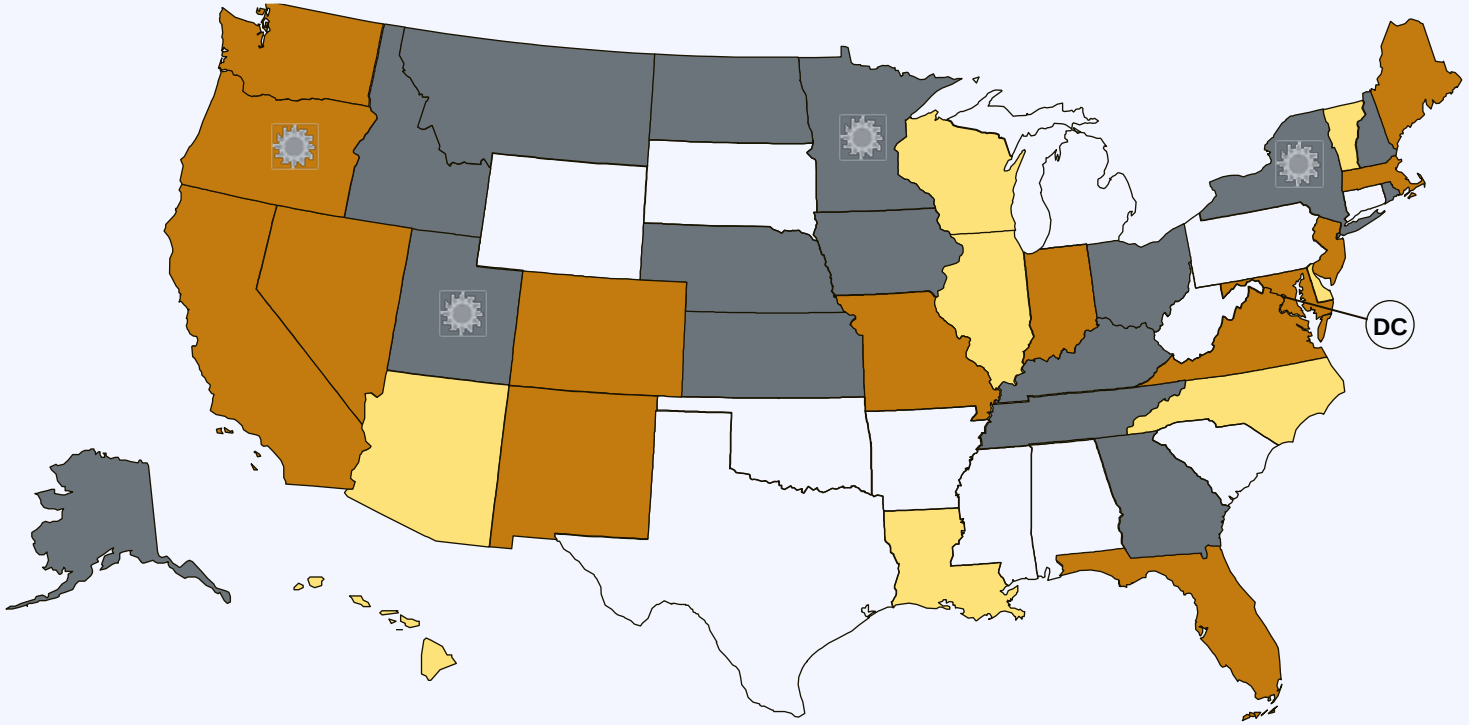
Any solar energy system to be built on a new structure (i.e. carport, pergola, etc.) that is ancillary to an existing building is subject to the Residential Accessory Structure and Use regulations. Nonresidential accessory structures may require planning review based on previous planning approval for the site.

(Continued on back)

Sacramento, CA;
Madison, WI; Miami, FL;
Portland, OR

Removing Barriers

Solar access laws exist in 40 states and the USVI to prevent barriers and authorize incentives, but people are often unaware of their rights.



Solar Easements Provision

Solar Rights Provision

Solar Easements and Solar Rights Provisions

U.S. Virgin Islands

Local option to create solar rights provision

Powered by SunShot U.S. Department of Energy

Source: DSIRE

Creating Incentives

Creating Incentives

- Streamline Approval Process
- Reduce Permitting Costs
- Increase Flexibility on Other Standards in Exchange for the Incorporation of Solar

Grant aims to hasten permits for solar-power installations

BY CATHY PROCTOR
DENVER BUSINESS JOURNAL

The Colorado Solar Energy Industries Association (COSEIA) says Colorado businesses and homeowners would save money on solar-power installations if municipalities tightened up their permitting processes.

The association will get an opportunity to help prove it, thanks to a $491,000 grant from the U.S. Department of Energy, which issued $12 million in grants to 22 regional teams for the purpose of speeding the processing and issuing of permits.

The permitting process is "disjointed," said RJ Harrington, policy director for COSEIA, which will be joined on the Denver team by the Rocky Mountain Institute, American Solar Energy Society,

KATHLEEN LAVINE | BUSINESS JOURNAL

The solar industry says people would save money if the installation-permitting process was faster.

and representatives from local governments in Denver, Golden, Fort Collins and Boulder County — areas with a lot of solar-power activity.

"There are too many different vari-

SEE SOLAR | A22

Source: Denver Business Journal

Enacting Standards

Baseline Considerations

- Clarify what types of solar systems are allowed and where
- Mitigate potential nuisances associated with solar equipment (e.g. visual impacts, encroachment)
- Define and protect solar access

Baseline Considerations

Zoning Code and Subdivision Regulations	
SECTION	**TOPICS TO ADDRESS**
Permitted Uses	Primary vs. accessory
Dimensional Standards	Height, lot coverage, setbacks
Development Standards	Screening, placement (on building or site), site planning for solar access (lot and building orientation)
Definitions	Types of solar systems, solar access, and related terminology

Optional Considerations

- Require solar-orientation for new development
- Require solar-ready development

CONSIDER CONTEXT

- Residential
- Non-residential
- New development
- Infill or redevelopment

Types of Regulations

Baseline

- Standards for Small-Scale Solar Energy Systems
- Standards for Large-Scale Solar Energy Systems
- Solar Access

Optional

- Solar Siting
- Solar-Ready Homes

Source: www.hmgf-ugm.org

Small-Scale Solar Energy Systems

Typical Requirements

- Small-scale solar energy systems permitted as accessory uses in defined districts
- Placement on side and back roof slopes encouraged
- Must meet district height, lot coverage, and setback requirements (some allow for exemptions through variance)

Source: Clarion Associates

Large-Scale Solar Energy Systems

Typical Requirements

- Defined as solar farms, solar power plants, or "major" solar facilities
- Allowed as primary use in very limited locations
- Height limits
- Lot coverage limits
- Fencing and enclosures

Source: Solar Thermal Magazine

Solar Access Ordinances

Typical Requirements

- Protection of solar access
- Minimize shade on adjoining properties through limits on
  - Building height and massing
  - Tree and landscaping placement

Trees Block Solar Panels, and a Feud Ends in Court

Jim Wilson/The New York Times

Under a California law, a criminal court ruled that these redwood trees cast too much shade on Mark Vargas's solar panels.

By FELICITY BARRINGER
Published: April 7, 2008

SIGN IN TO E-MAIL OR SAVE THIS
PRINT
SINGLE PAGE
REPRINTS

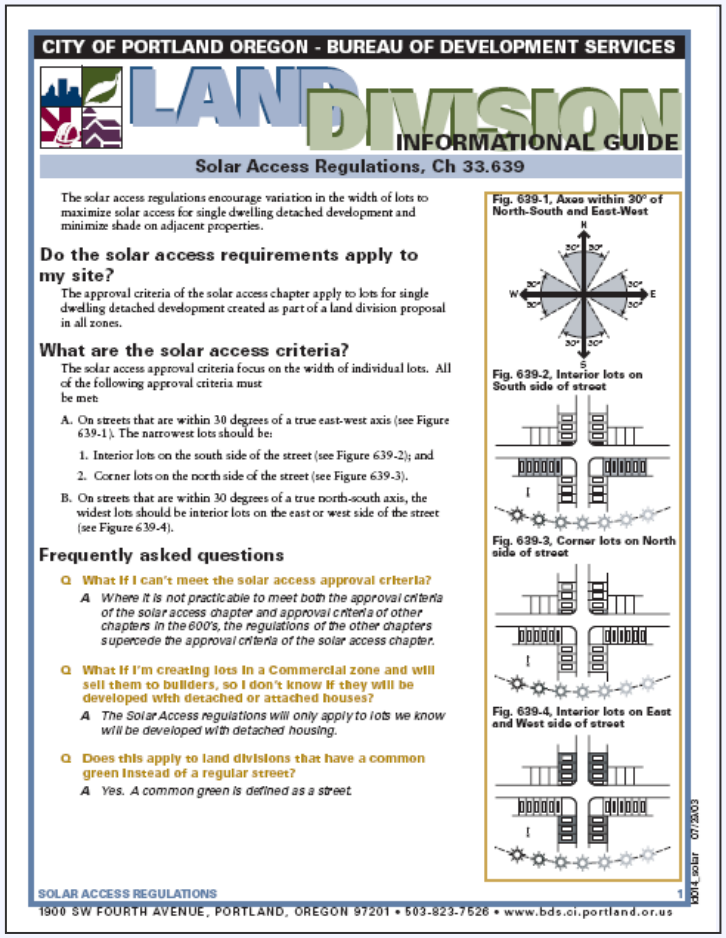
SUNNYVALE, Calif. — Call it an eco-parable: one Prius-driving couple takes pride in their eight redwoods, the first of them planted over a decade ago. Their electric-car-driving neighbors take pride in their rooftop solar panels, installed five years after the first trees were

Source: New York TImes

Solar Siting Ordinances

Typical Requirements

- Minimum number of lots must be "Solar-Oriented Lots"
- Flexible setbacks to maximize solar access
- Streets designed to maximize solar access



CITY OF PORTLAND OREGON - BUREAU OF DEVELOPMENT SERVICES

LAND DIVISION INFORMATIONAL GUIDE

Solar Access Regulations, Ch 33.639

The solar access regulations encourage variation in the width of lots to maximize solar access for single dwelling detached development and minimize shade on adjacent properties.

Do the solar access requirements apply to my site?

The approval criteria of the solar access chapter apply to lots for single dwelling detached development created as part of a land division proposal in all zones.

What are the solar access criteria?

The solar access approval criteria focus on the width of individual lots. All of the following approval criteria must be met:

A. On streets that are within 30 degrees of a true east-west axis (see Figure 639-1), the narrowest lots should be:

1. Interior lots on the south side of the street (see Figure 639-2); and
2. Corner lots on the north side of the street (see Figure 639-3).

B. On streets that are within 30 degrees of a true north-south axis, the widest lots should be interior lots on the east or west side of the street (see Figure 639-4).

Frequently asked questions

Q What if I can't meet the solar access approval criteria?

A Where it is not practicable to meet both the approval criteria of the solar access chapter and approval criteria of other chapters in the 600's, the regulations of the other chapters supercede the approval criteria of the solar access chapter.

Q What if I'm creating lots in a Commercial zone and will sell them to builders, so I don't know if they will be developed with detached or attached houses?

A The Solar Access regulations will only apply to lots we know will be developed with detached housing.

Q Does this apply to land divisions that have a common green instead of a regular street?

A Yes. A common green is defined as a street.

Fig. 639-1, Axes within 30° of North-South and East-West

Fig. 639-2, Interior lots on South side of street

Fig. 639-3, Corner lots on North side of street

Fig. 639-4, Interior lots on East and West side of street

SOLAR ACCESS REGULATIONS 1

1900 SW FOURTH AVENUE, PORTLAND, OREGON 97201 • 503-823-7526 • www.bds.ci.portland.or.us

Source: www.**portland**online.com

Solar Ready Homes

Typical Requirements

- Structural/roof specifications
- Solar "stub-ins" required for new homes to support future photovoltaic panel or solar hot water heater installation
- Installation of PV Conduit or hot water pipes required on south, east, or west-facing roofs

Source: www.correctsolarinstallation.com

Resources

Resources

Project Website – FAQ Page

Frequently Asked Questions

Planning and Zoning for Solar Energy

How do other communities encourage the use of solar energy systems through their comprehensive plans?

The local comprehensive plan presents a future vision of the physical, social, and economic characteristics of an entire city or county, and it specifies goals and policies intended to implement that vision. Because it is the most expansive official policy statement of a city council or county board, it is an ideal tool to support the deployment of solar energy systems on both public and private property.

There are two primary mechanisms by which comprehensive plans can support solar energy system deployment: (1) documenting the solar resource and (2) articulating policies to guide decision making.

First, comprehensive plans can provide information about the solar resource available in different parts of the community. This may be in the form a solar resource map showing which areas receive the most sunlight annually, or it may be a text description of site characteristics that maximize solar potential.

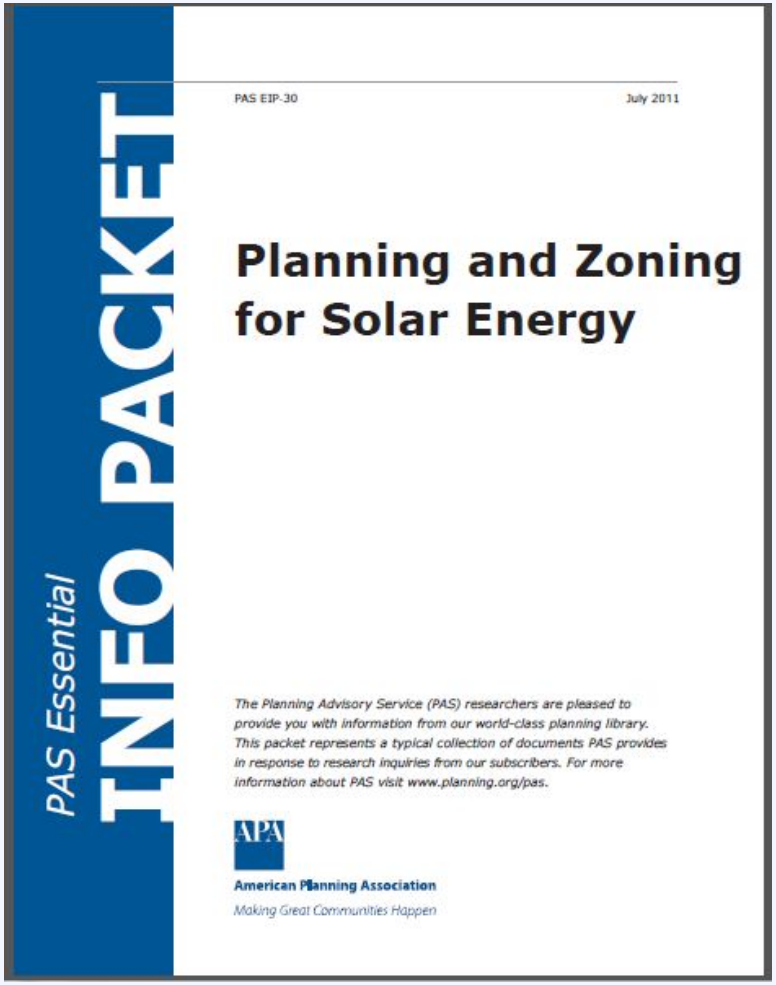
Second, comprehensive plans can articulate specific policies to guide decision making about solar energy system deployment on public and private land. These policies may address solar access protection, street and building orientation, or preferential locations for new solar energy systems.

Examples from PAS Essential Info Packet 30: Planning and Zoning for Solar Energy

- Fort Collins (Colorado), City of. 2011. City Plan. Environmental Health: Energy.
- Jackson (Oregon), County of. 2007. Jackson County Comprehensive Plan. Section 11, Energy Conservation.
- Greensburg (Kansas), City of. 2008. Greensburg Sustainable Comprehensive Plan. Housing; Future Land Use and Policy.
- Owensboro Metropolitan Planning Commission. 2007. Comprehensive Plan for Owensboro, Whitesville, Daviess County, Kentucky. Section 710. Climate and Solar Access.
- Pinal (Arizona), County of. 2009. We Create Our Future: Pinal County Comprehensive Plan. Chapter 7, Environmental Stewardship – Energy.
- Pleasanton (California), City of. 2009. General Plan 2005–2025. Energy Element.
- Shakopee (Minnesota), City of. 2009. Comprehensive Plan 2030. 12, Solar Access.
- Victoria (Minnesota), City of. 2010. 2030 Comprehensive Plan Update. Part II.L.1, Plan Elements – Special Resources – Solar Access Protection. Prepared by TKDA, St. Paul, Minn.

http://www.planning.org/research/solar/faq.htm

Essential Information Packet



http://www.planning.org/pas/infopackets/open/eip30.htm

Customized Research Assistance

- Available to anyone with a question related to planning for solar energy
- Provided through PAS Inquiry Answer Service
- Submit questions to pas@planning.org with subject line "Solar Energy Inquiry"

Q & A

Agenda

08:50 – 09:10	Solar 101
09:10 – 09:40	Planning and Zoning for Solar
09:40 – 09:50	*Break*
09:50 – 10:10	Addressing Solar Barriers Activity
10:10 – 10:30	Understanding Utility Regulations
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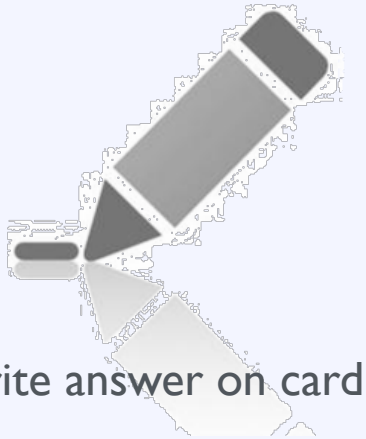
Activity: Identifying Benefits

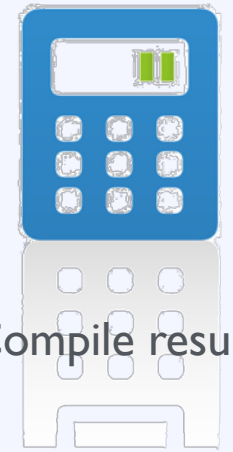
What is the greatest benefit solar can bring to your community? [Blue Card]

