Solar Powering Your Community

Addressing Soft Costs and Barriers

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SunShot Solar Outreach Partnership: 2013-16

ICMA
Leaders at the Core of Better Communities

APA
American Planning Association
Making Great Communities Happen

NARC
Building Regional Communities
National Association of Regional Councils

ICLEI
Local Governments for Sustainability USA

IREC
Interstate Renewable Energy Council

MEISTER
CONSULTANTS GROUP

NC CLEAN ENERGY TECHNOLOGY CENTER
Formerly the NC Solar Center

The SOLAR FOUNDATION

SEPA
solar electric power association

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.

SunShot Solar Outreach Partnership: 2013-16

- 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

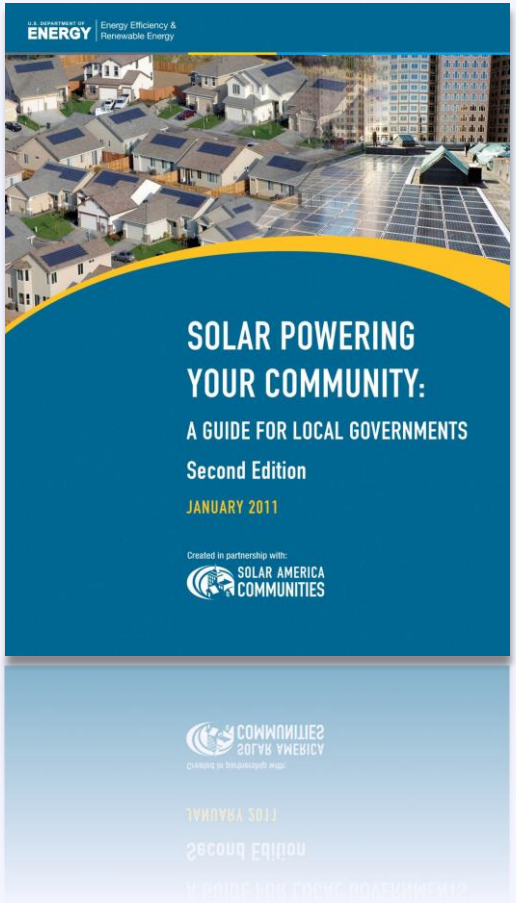
Workshop Goal

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

Technical Resources

Resource **Solar Powering Your Community Guide**

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



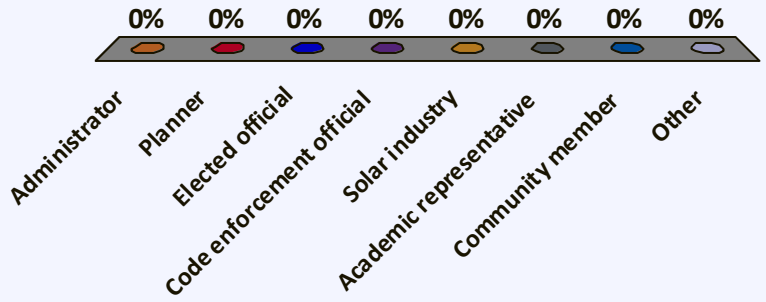
www.energy.gov

www.solaroutreach.org

We want to get to know you better

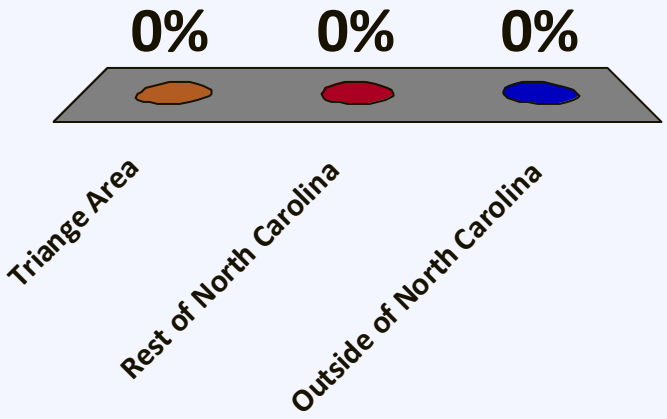
Who are you?

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



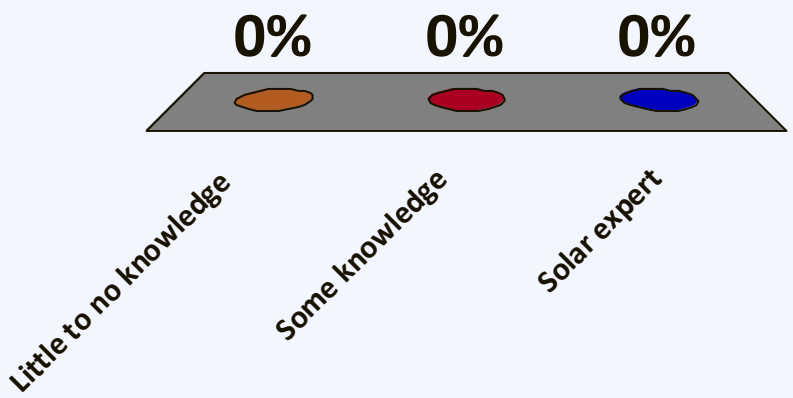
Where are you coming from?