Right Now



Write answer on card

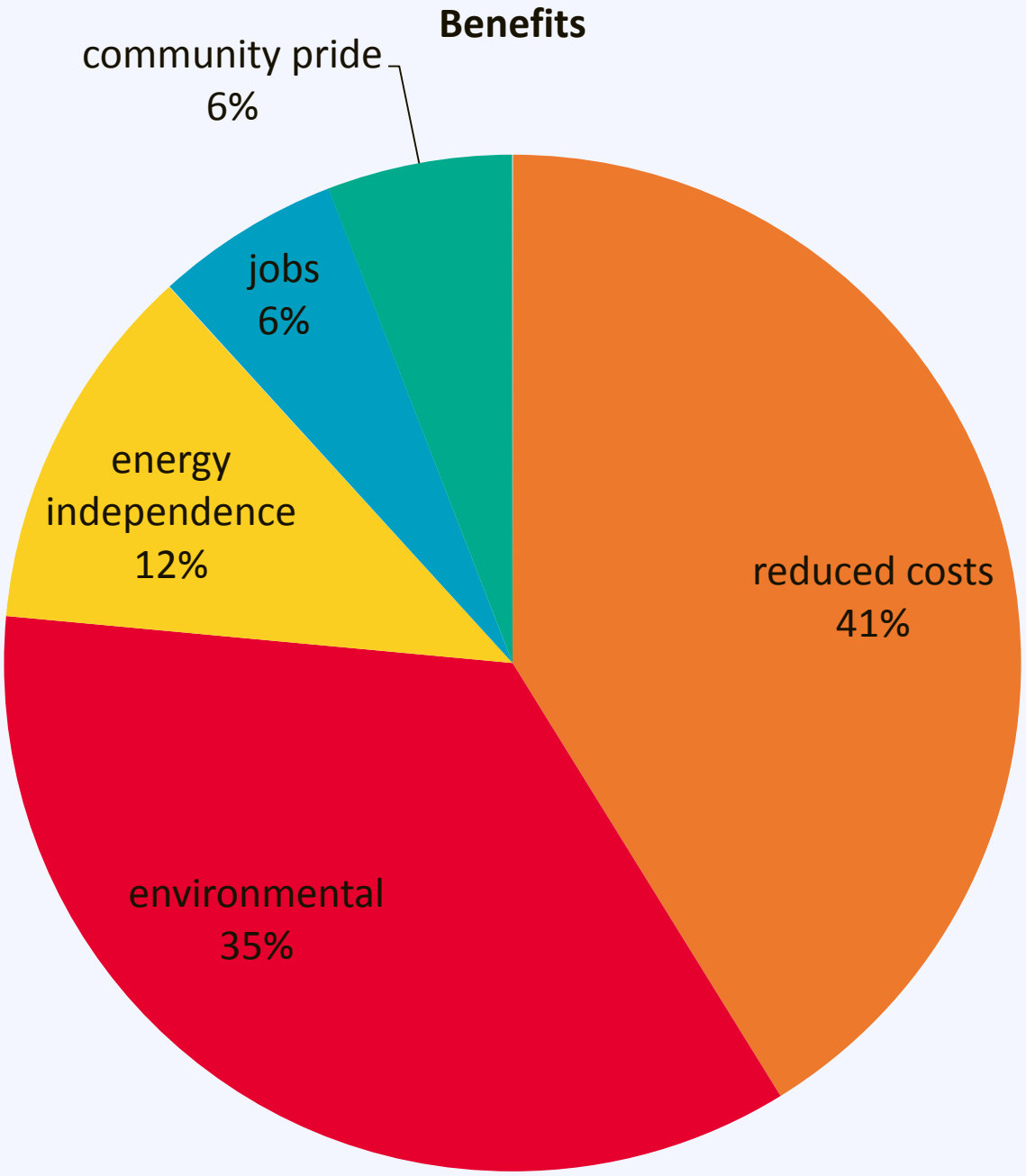
During Session



Compile results

After Break

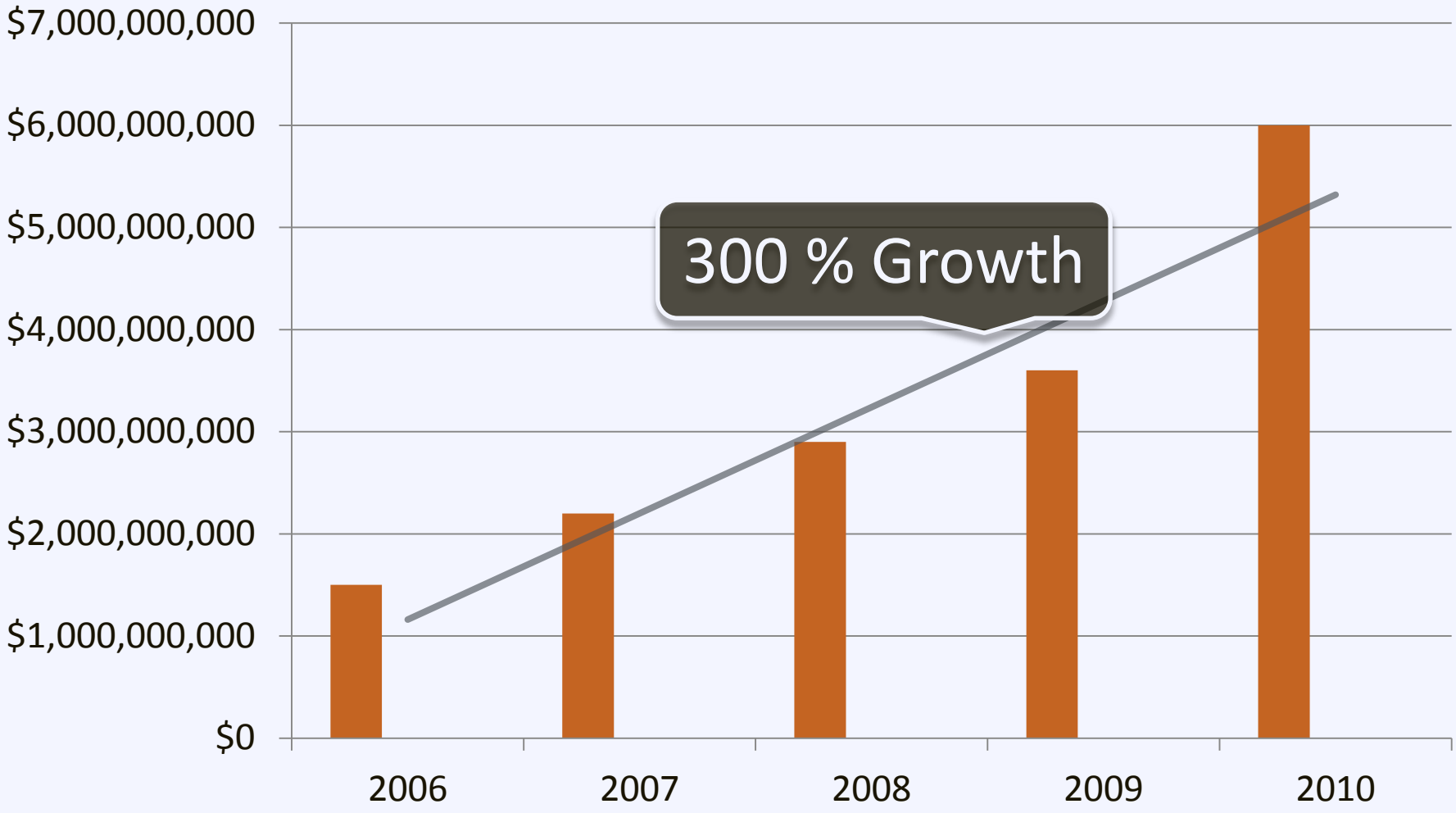
Group discussion



Benefits of Solar Energy

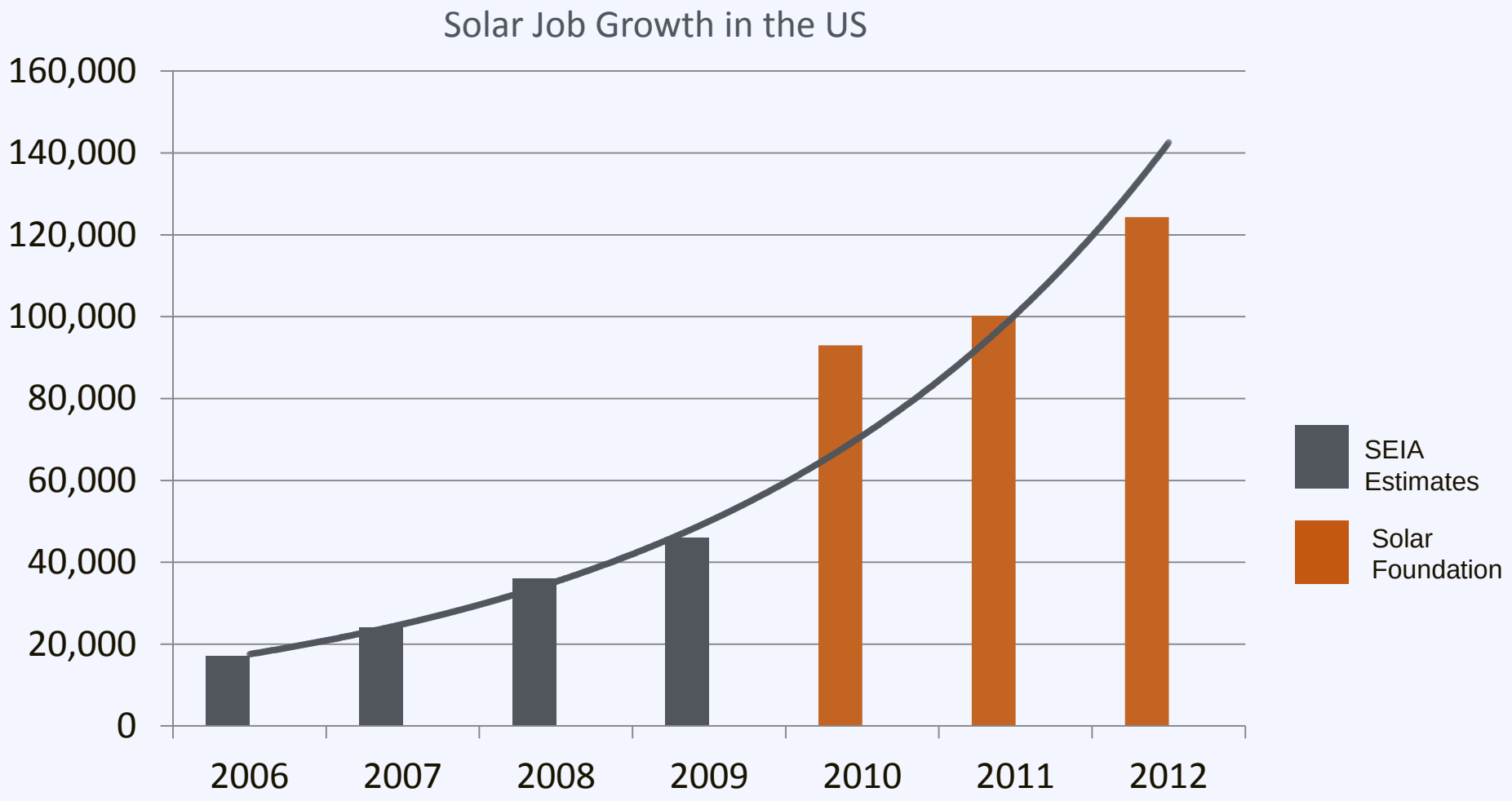
- Local economy growth
- Local jobs
- Energy independence
- Stabilizes price volatility
- Valuable to utilities
- Smart investment

Benefit: Economic Growth



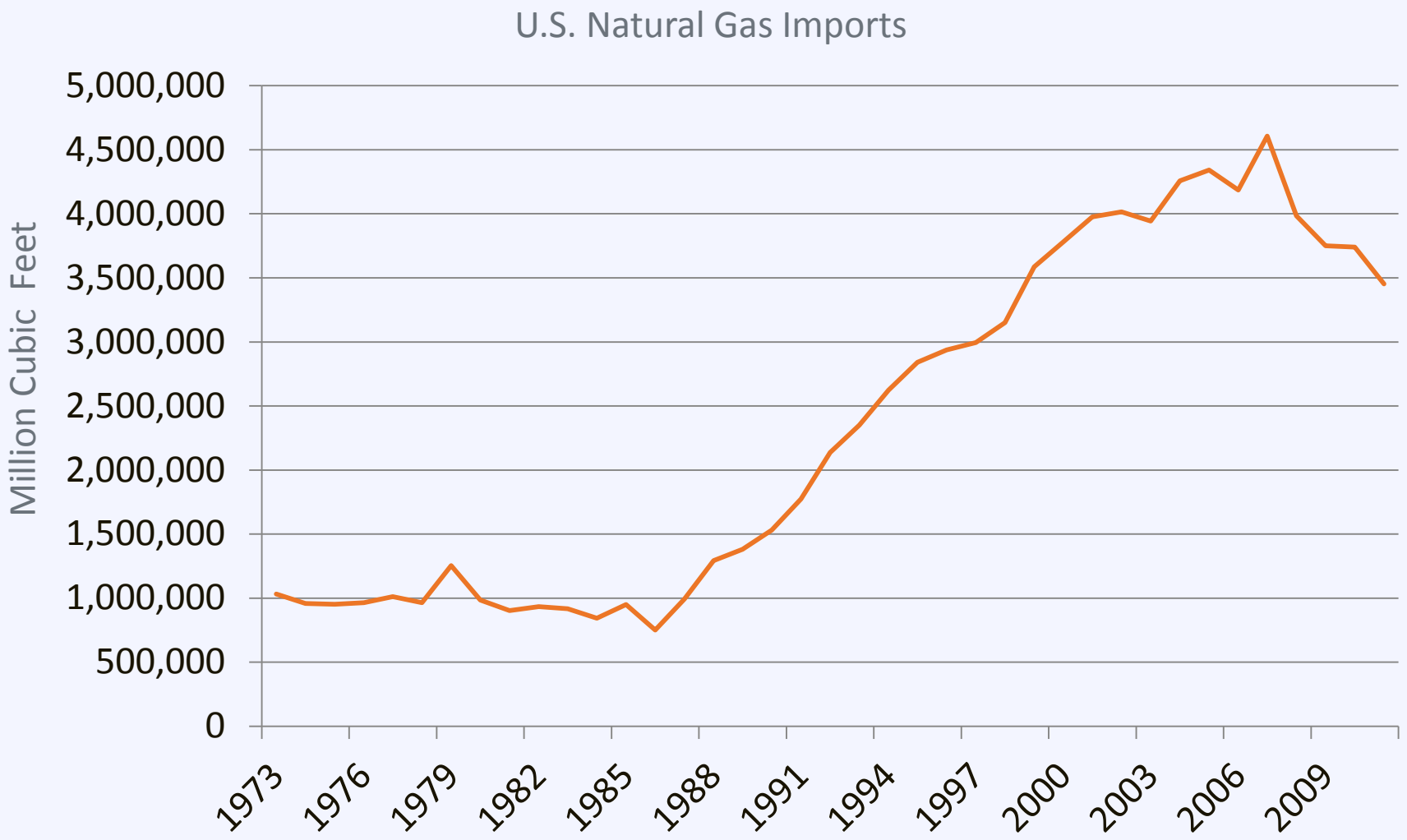
Source: SEIA/GTM Research - 2010 Year in Review Report http://www.seia.org/galleries/pdf/SMI-YIR-2010-ES.pdf SEIA/GTM Research- 2009 year in Review Supplemental Charts

Benefit: Job Growth



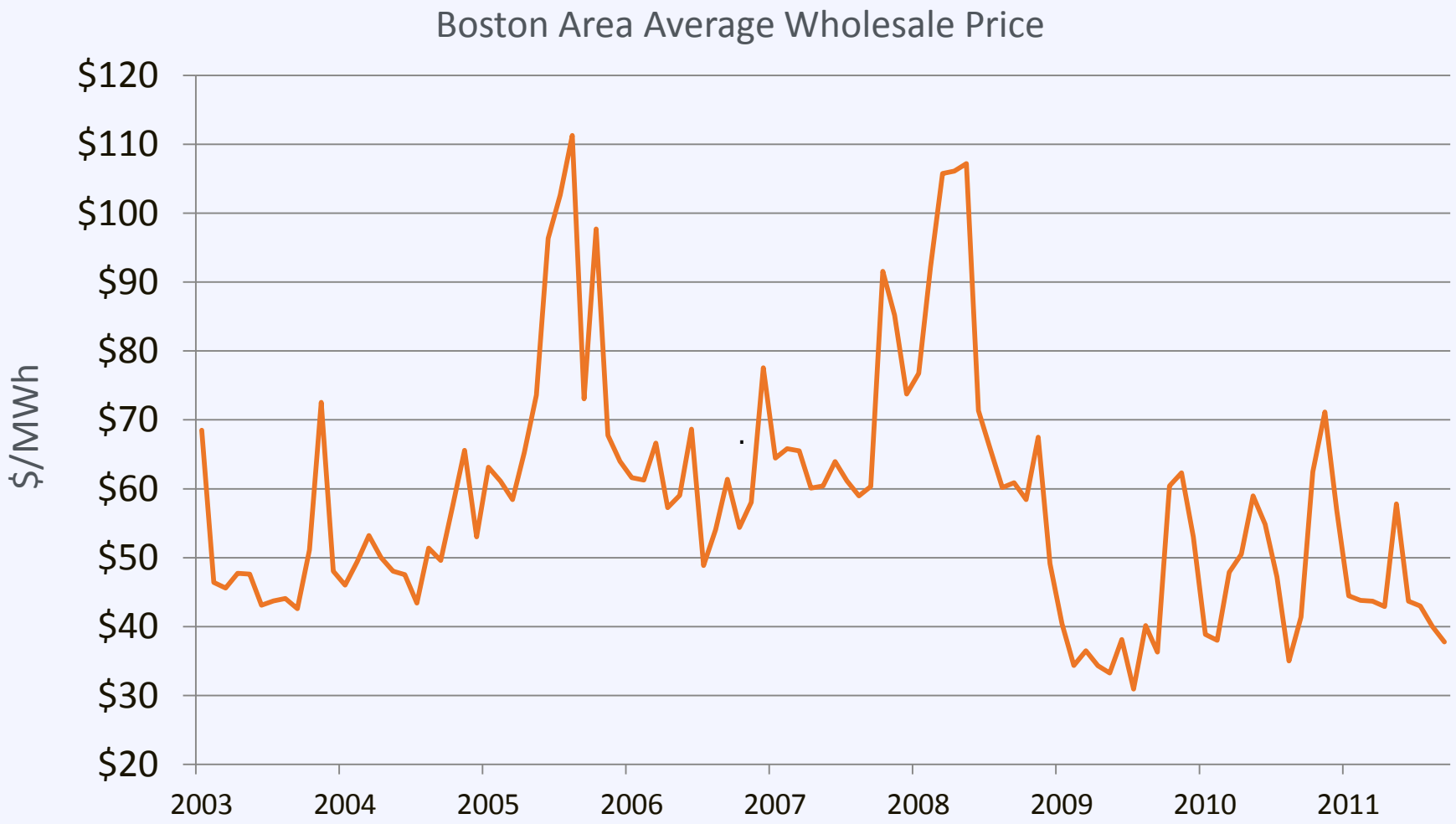
Source: SEIA Estimates (2006-2009), The Solar Foundation's National Solar Jobs Census 2010 (2010), The Solar Foundation's National Solar Jobs Census 2011 (2011-2012).

Benefit: Energy Independence



Source: EIA http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mttimus2&f=a

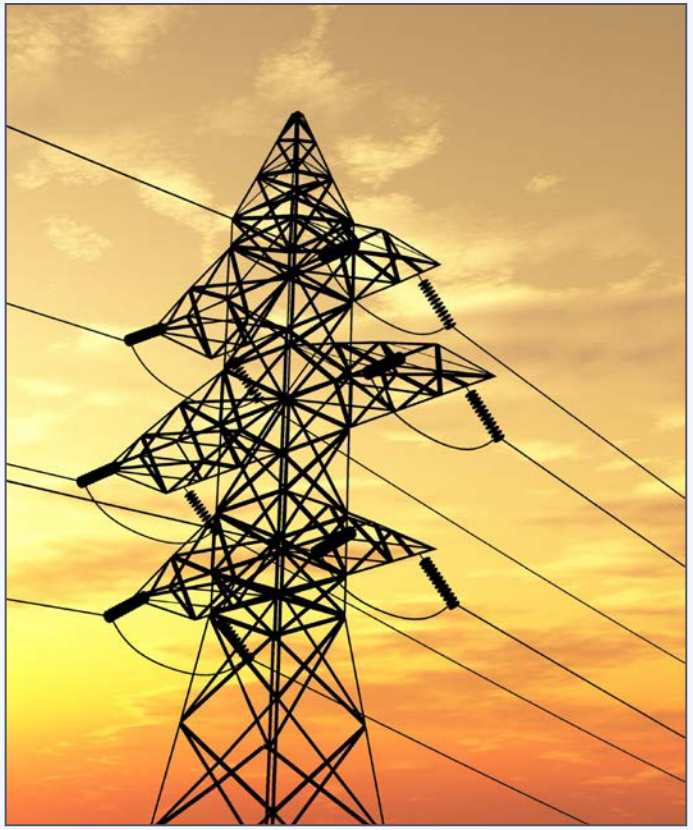
Benefit: Stabilize Energy Prices



Source: NEPOOL

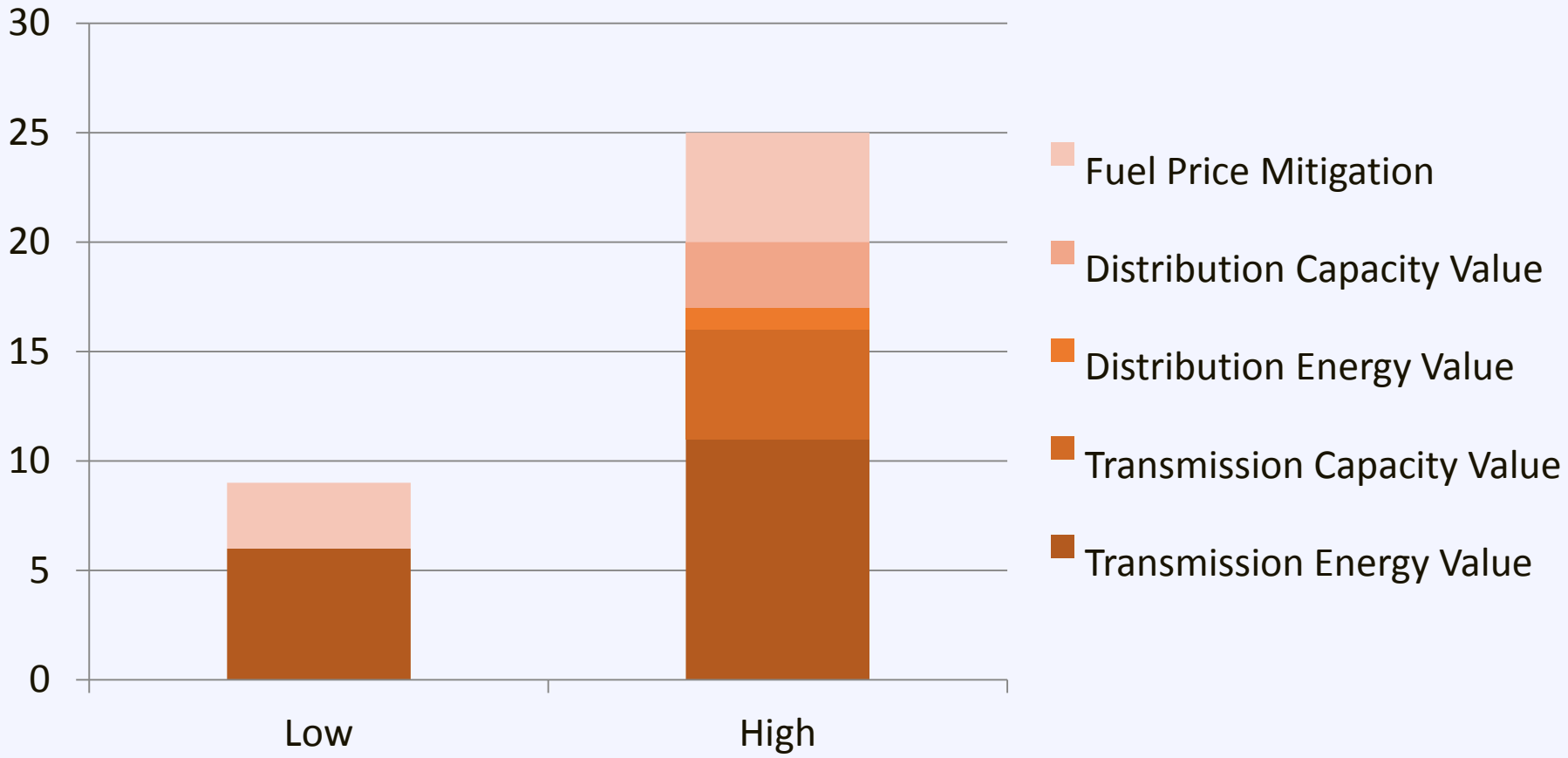
Benefits: Valuable to Utilities

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



Benefits: Valuable to Utilities

Value to the utility is **10 to 25 cents** beyond the value of the electricity



Powered by SunShot U.S. Department of Energy

Source: http://www.asrc.cestm.albany.edu/perez/2011/solval.pdf

Benefit: Smart Investment for Homes

From NREL:

Solar homes sold

20% faster

and for

17% more

than the equivalent non-solar homes

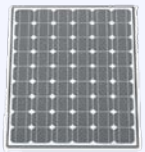
in surveyed California subdivisions

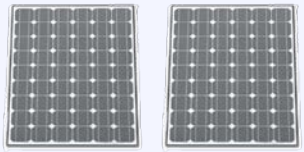
Powered by SunShot U.S. Department of Energy

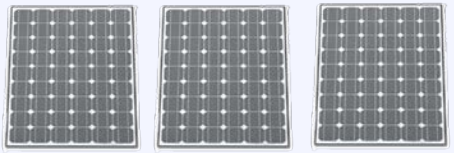
Source: http://www.nrel.gov/docs/fy07osti/38304-01.pdf

Benefit: Smart Investment for Homes

From SunRun:

3 kW  = **$ 16,500** *added sale premium*

6 kW  = **$ 33,000** *added sale premium*

9 kW  = **$ 49,500** *added sale premium*

Source: Tracking the Sun IV, SunRun

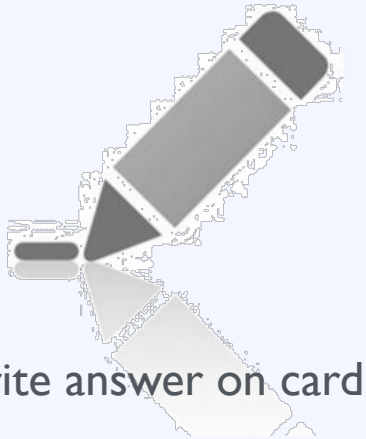
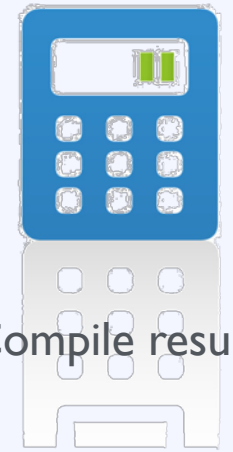
Benefit: Smart Investment for Business

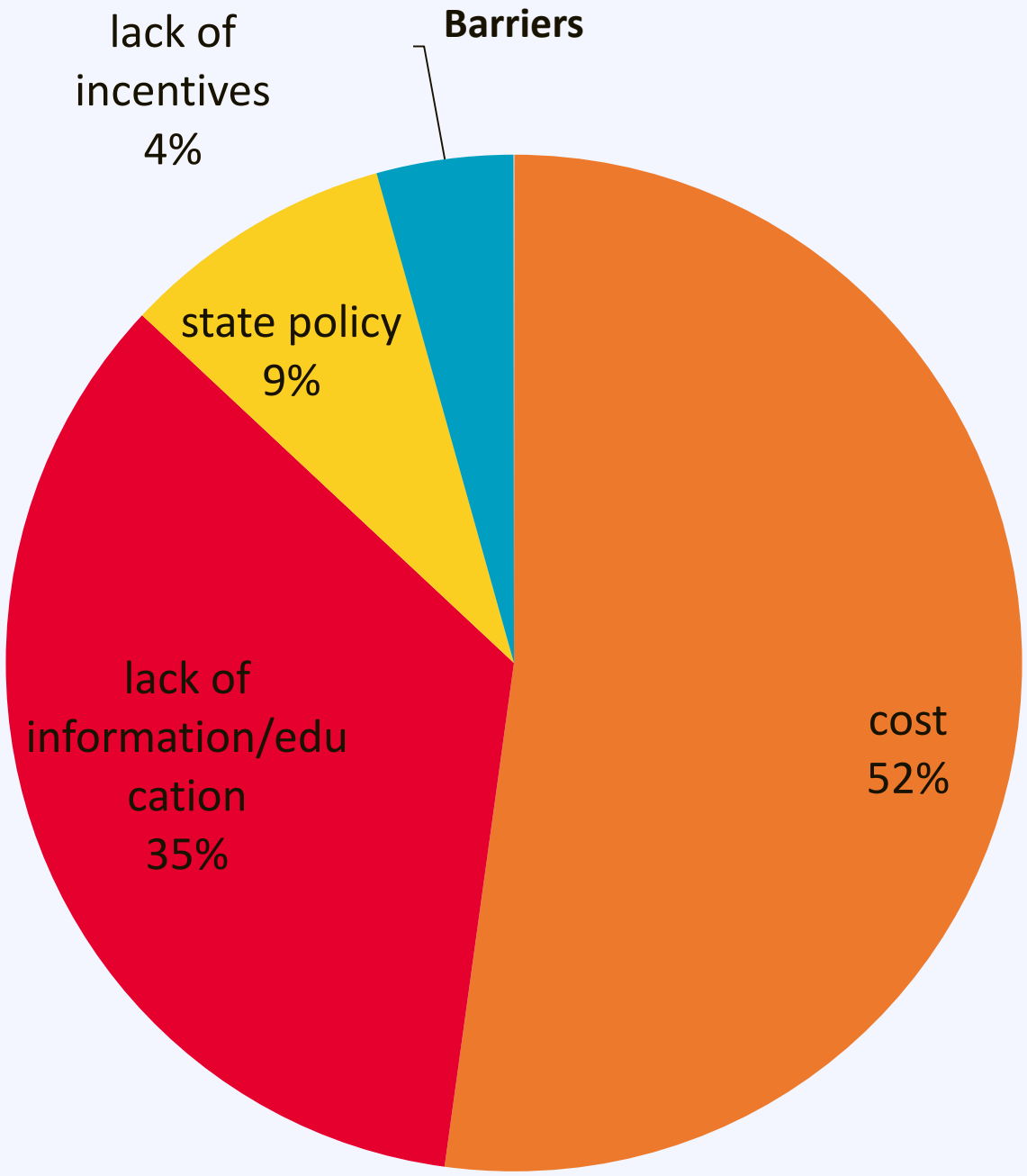
Benefit: Smart Investment for Government

Source: Borrego Solar

Activity: Addressing Barriers

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

Right Now	During Session	After Break
		
Write answer on card	Compile results	Group discussion



Some things you may hear…

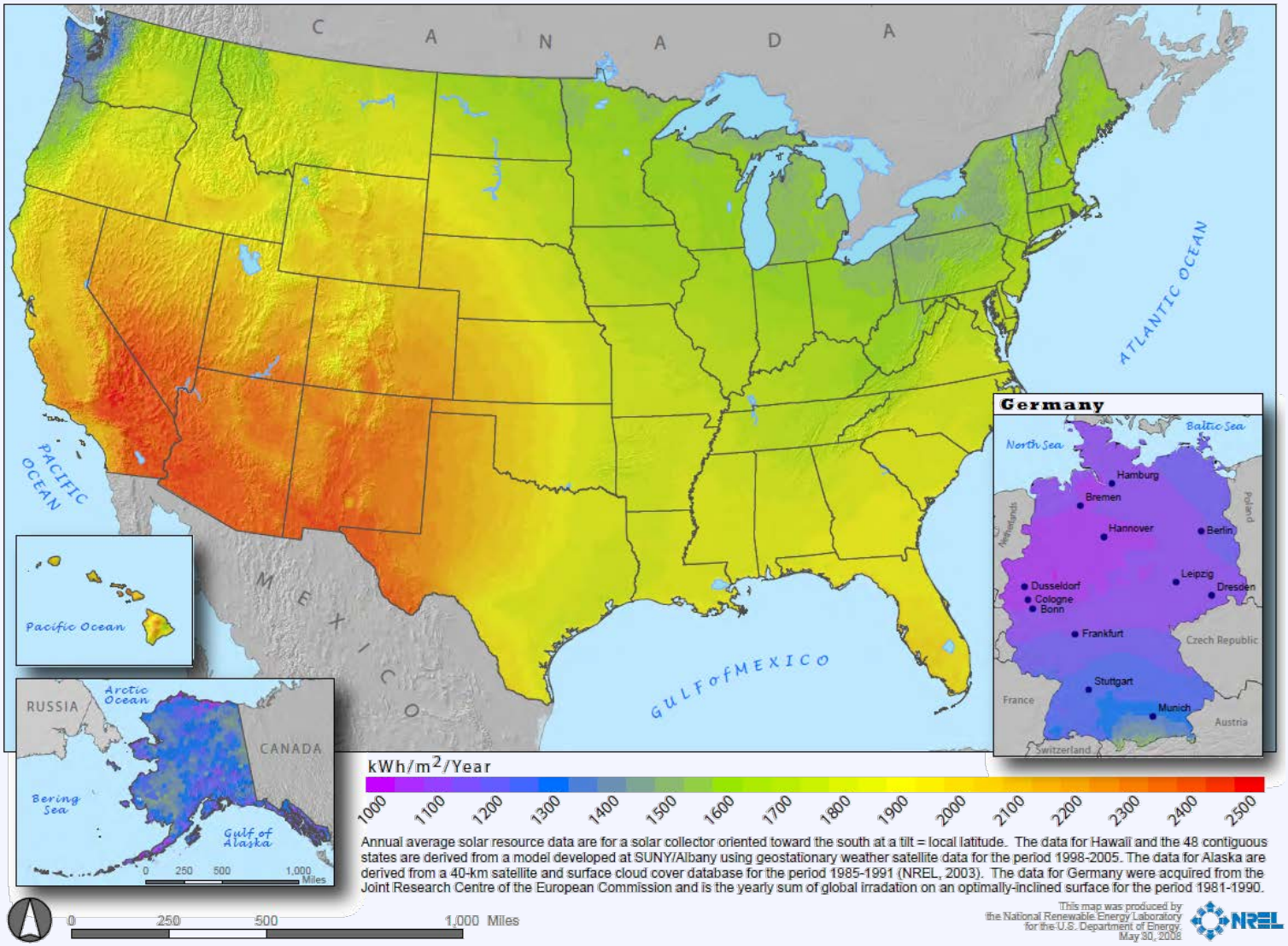
My area isn't sunny enough for solar

Going solar is too expensive

Solar is not ready to compete as a serious energy source

The government should not "pick winners and losers"