A. Huntsville Area
B. The rest of Alabama
C. Outside of Alabama



How familiar are you with solar?

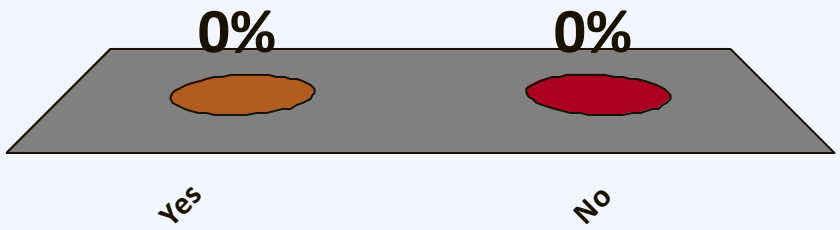
A. Little to no knowledge
B. Some knowledge
C. Solar expert



Do you have solar on your home?

A. Yes

B. No



If you do have solar on your home:

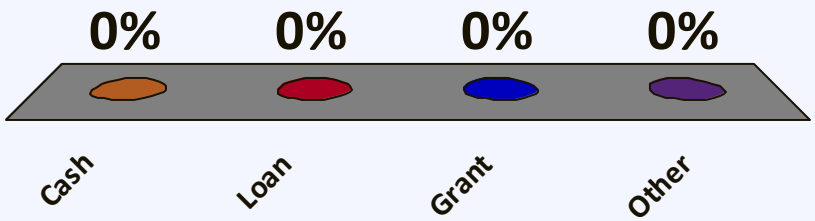
How did you finance it?

A. Cash

B. Loan

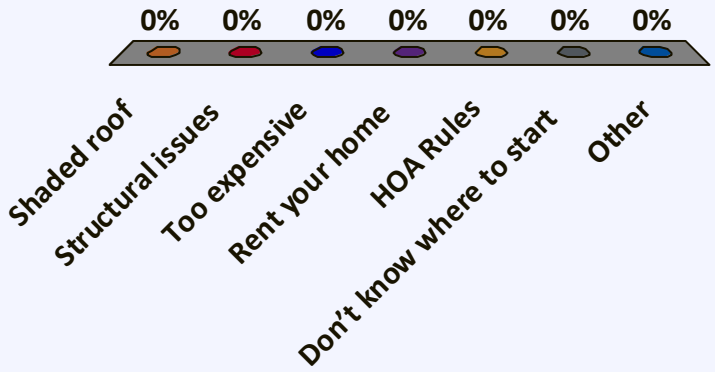
C. Grant

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

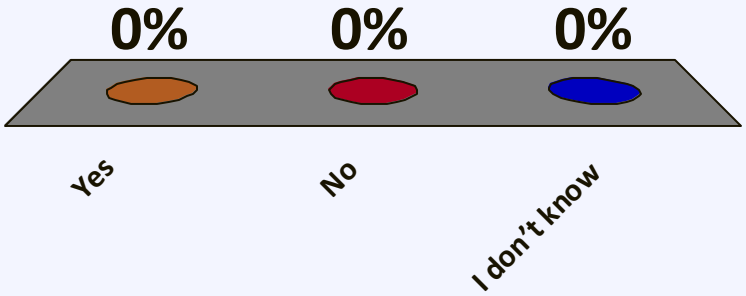


Does your local government have solar on public properties?

A. Yes

B. No

C. I don't know



What are your goals from today's session?

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Agenda

10:20 – 10:50	Putting Solar Energy on the Local Policy Agenda
10:50 – 11:20	State of the Local Solar Market
11:20 – 11:50	Federal, State, and Utility Policy Drivers
11:50 – 12:15	*Break and Lunch*
12:15 – 12:45	Planning for Solar: Getting Your Community Solar Ready
12:45 – 1:20	Solar Market Development Tools
1:20 – 1:30	*Break*
1:30 – 2:15	Local Speakers
2:15 – 3:00	Developing a Solar Policy Implementation Plan
3:00 – 3:30	Networking Opportunity

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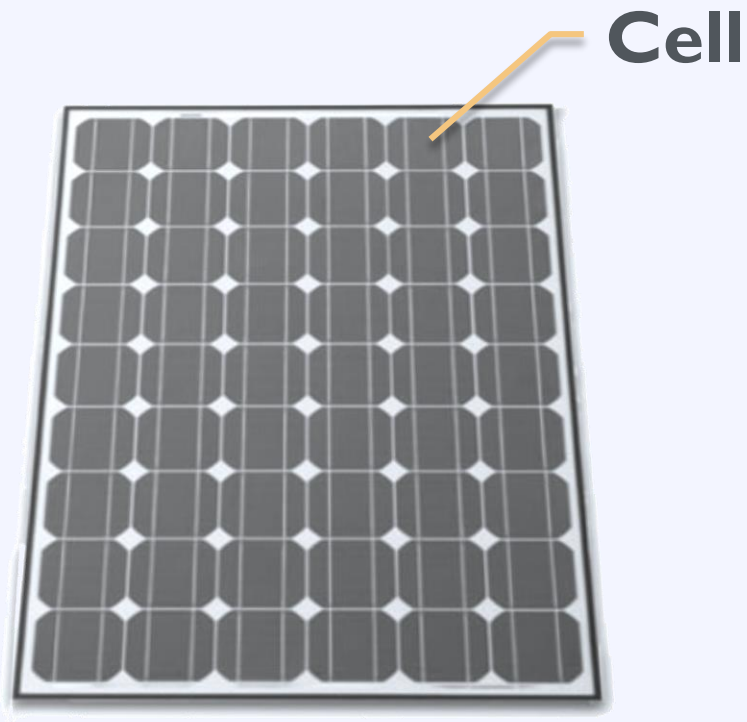
Solar Technologies

Solar Photovoltaic (PV)