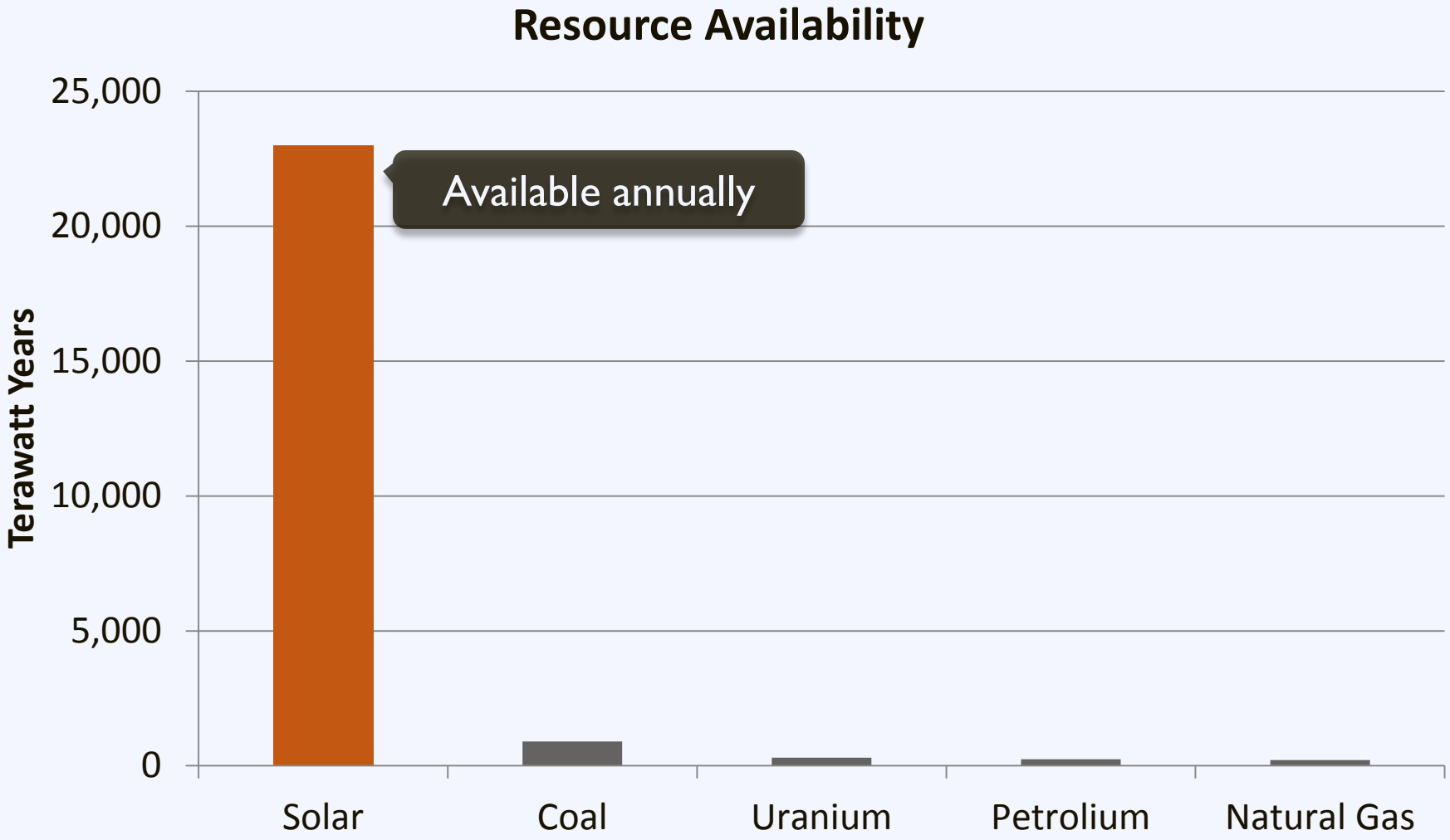
Fact: Solar works across the US



Powered by SunShot U.S. Department of Energy

Source: National Renewable Energy Laboratory

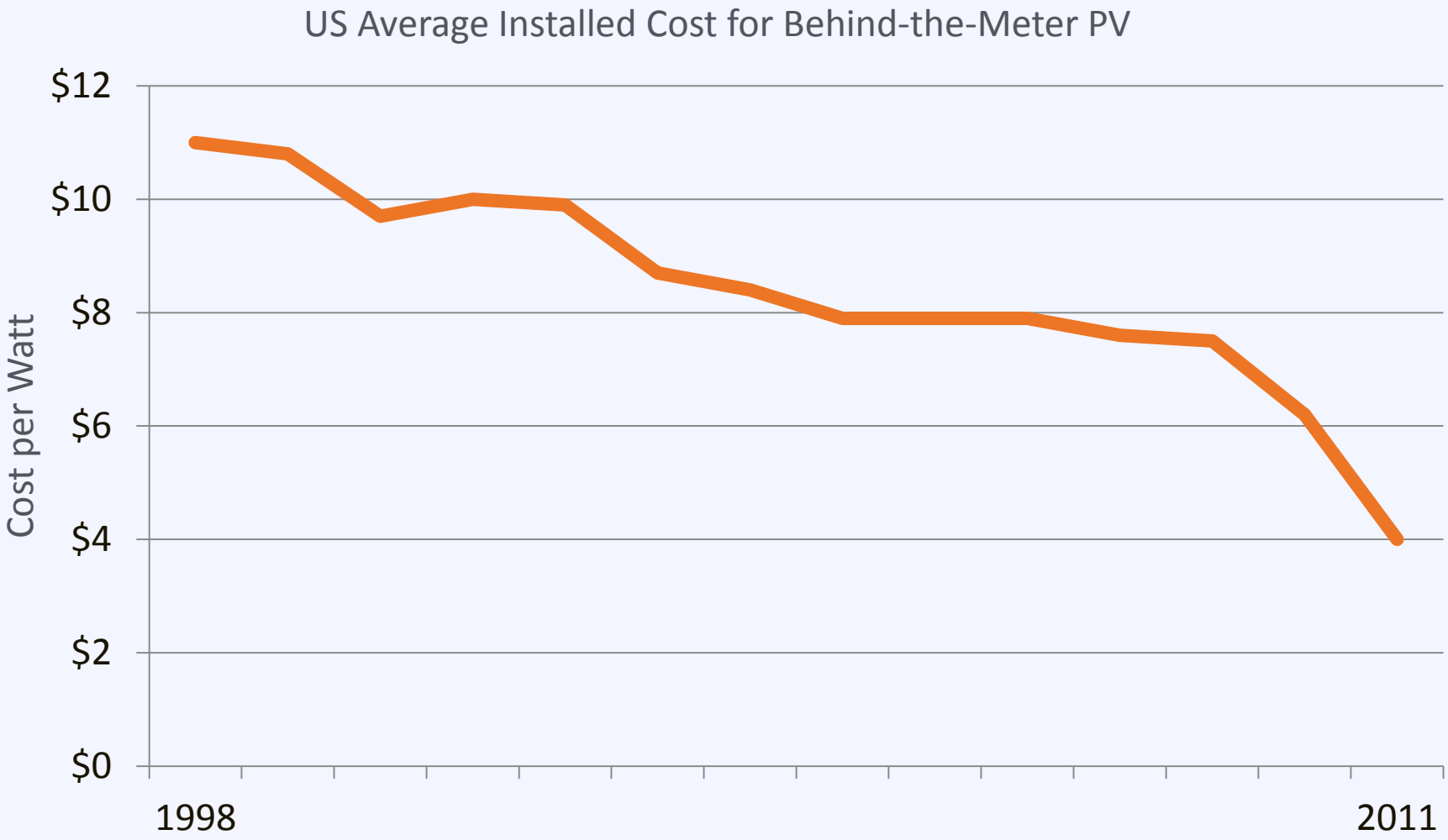
Fact: Solar is a ubiquitous resource



Powered by SunShot
U.S. Department of Energy

Source: Perez & Perez. 2009. *A fundamental look at energy reserves for the planet.*

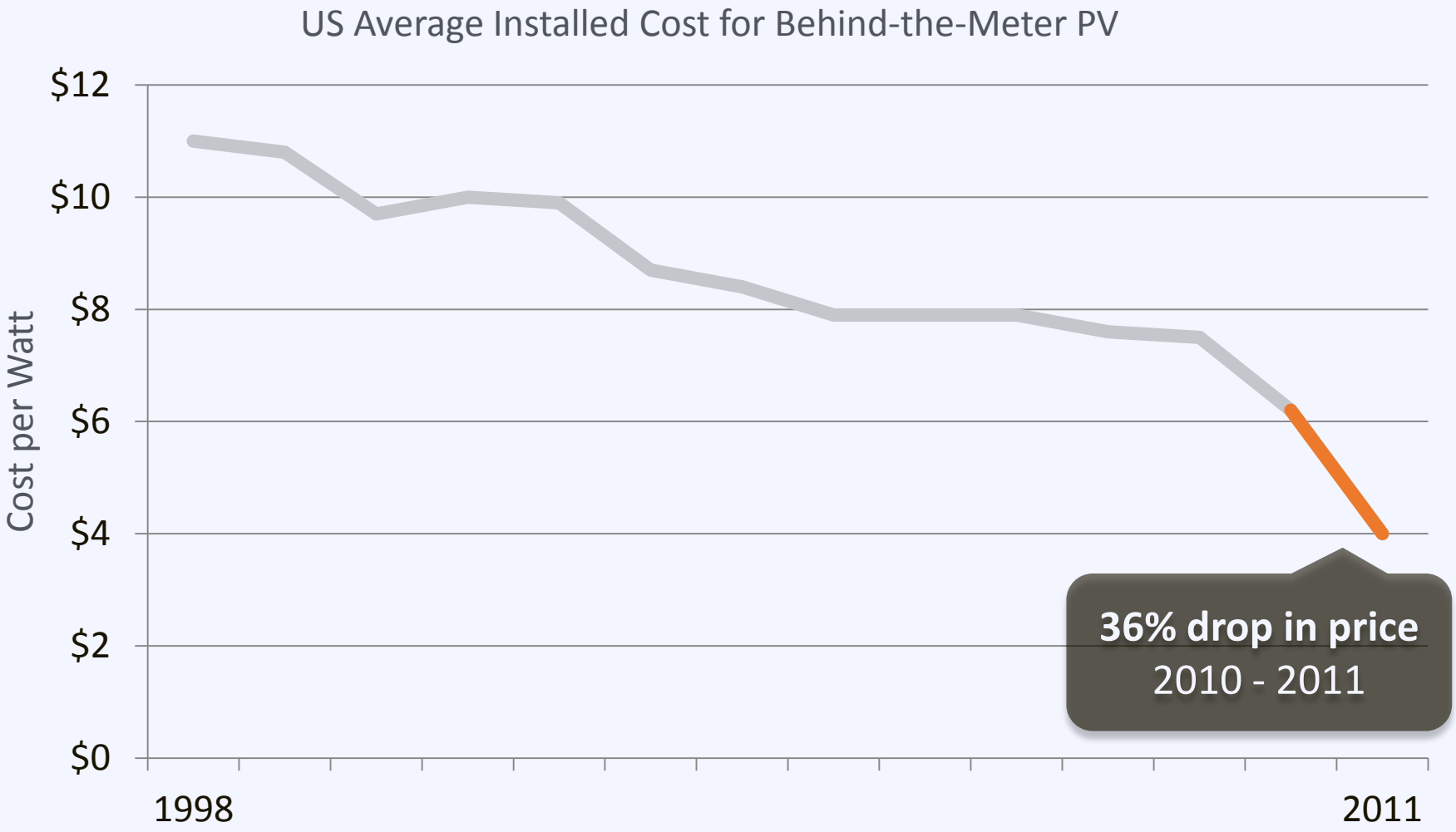
Fact: Solar is cost competitive



Tracking the Sun IV: The Installed Cost of Photovoltaics in the US from 1998-2010 (LBNL), SEIA/GTM Research. 2012. *Solar Market Insight 2011 Year-in-Review.*

Powered by SunShot U.S. Department of Energy

Fact: Solar is cost competitive



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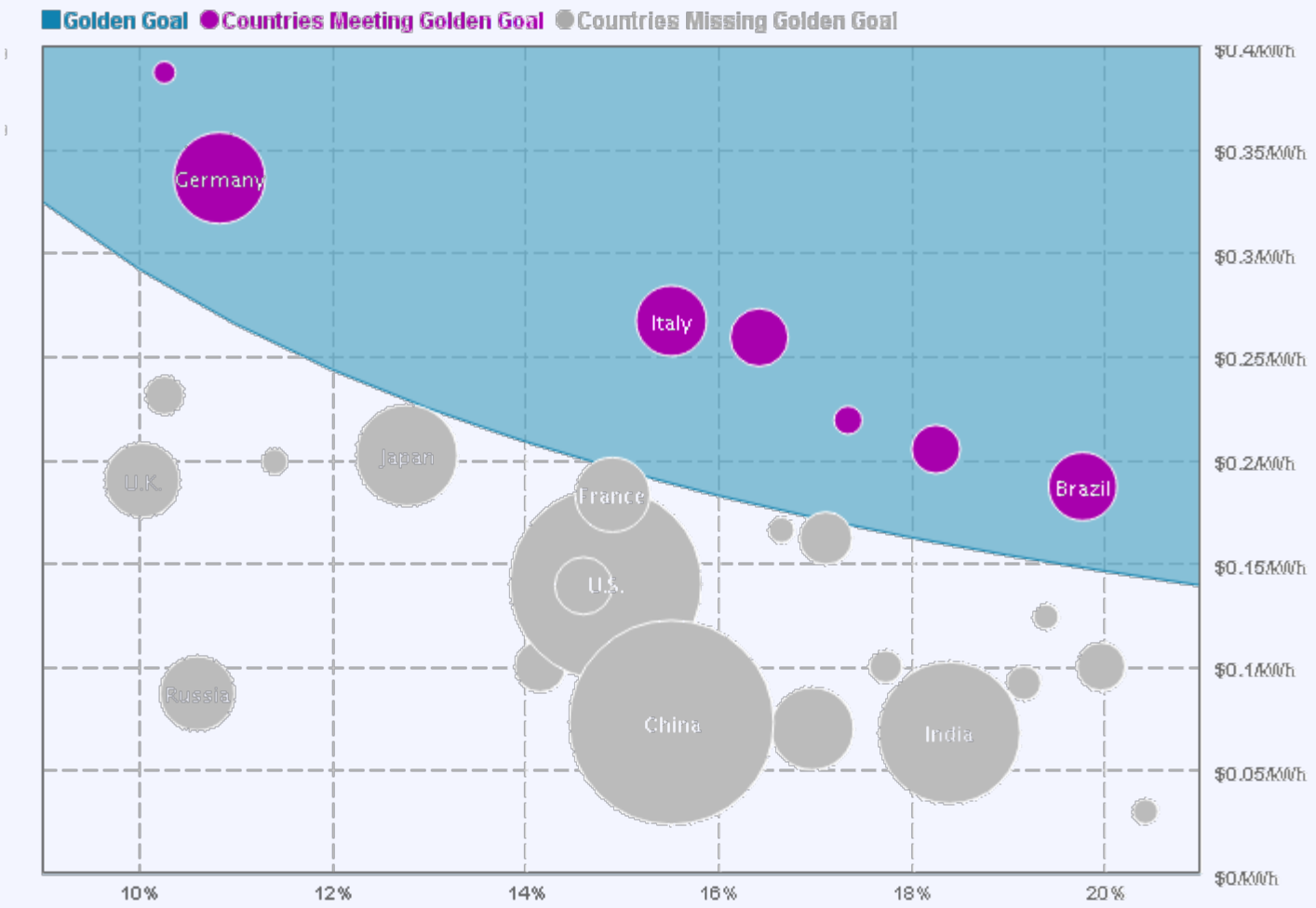
Powered by SunShot U.S. Department of Energy

Fact: Solar is cost competitive

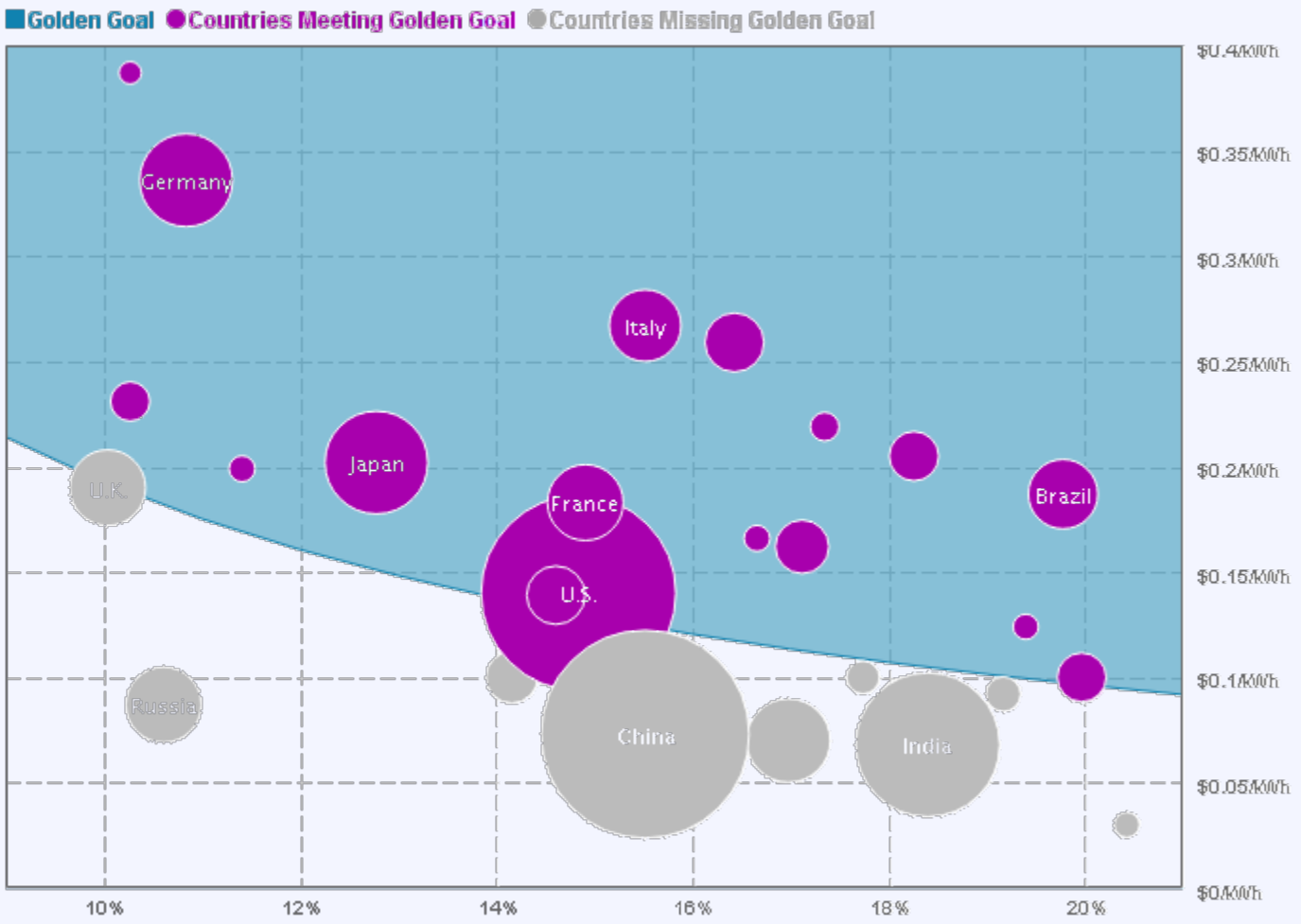
2012



Source: Bloomberg

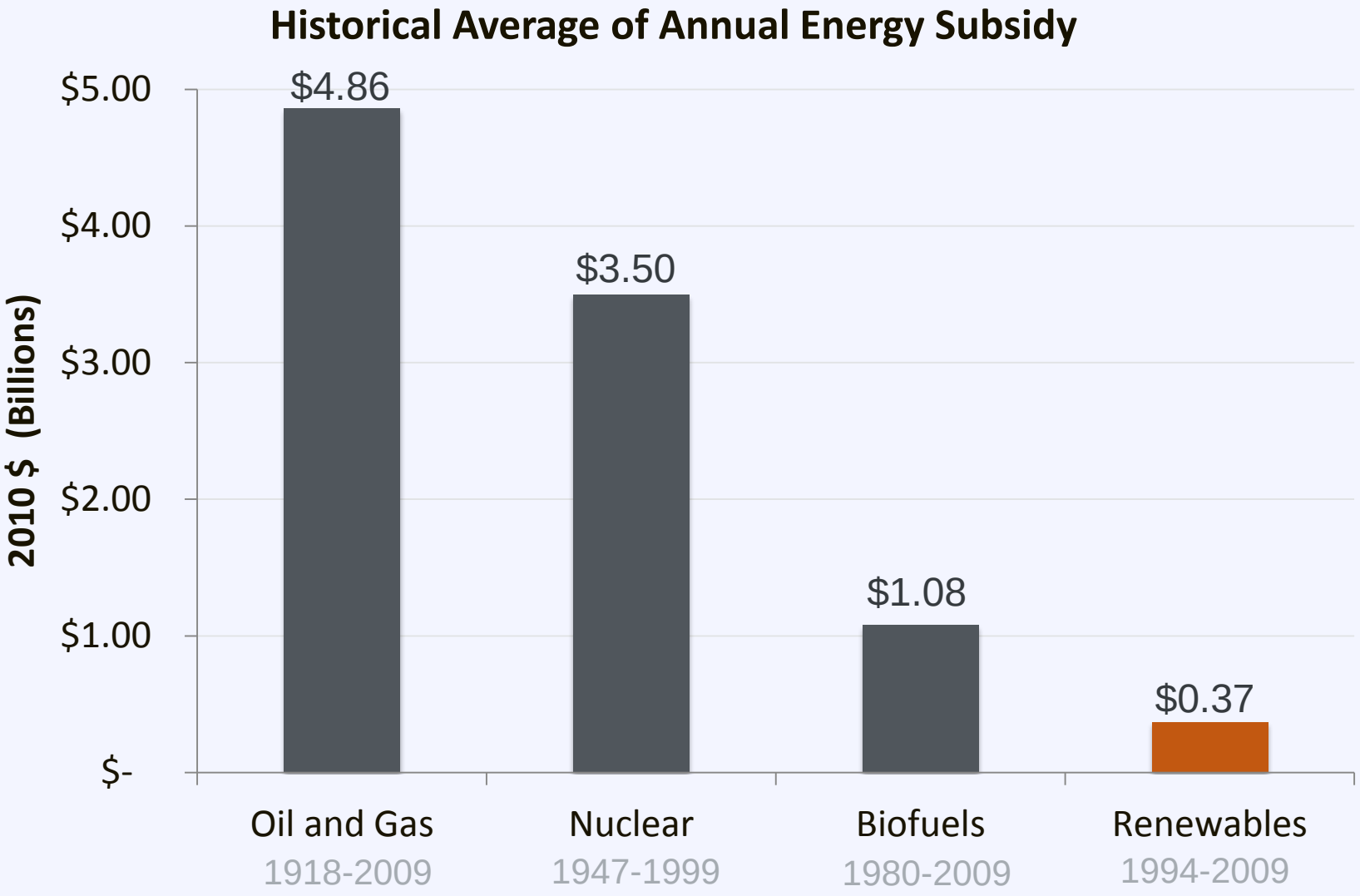
Fact: Solar is cost competitive

2020



Source: Bloomberg

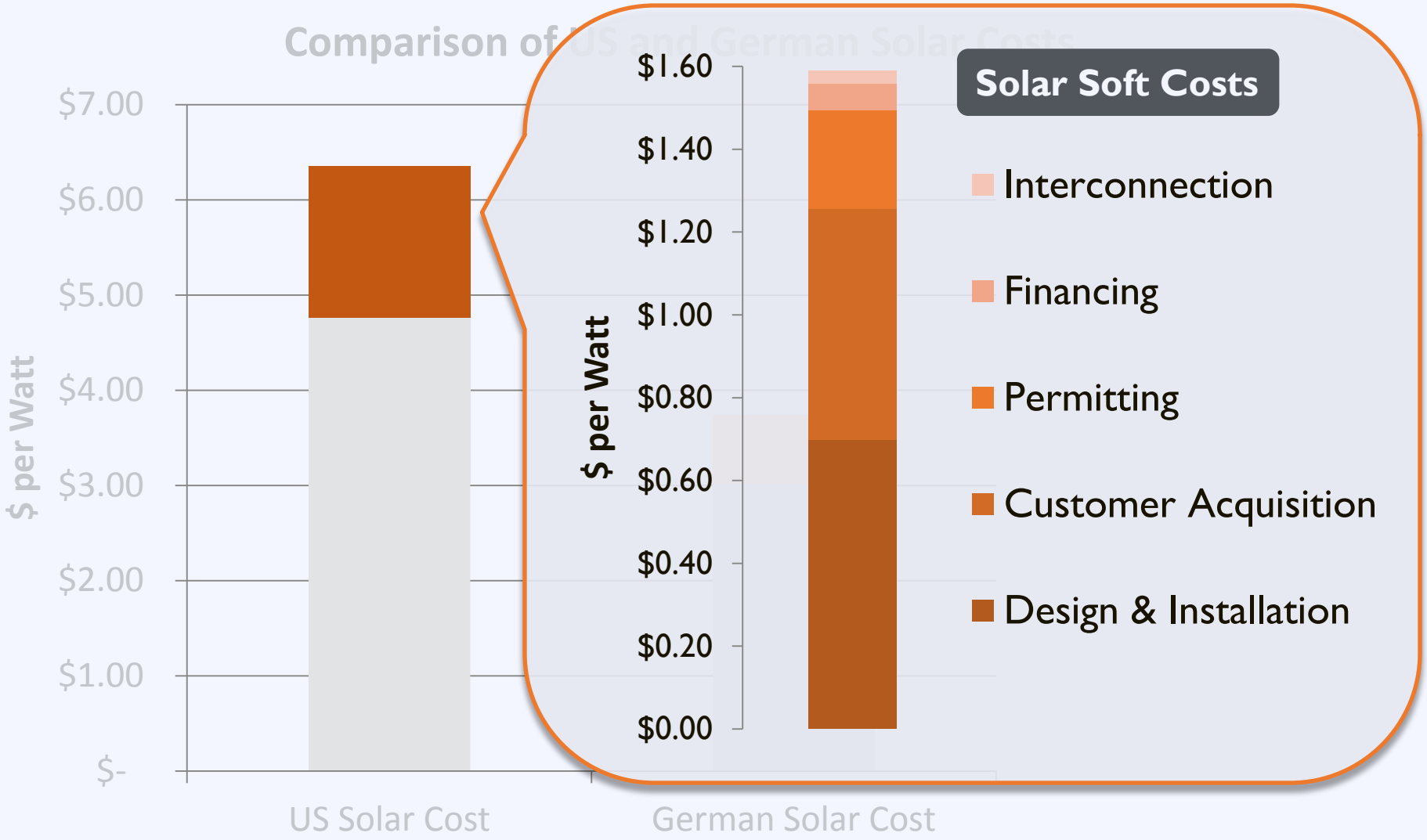
Fact: All energy is subsidized



Sources: DBL Investors

Powered by SunShot U.S. Department of Energy

Barriers Still Exist



Powered by SunShot U.S. Department of Energy

Source: NREL (http://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0599_full%20paper.pdf) (http://www.nrel.gov/docs/fy12osti/53347.pdf) (http://www.nrel.gov/docs/fy12osti/54689.pdf)

Q & A

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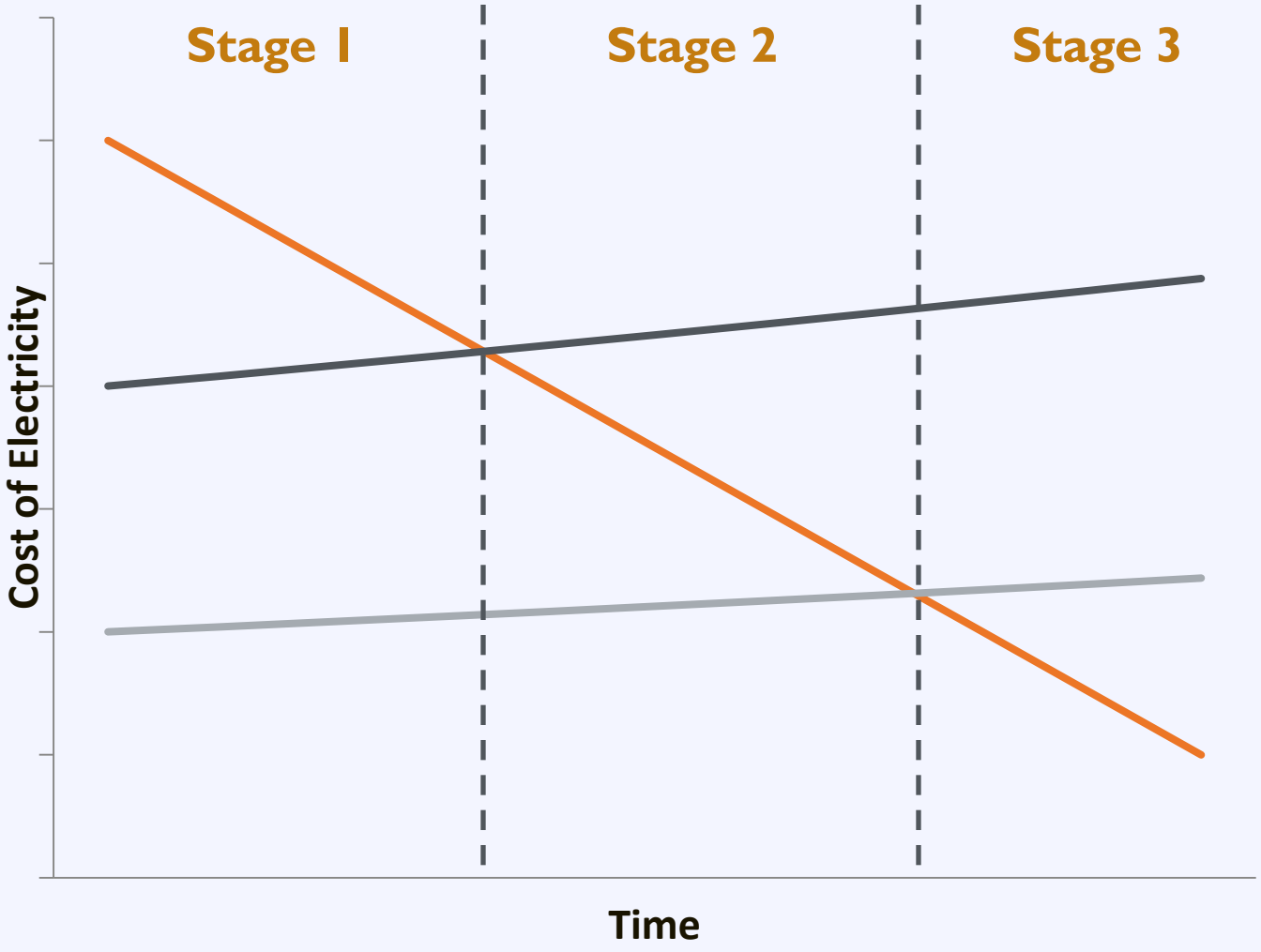
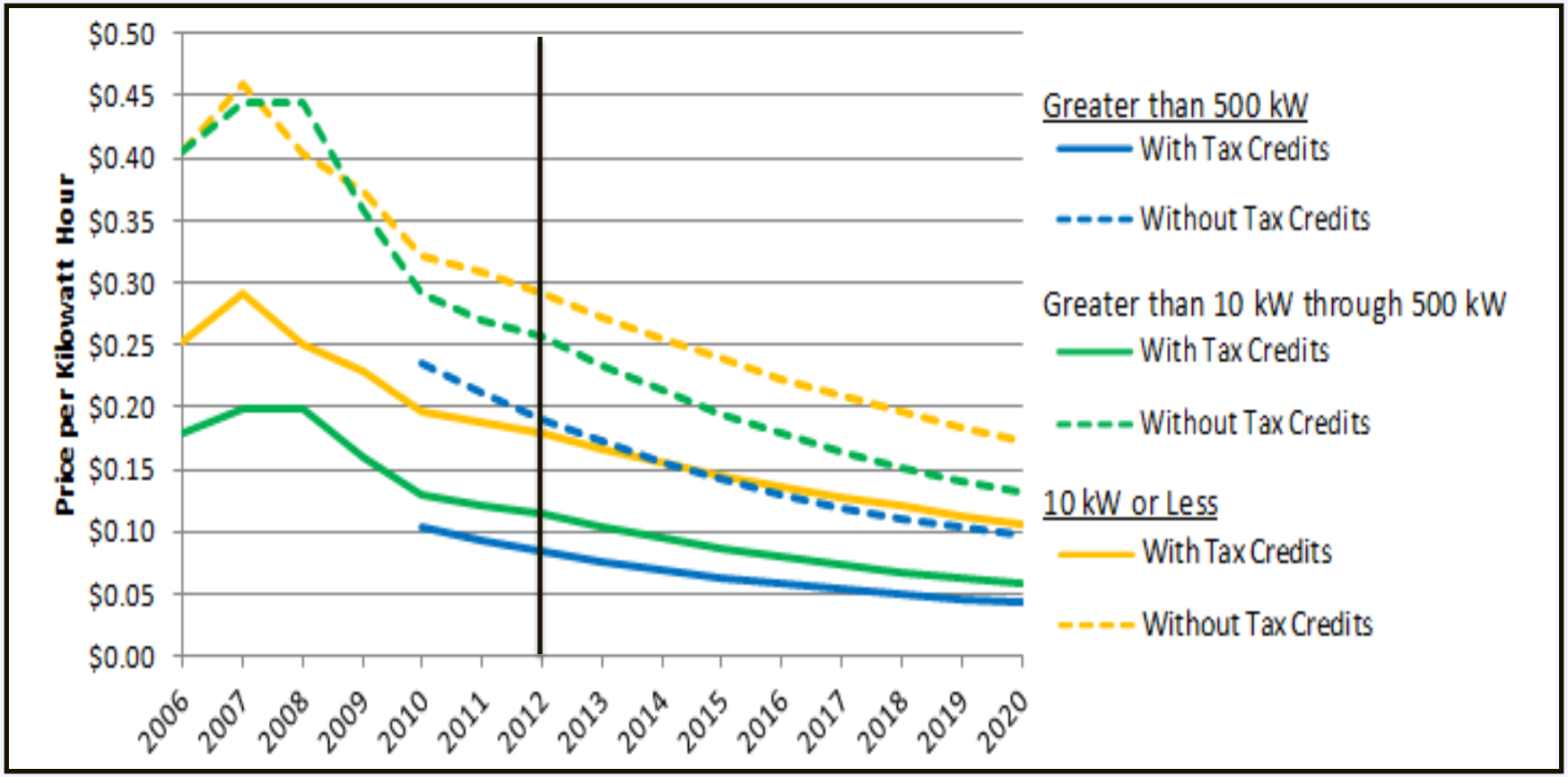
Utility Market Stages



Source: Solar Electric Power Association

Illustration: Where Are We?

Levelized Cost of Solar in North Carolina (20 Yr)



Source: NC Sustainable Energy Association

Electric Market Status (2010)

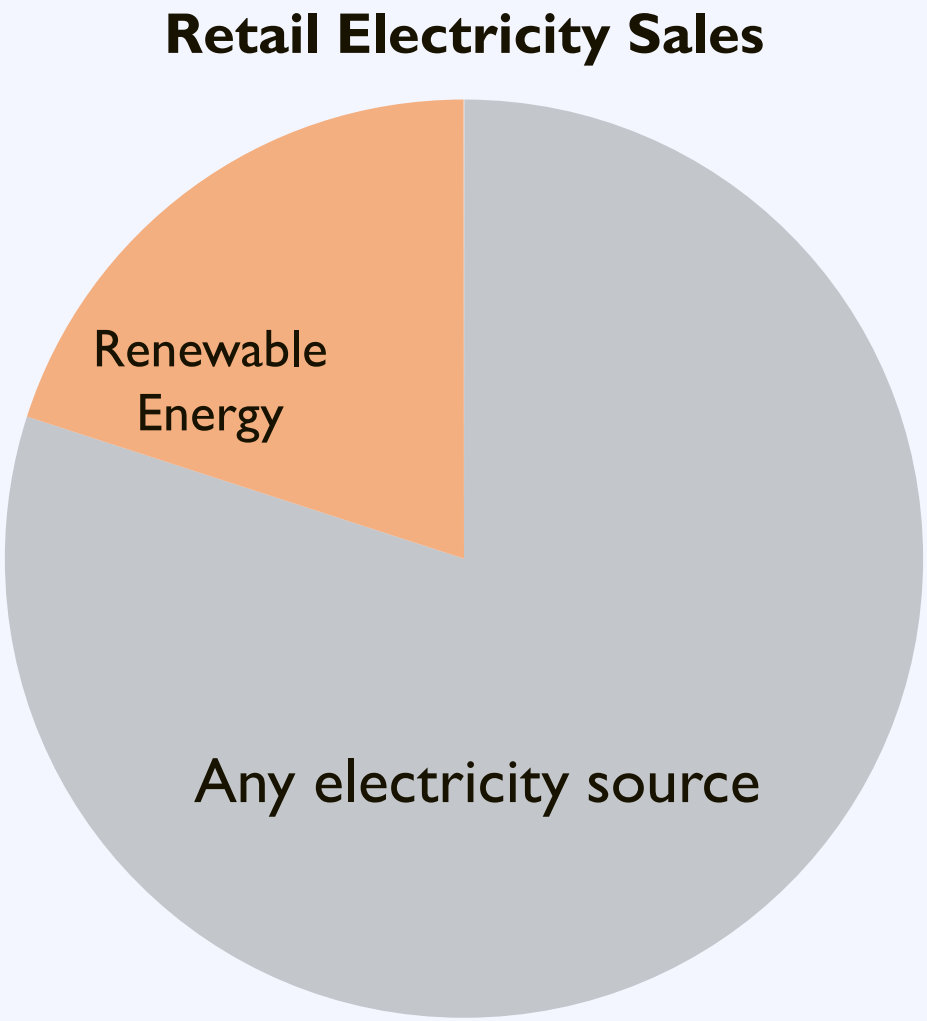
Retail Sales	Investor-Owned	Municipal	Rural Coops	TOTAL
South Carolina	62.4%	18.5%	19.2%	82.5 M MWh
North Carolina	74.2%	12.1%	13.7%	136.4 M MWh
Georgia	62.0%	8.6%	29.5%	140.7 M MWh

# Customers	Investor-Owned	Municipal	Rural Coops	TOTAL
South Carolina	56.4%	13.9%	29.7%	2,434,144
North Carolina	66.9%	12.1%	21.0%	4,841,173
Georgia	51.1%	7.3%	41.5%	4,615,805

Prices	Investor-Owned	Municipal	Rural Coops	Average
South Carolina	8.13¢/kWh	7.40¢/kWh	10.71¢/kWh	8.49¢/kWh
North Carolina	8.10¢/kWh	10.20¢/kWh	10.40¢/kWh	8.67¢/kWh
Georgia	8.61¢/kWh	8.41¢/kWh	9.55¢/kWh	8.87¢/kWh

Source: US Energy Information Administration

Renewable Portfolio Standard



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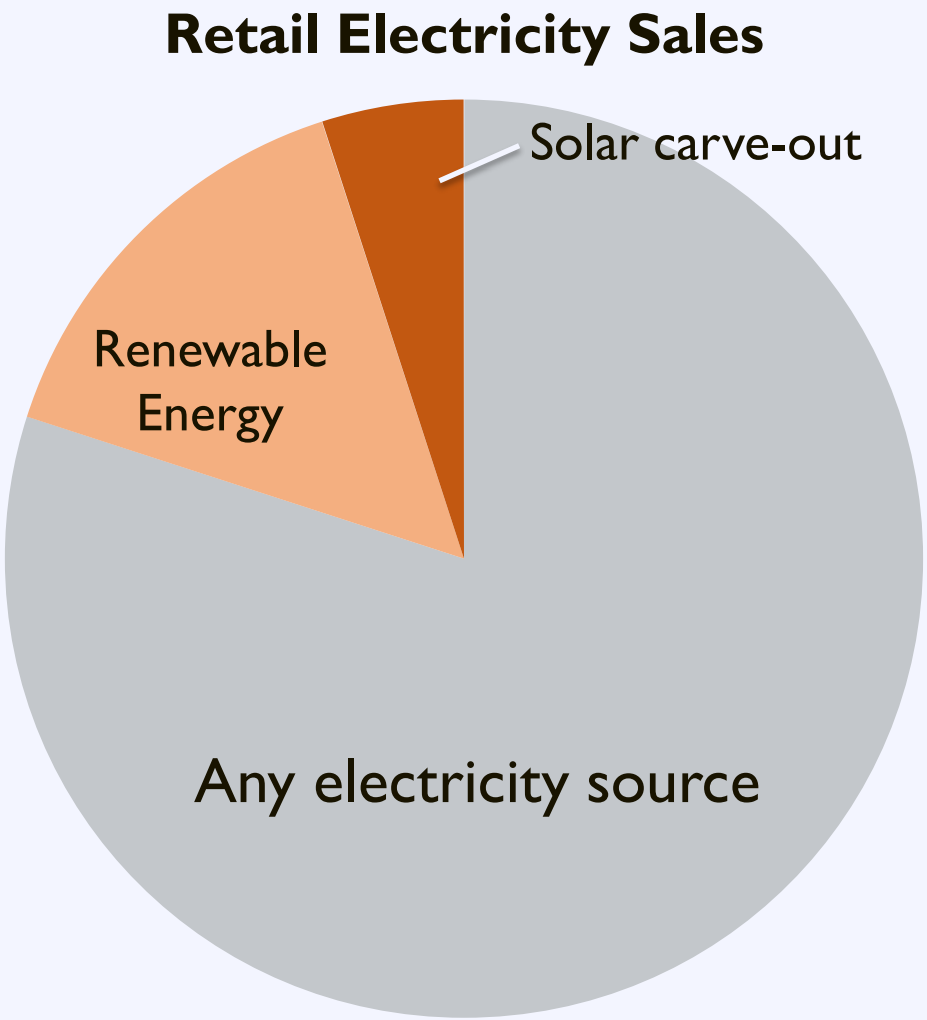
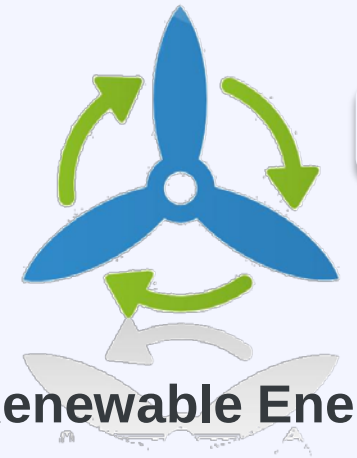


Renewable Portfolio Standard

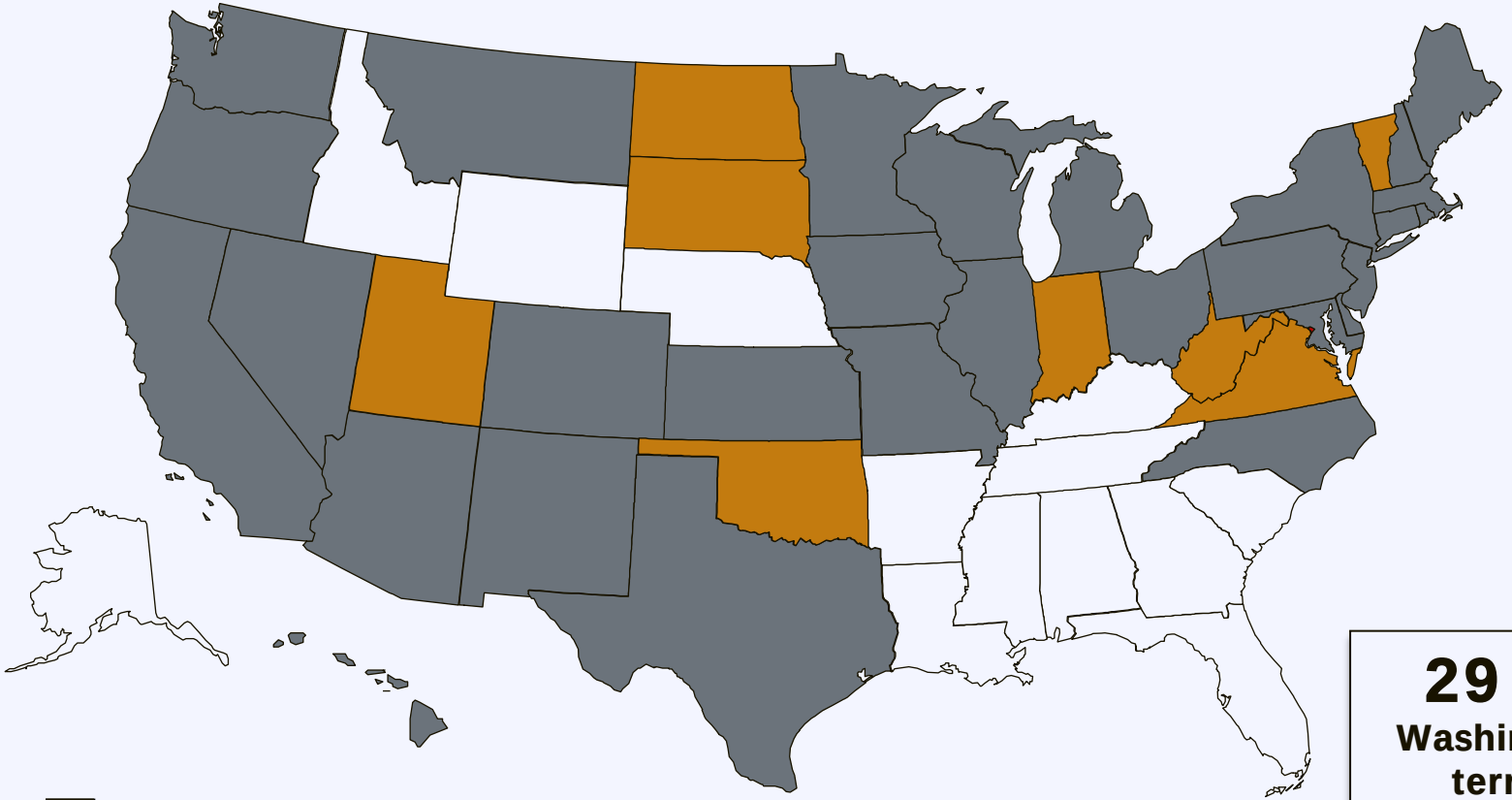


Two revenue streams

e- REC

Renewable Portfolio Standard

www.dsireusa.org / August 2012



29 states +
Washington DC and 2 territories have Renewable Portfolio Standards
(8 states and 2 territories have renewable portfolio goals)

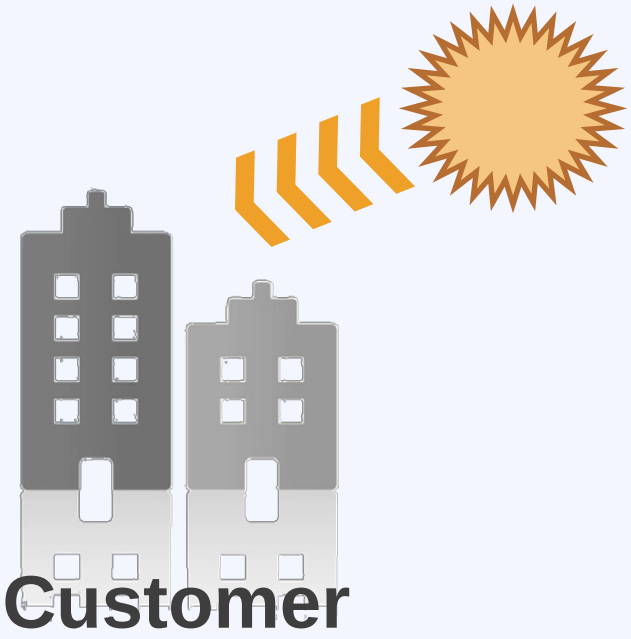
Powered by SunShot
U.S. Department of Energy

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

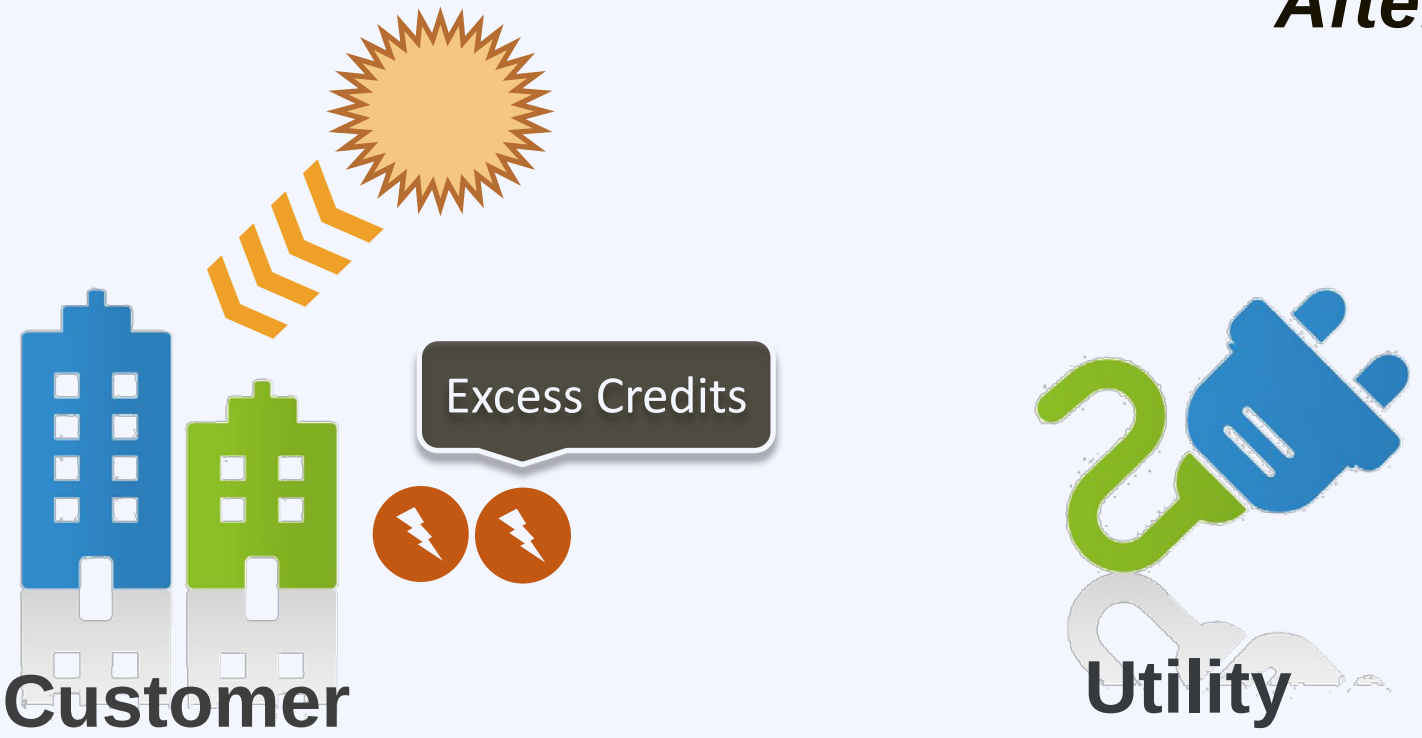
Net Metering: Overview

Morning



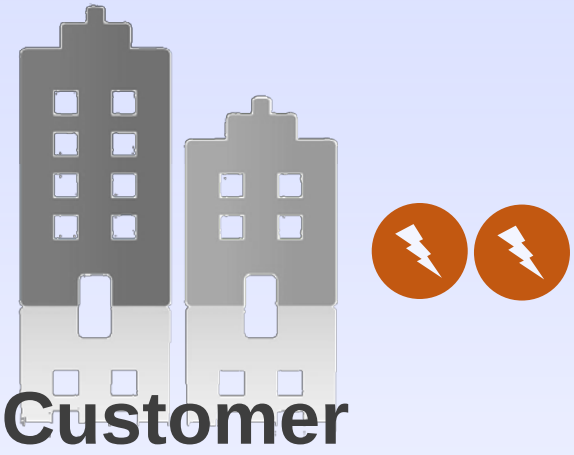
Net Metering: Overview

Afternoon



Net Metering: Overview

Night



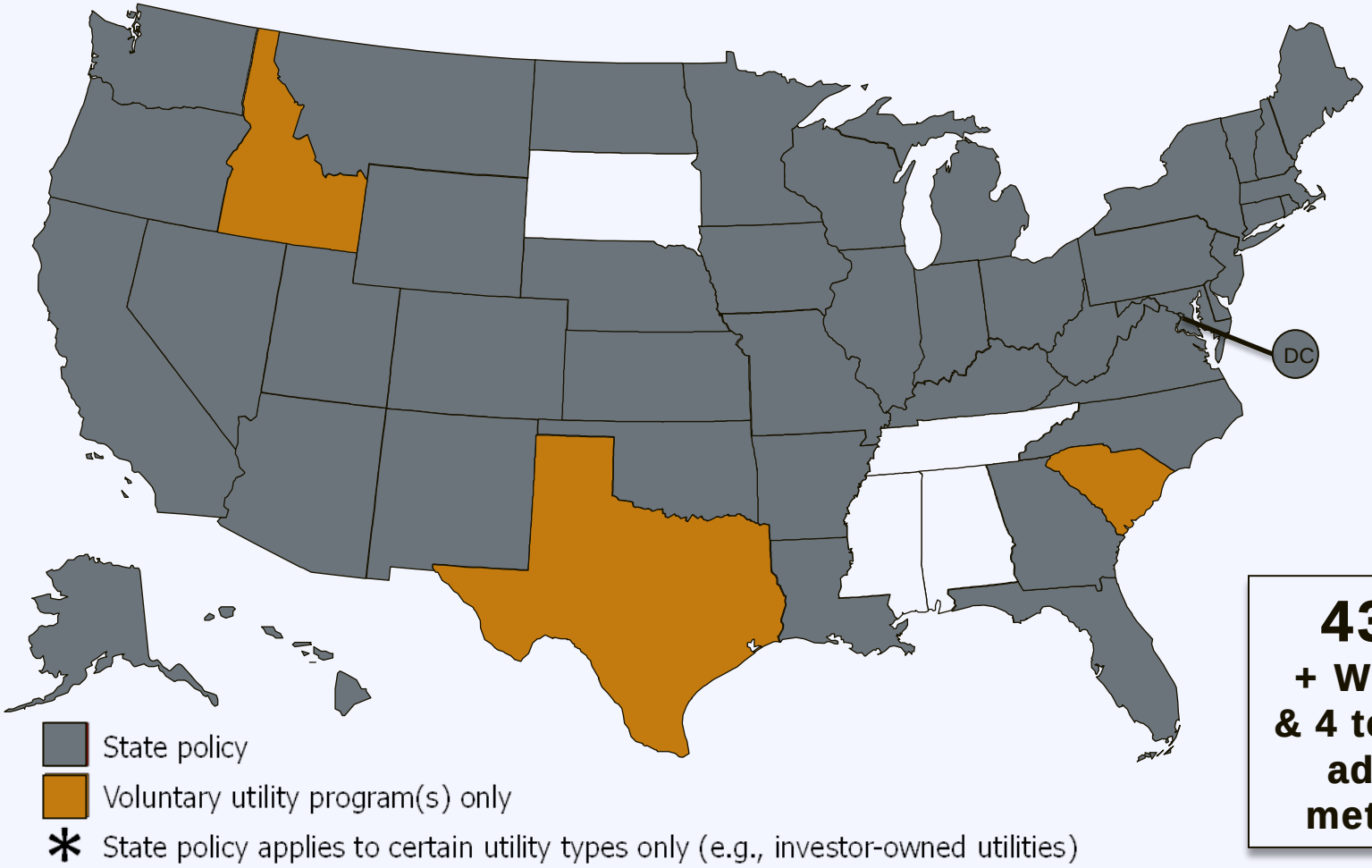
Customer

Utility

Solar can cover 100% of the customer's load - even at night

Net Metering: State Policies

www.dsireusa.org / August 2012



43 states
+ Washington DC & 4 territories have adopted a net metering policy

Note: Numbers indicate individual system capacity limit in kilowatts. Some limits vary by customer type, technology and/or application. Other limits might also apply. This map generally does not address statutory changes until administrative rules have been adopted to implement such changes.

Powered by SunShot
U.S. Department of Energy

Net Metering: Market Share

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

Powered by SunShot U.S. Department of Energy

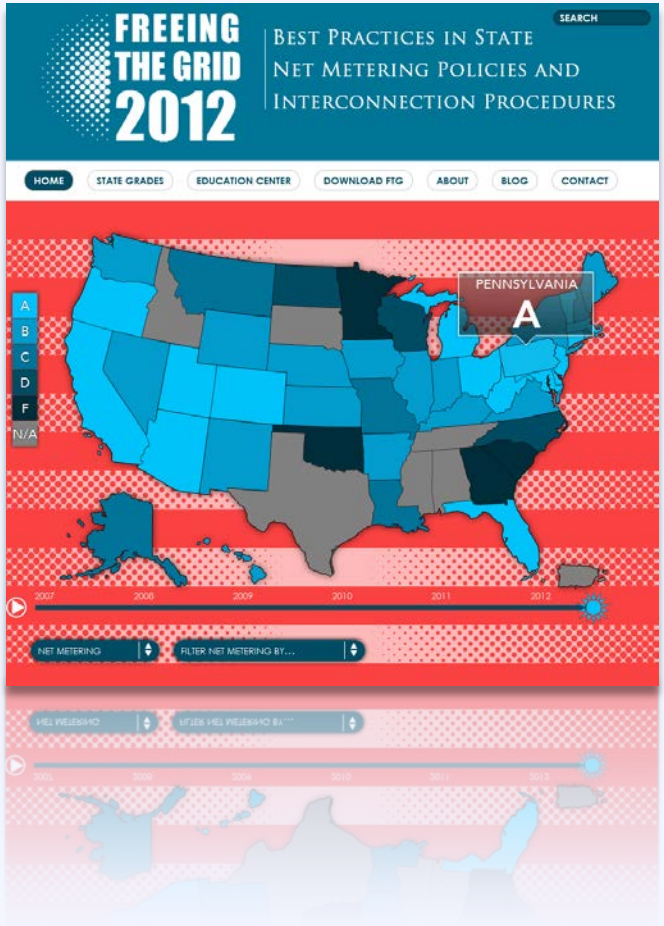
Source: IREC (http://www.irecusa.org/wp-content/uploads/IRECSolarMarketTrends-2012-web.pdf)

Net Metering: Resources

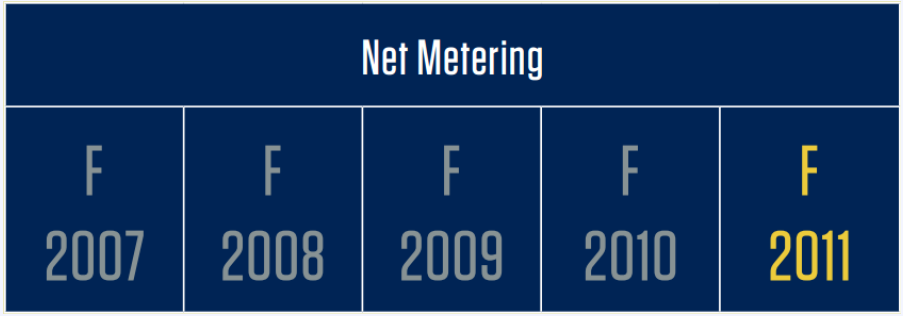
Resource **Freeing the Grid**

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

http://freeingthegrid.org/



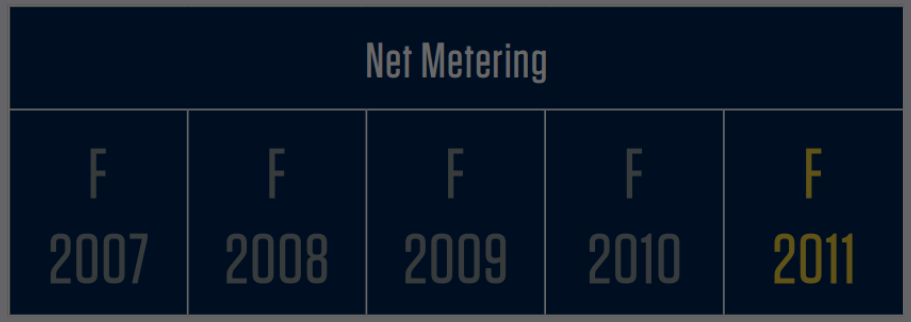
Net Metering: Georgia



Eligible Renewable/ Other Technologies:	Net Metering
Applicable Sectors:	Photovoltaics, Wind, Fuel Cells
Applicable Utilities:	Commercial, Industrial, Residential
System Capacity Limit:	All utilities
Aggregate Capacity Limit:	100 kW non-residential; 10 kW residential
Net Excess Generation:	0.2% of utility's peak demand during previous year
REC Ownership:	Credited to customer's next bill at a predetermined rate filed with the commission
Meter Aggregation:	Not addressed

Source: Freeing the Grid

Net Metering: Georgia



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Powered by SunShot U.S. Department of Energy

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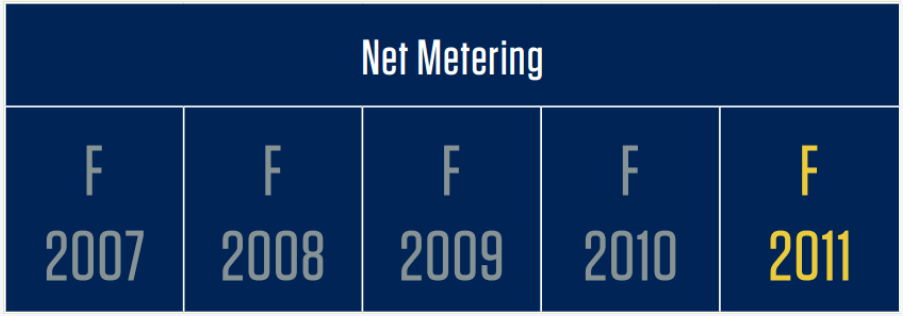

Recommendations:

- Remove system size limitations
- Increase program capacity to at least 5% of a utilities peak demand
- Adopt safe harbor language to protect customer-sited generators from extra and/or unanticipated fees

Eligible Renewable/ Other Technologies:	Net Metering
Applicable Sectors:	Photovoltaics, Wind, Fuel Cells
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Powered by SunShot U.S. Department of Energy

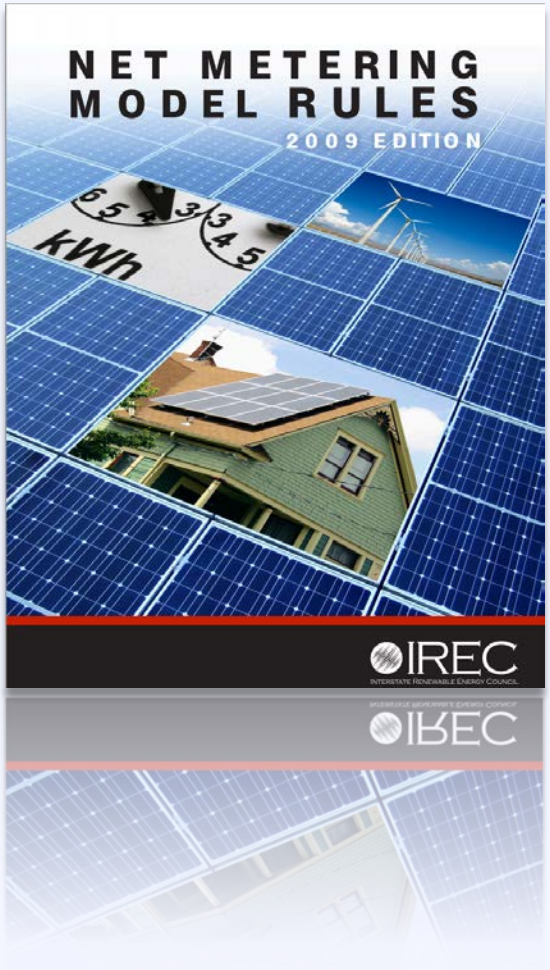
Source: Freeing the Grid

Net Metering: Resources

Resource **Interstate Renewable Energy Council**

IREC developed its model rules in an effort to capture best practices in state net metering policies.

www.irecusa.org



Interconnection

5,000+ utilities

with unique interconnection procedures

Powered by SunShot
U.S. Department of Energy

Source: NREL (http://www.nrel.gov/docs/fy12osti/54689.pdf

Interconnection: Background

2000: NREL finds that interconnection is a significant barrier to customer sited DG

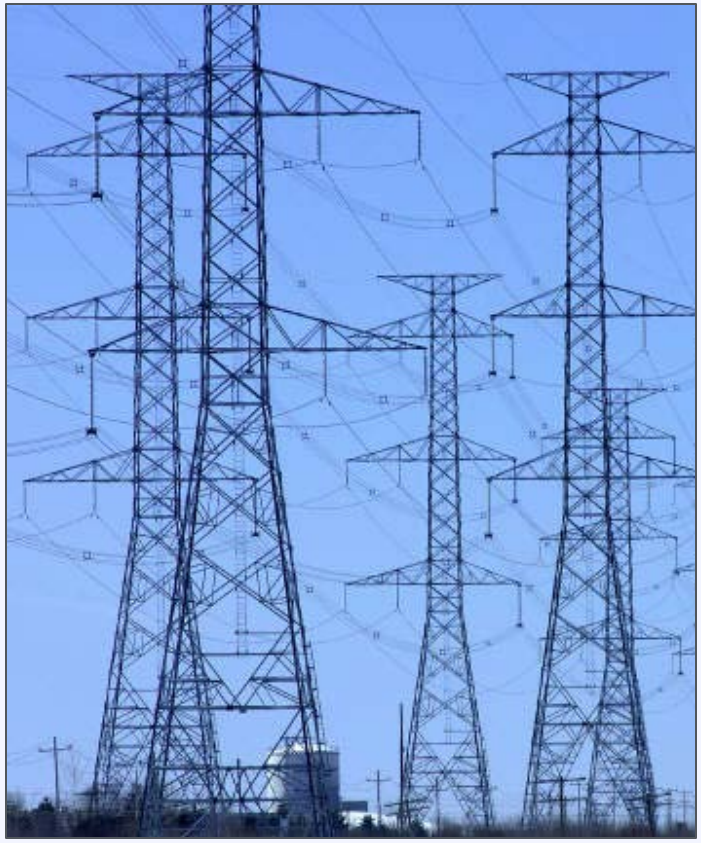
2005: Congress requires state regulator authorities to consider an interconnection standard (IEEE 1547)

2012: 43 States & DC have adopted interconnection standards

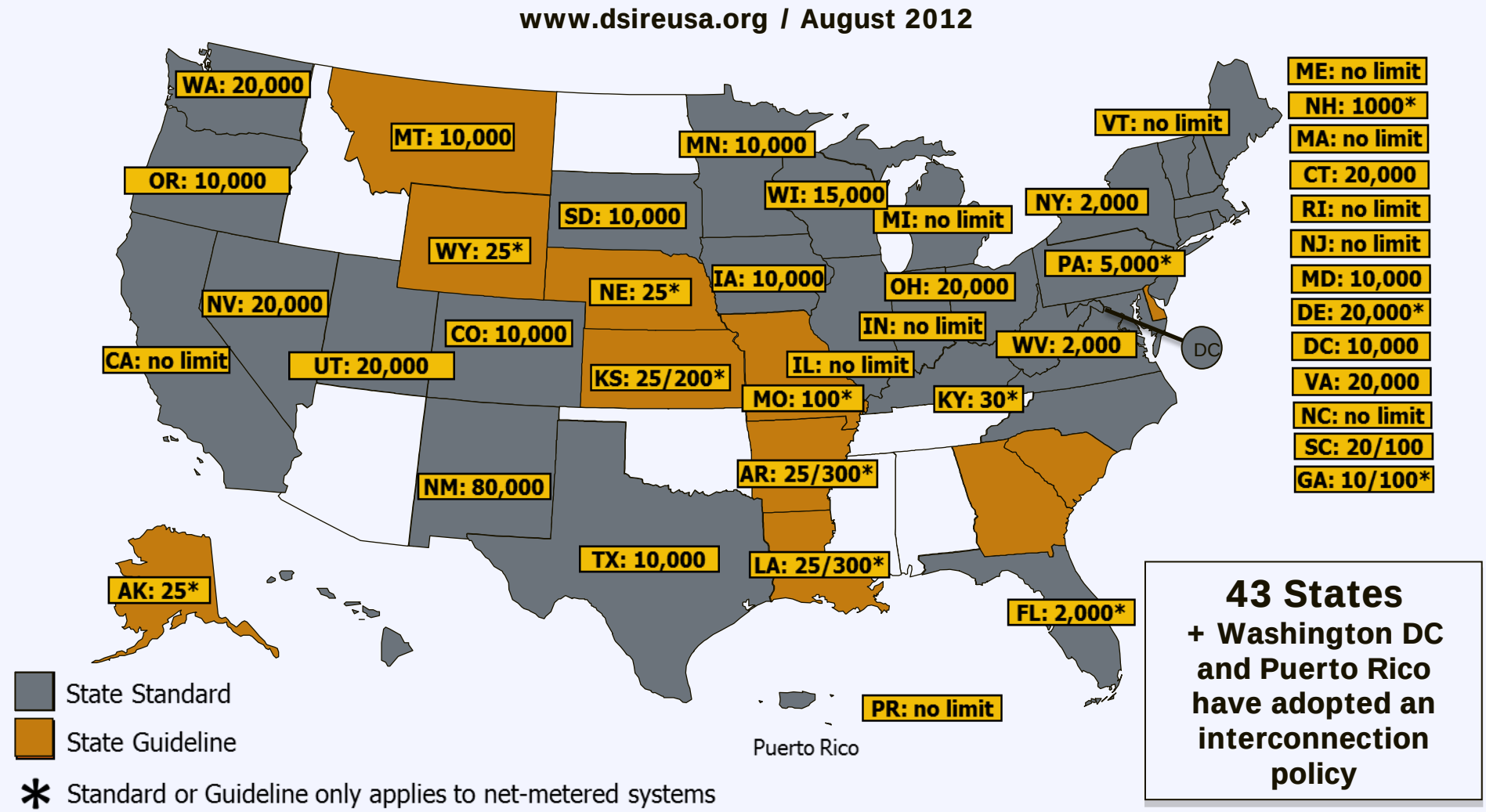
- CA Rule 21
- FERC SGIP
- MADRI Procedures
- IREC Procedures

Interconnection: Best Practices

1. Use standard forms and agreements
2. Implement expedited process
3. Implement simplified procedure for small solar arrays



Interconnection: State Policies



Notes: Numbers indicate system capacity limit in kW. Some state limits vary by customer type (e.g., residential versus non-residential). "No limit" means that there is no stated maximum size for individual systems. Other limits may apply. Generally, state interconnection standards apply only to investor-owned utilities.

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Interconnection: Georgia

Interconnection				
F 2007	F 2008	F 2009	– 2010	– 2011

Recommendations:

- Adopt IREC's model interconnection procedures

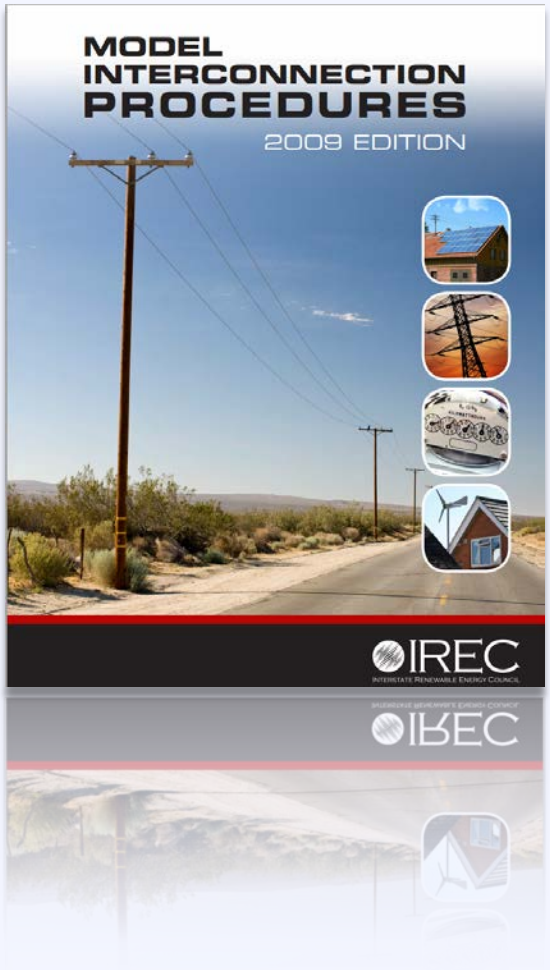
Eligible Renewable/Other Technologies:	–
Applicable Sectors:	–
Applicable Utilities:	–
System Capacity Limit:	–
Standard Agreement:	–
Insurance Requirements:	–
External Disconnect Switch:	–
Net Metering Required:	–

Interconnection: Resources

Resource **Interstate Renewable Energy Council**

IREC developed model interconnection procedures in an effort to capture emerging best practices in this vital area.

www.irecusa.org



Q & A

Agenda

08:50 – 09:10	Solar 101
09:10 – 09:40	Planning and Zoning for Solar
09:40 – 09:50	*Break*
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Understanding Solar Financing

Direct Incentives	Income Tax Credits	Rebates	PBIs/FITs
Financing	3rd Party Ownership	PACE	QECBs
Other Incentives	Property & Sales Taxes		

Comparison: PV Financial Incentives

North Carolina		
-	Rebates	-
-	State Grants	-
-	State Loans	-
-	PACE Financing	-
✓	Prod. Incentives	Duke, Progress, TVA, NC Greenpower
✓	Corp. Tax Credits	35% up to $2.5 million
✓	Pers. Tax Credits	35% up to $10,500
✓	Prop. Tax Incentives	80% abatement, R basically exempt

Georgia		
✓	Rebates	5 EMCs (R);TVA
-	State Grants	-
✓	State Loans	$500 – $35,000 (C, AG)
-	PACE Financing	-
✓	Prod. Incentives	GA Power, TVA
✓	Corp. Tax Credits	35% up to $500,000
✓	Pers. Tax Credits	35% up to $10,500
-	Prop. Tax Incentives	-

Understanding Solar Financing

Direct Incentives	Income Tax Credits	Rebates	PBIs/FITs
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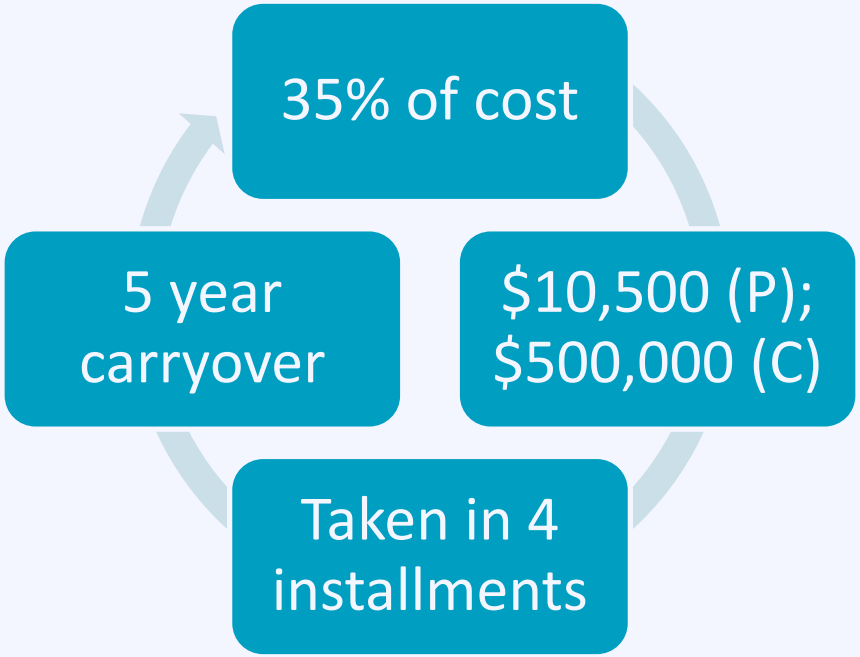
Tax Credits

Federal Tax Credits: 30% of cost for businesses and personal income tax payers, through 2016.

State Tax Credits (Personal and Corporate)



Solar Rebates in Georgia

- 5 EMCs (Cobb, Central GA, Greystone, Jackson, Sawnee)
- Residential only
- 10 kW or less
- $450/W (AC) up to $4,500

PBIs in Georgia

Georgia Power Solar Buyback:

Up to 25 kW or 100 kW; $0.17/kWh; 5 yr. contract; fully subscribed currently

TVA Generation Partners:

Up to 50 kW; $1,000 + $0.12/kWh above retail; 10-yr. contract; 1 munis + 3 coops

TVA Mid-Size Program Standard Offer:

50 kW – 20 MW; variable seasonal/TOD rates from $0.038/kWh - $0.16/kWh (3% escalation); 10 to 20-yr. contract

Understanding Solar Financing

Direct Incentives	Income Tax Credits	Rebates	PBIs/FITs
Financing	3rd Party Ownership	PACE	QECBs
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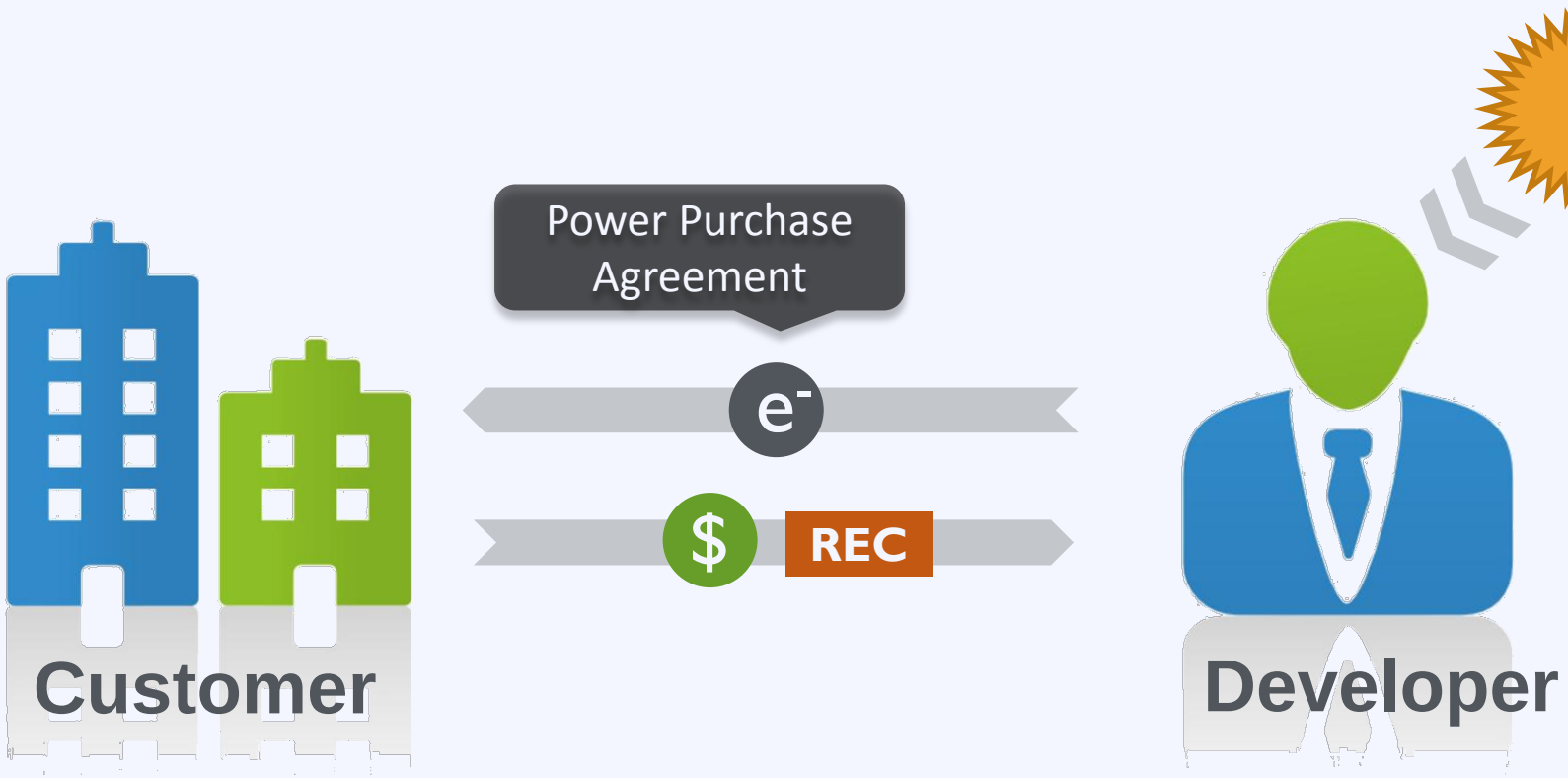
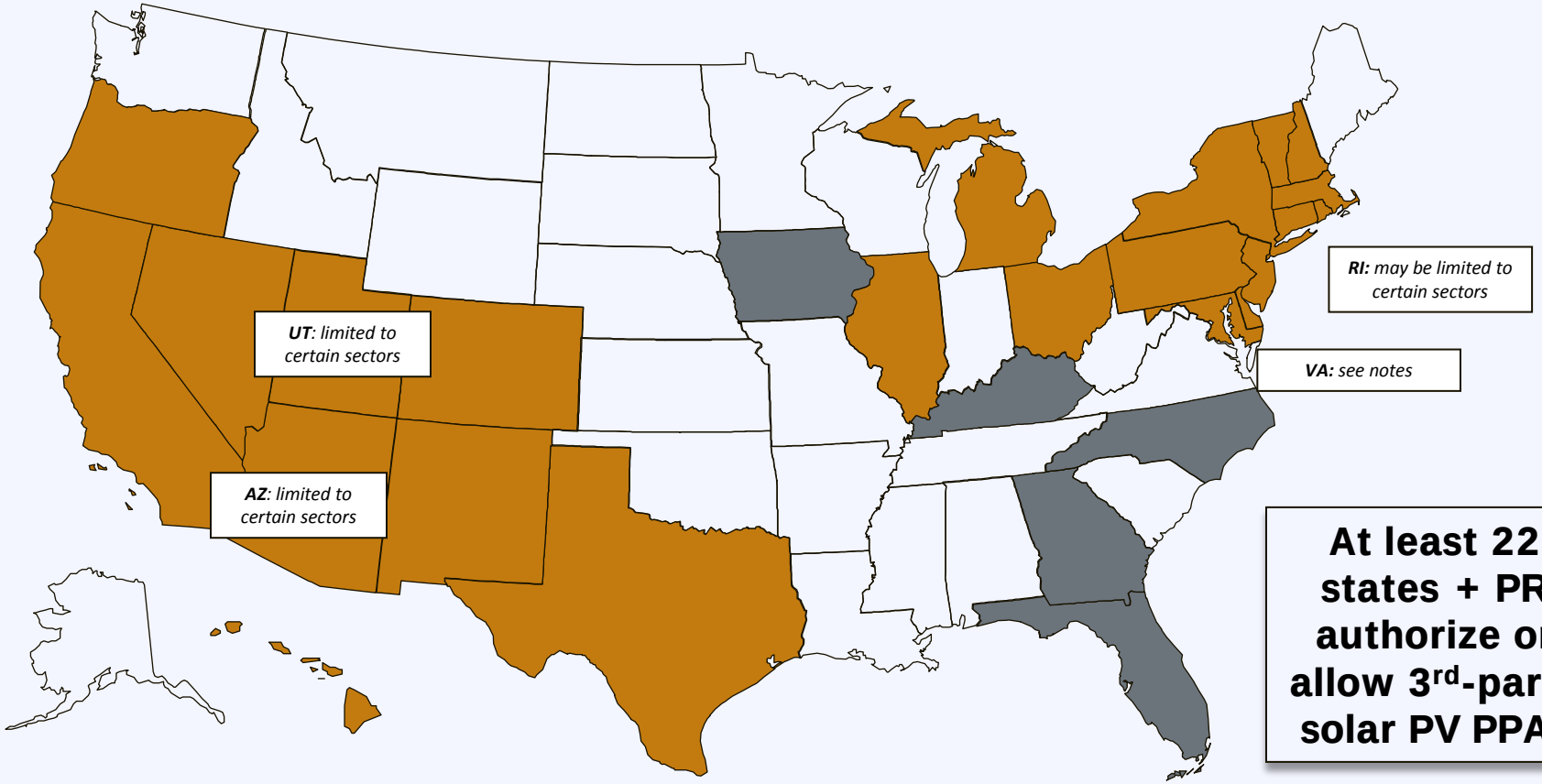
Third Party Ownership



3rd-Party Solar PV Power Purchase Agreements (PPAs)

www.dsireusa.org / August 2012



Authorized by state or otherwise currently in use, at least in certain jurisdictions within in the state

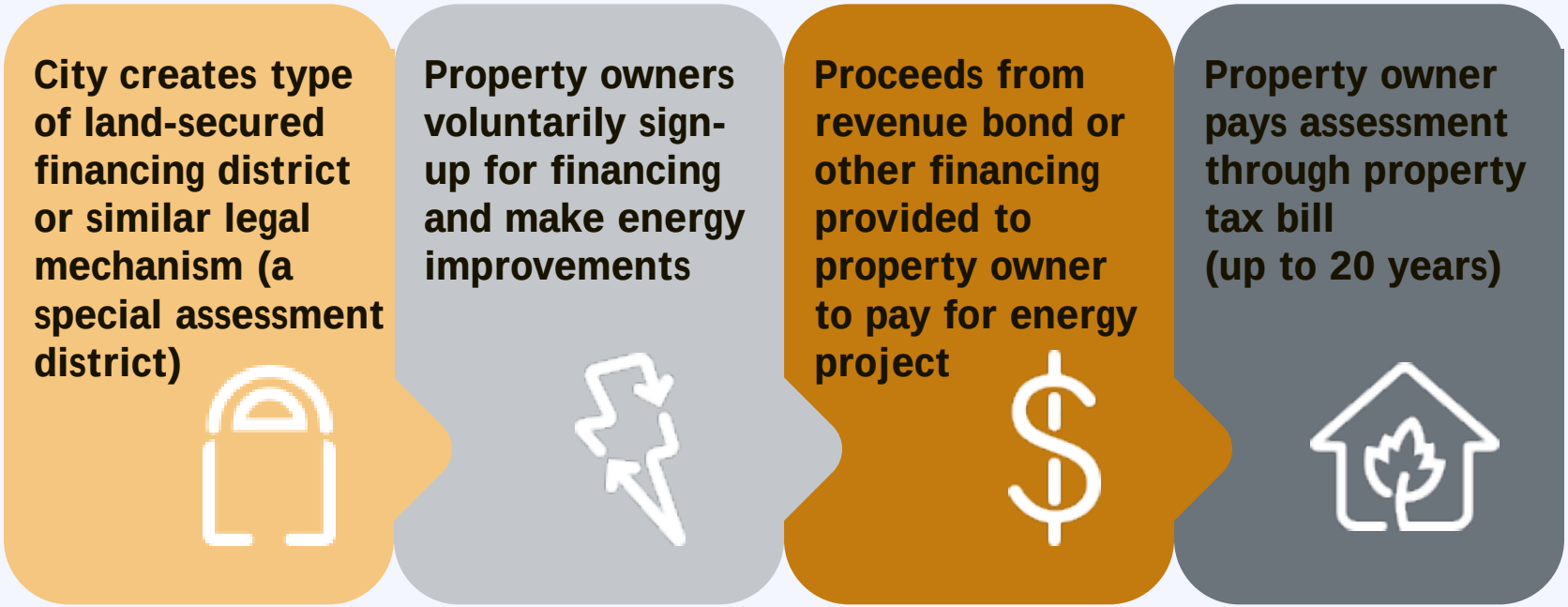
Apparently disallowed by state or otherwise restricted by legal barriers

Status unclear or unknown

Note: This map is intended to serve as an unofficial guide; it does not constitute legal advice. Seek qualified legal expertise before making binding financial decisions related to a 3rd-party PPA. See following slides for additional important information and authority references.

Property Assessed Clean Energy

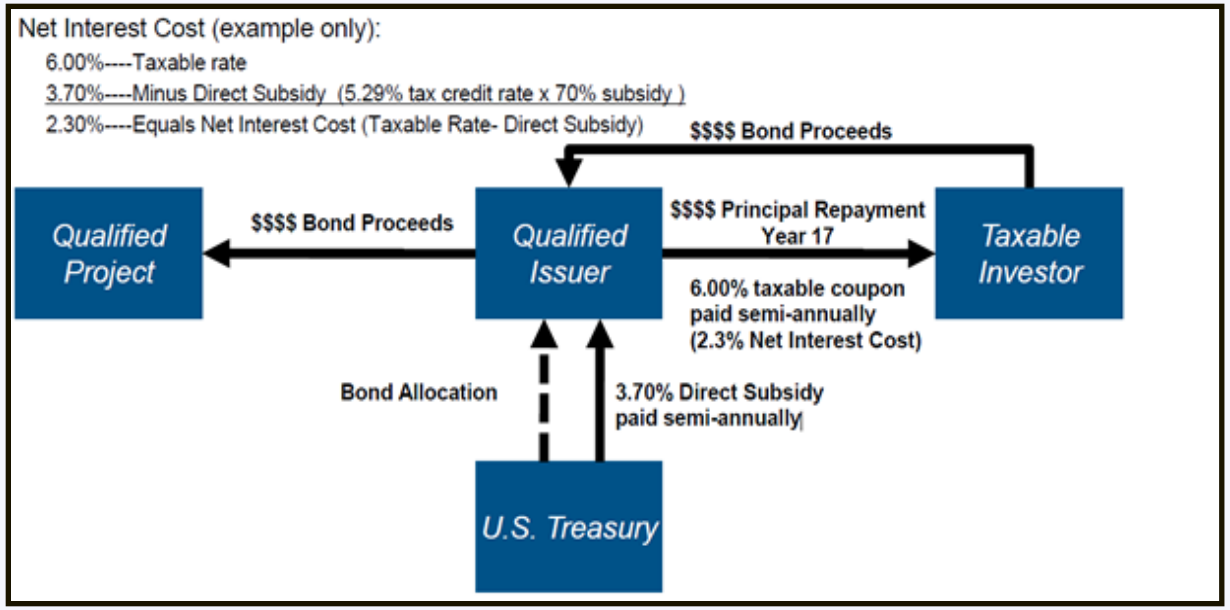
First Step: State authorization for local governments



Qualified Energy Conservation Bonds

- What?
  - Tax credit or direct payment subsidy
- Why?
  - Subsidy lowers the effective cost of capital
- Relevance for Solar?
  - Financing public facilities (numerous)
  - "Green Community" programs (a few)
- How?
  - State allocation or automatic allocation

Qualified Energy Conservation Bonds



Local Examples:

- Fulton County: Purpose??
- State application process ended March 2011 ($~37 million available)

Understanding Solar Financing

Direct Incentives	Income Tax Credits	Rebates	PBIs/FITs
Financing	3rd Party Ownership	PACE	QECBs
Other Incentives	Property & Sales Taxes		

Property & Sales Tax Exemptions

- No sales tax exemptions currently in place
- 4% state sales tax + up to 2-3% county taxes + 1% in Atlanta

Property Taxes????

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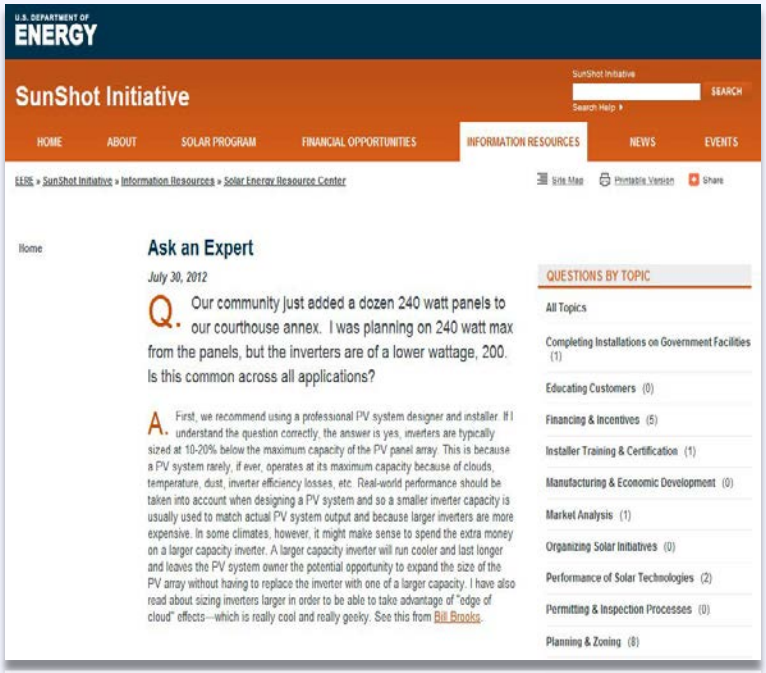
Activity: Next Steps

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

About the SunShot Solar Outreach Partnership

Technical Support

- 'Ask an Expert' Live Web Forums
- 'Ask an Expert' Web Portal
- Peer Exchange Facilitation
- In-Depth Consultations
- Customized Trainings



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

For more information email: solar-usa@iclei.org

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Q & A

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Net Metering: Virtual

No direct connection necessary

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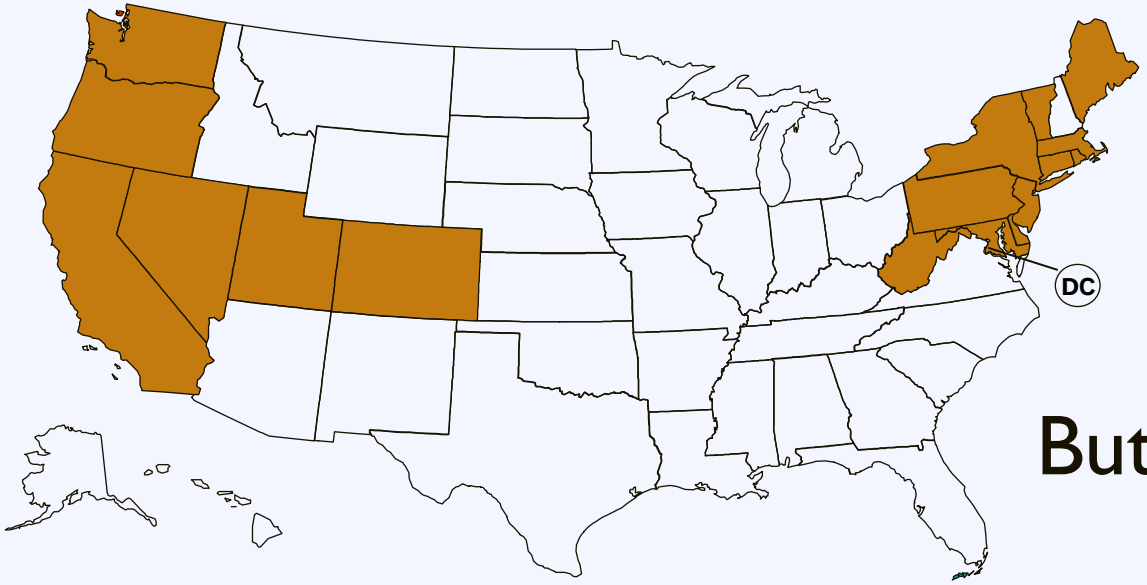
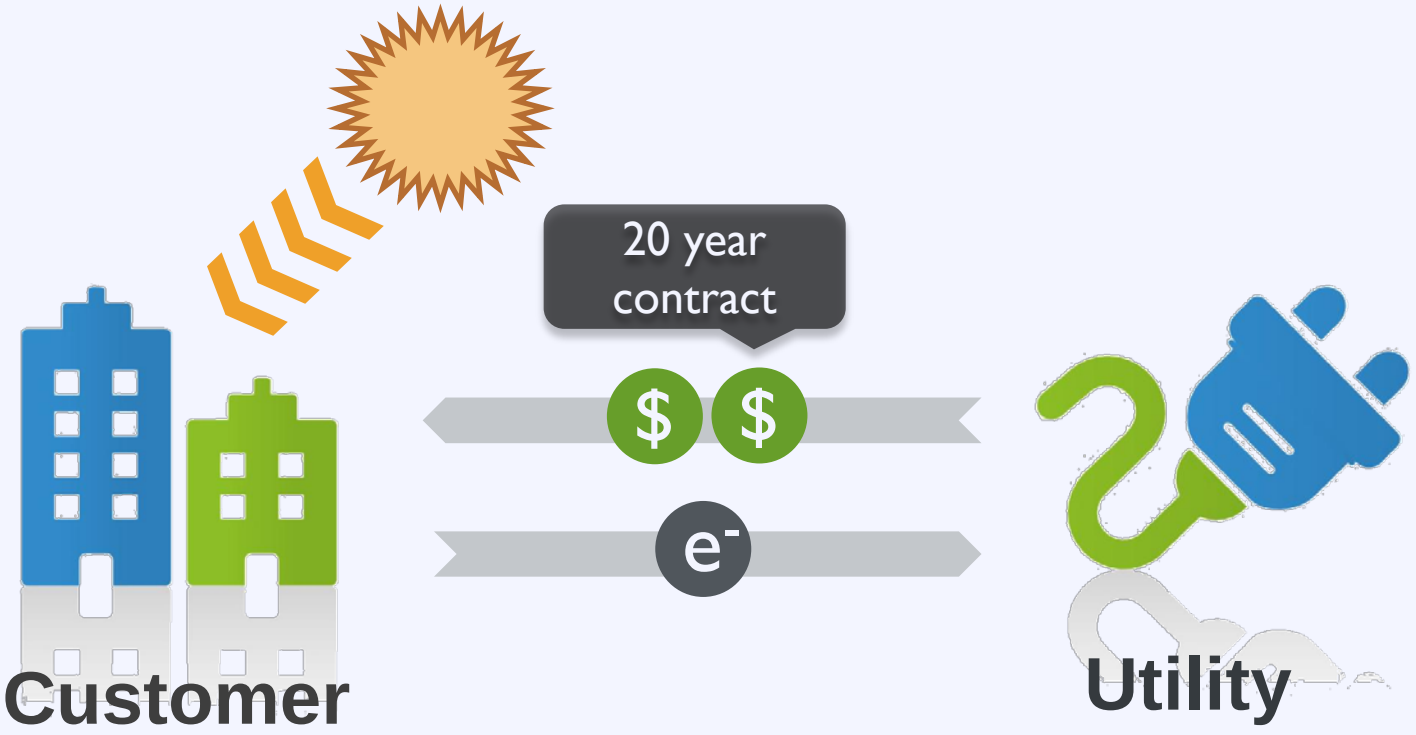
Net Metering: Meter Aggregation



But…It's complicated

- Ownership requirements
- Contiguous vs. non-contiguous properties
- Multiple customers
- Multiple generators
- Modified system/aggregate system size limits
- Rollover rates
- Distance limitations
- Number of accounts
- How to address accounts on different tariffs

What is a Feed in Tariff?



Components of a Feed in Tariff

- Fixed price payment
- Long term contract
- Guaranteed power purchase
- Price based on generation cost

Financing: Sponsored Loans

- Limited options in both Missouri and Kansas
- Local governments and utilities can develop loan programs:
  - direct loans (e.g., revolving loan fund)
  - loans through private lenders (e.g., credit enhancement)
- Benefits and drawbacks exist for both approaches
- The goal is to increase ***access*** to financing or induce ***additional*** improvements
- Various funding options exist