Solar Hot Water

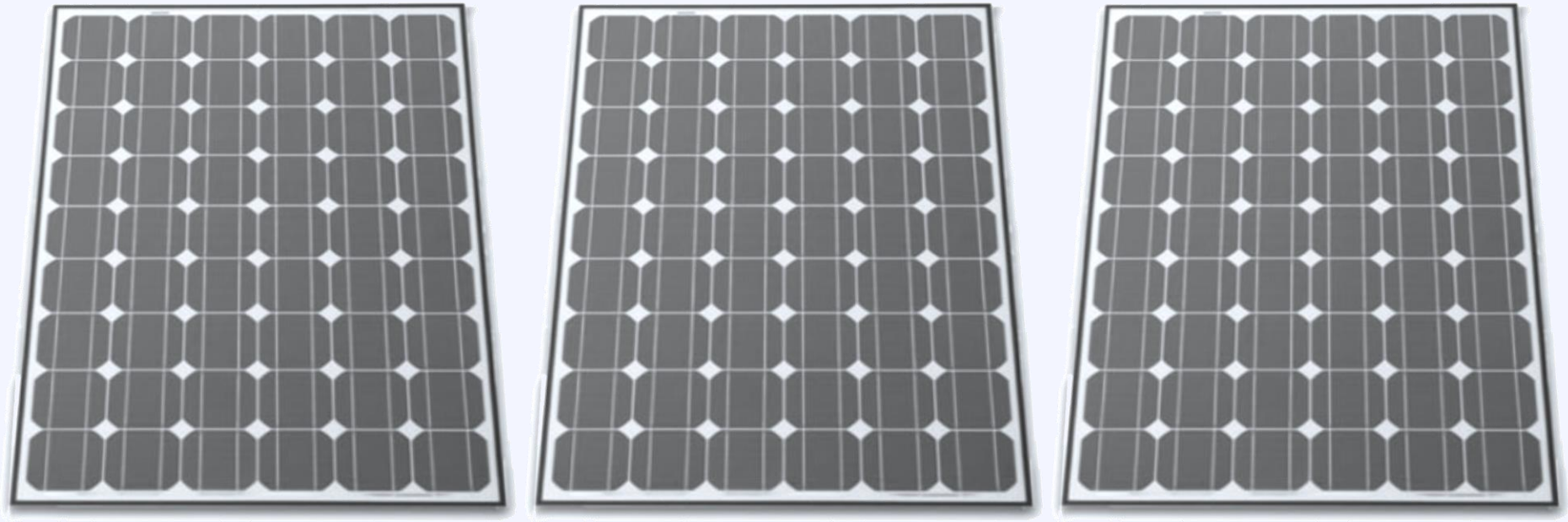
Concentrated Solar Power

Some Basic Terminology



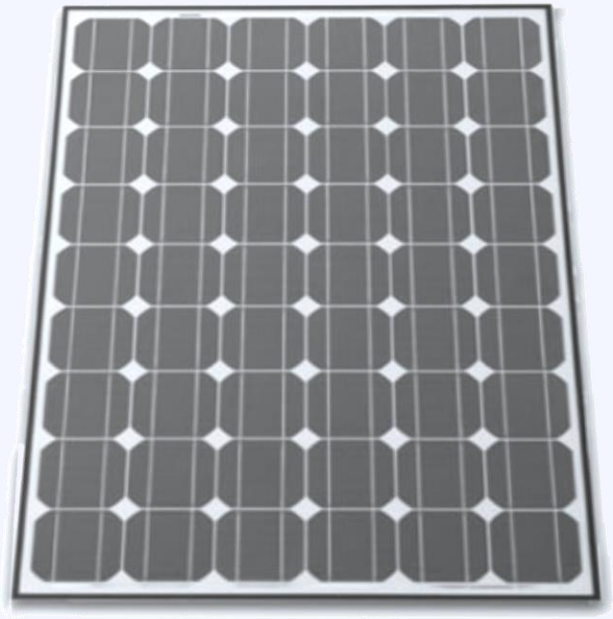
Panel / Module

Some Basic Terminology



Array

Some Basic Terminology



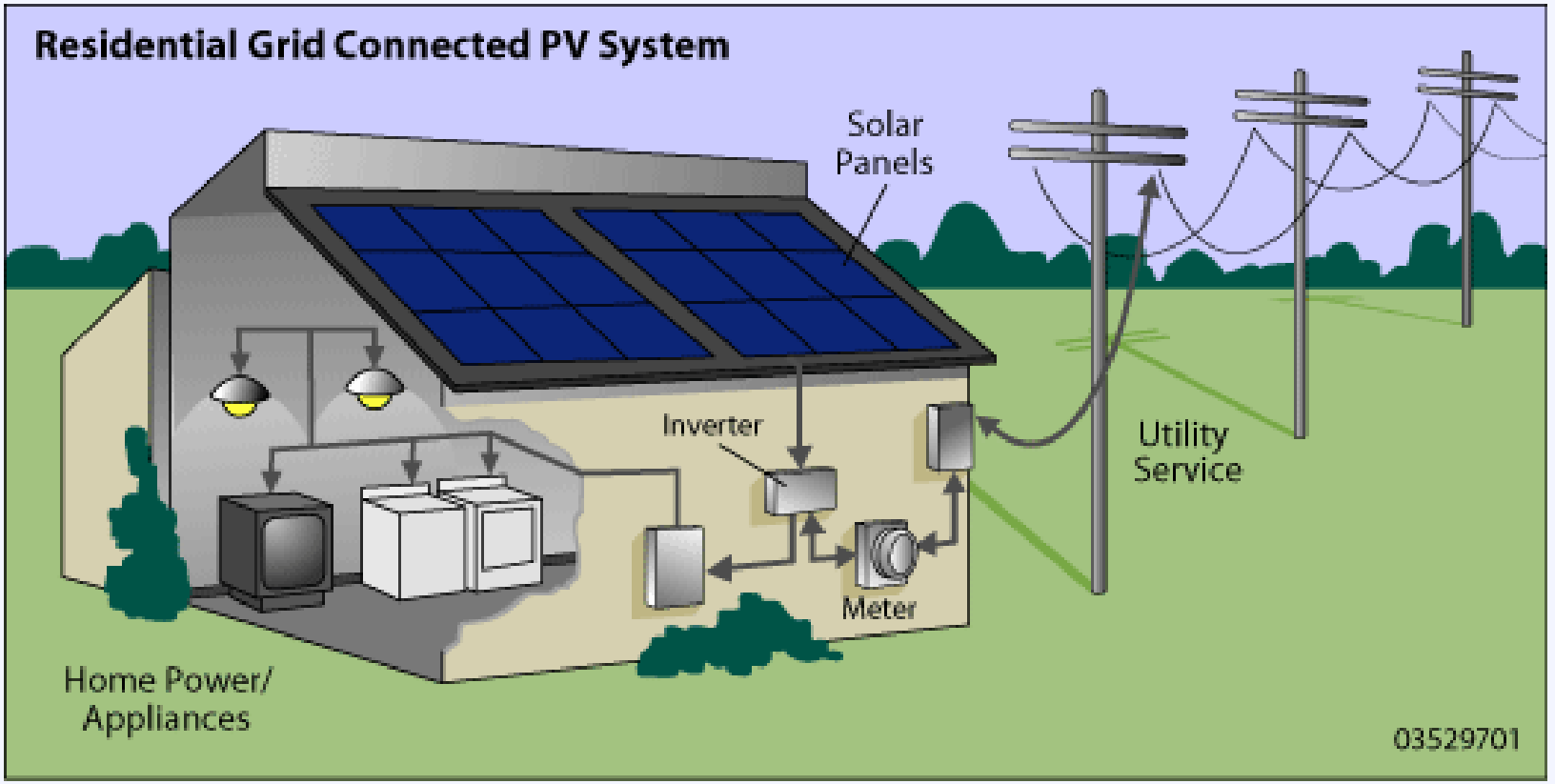
Capacity / Power

kilowatt (kW)

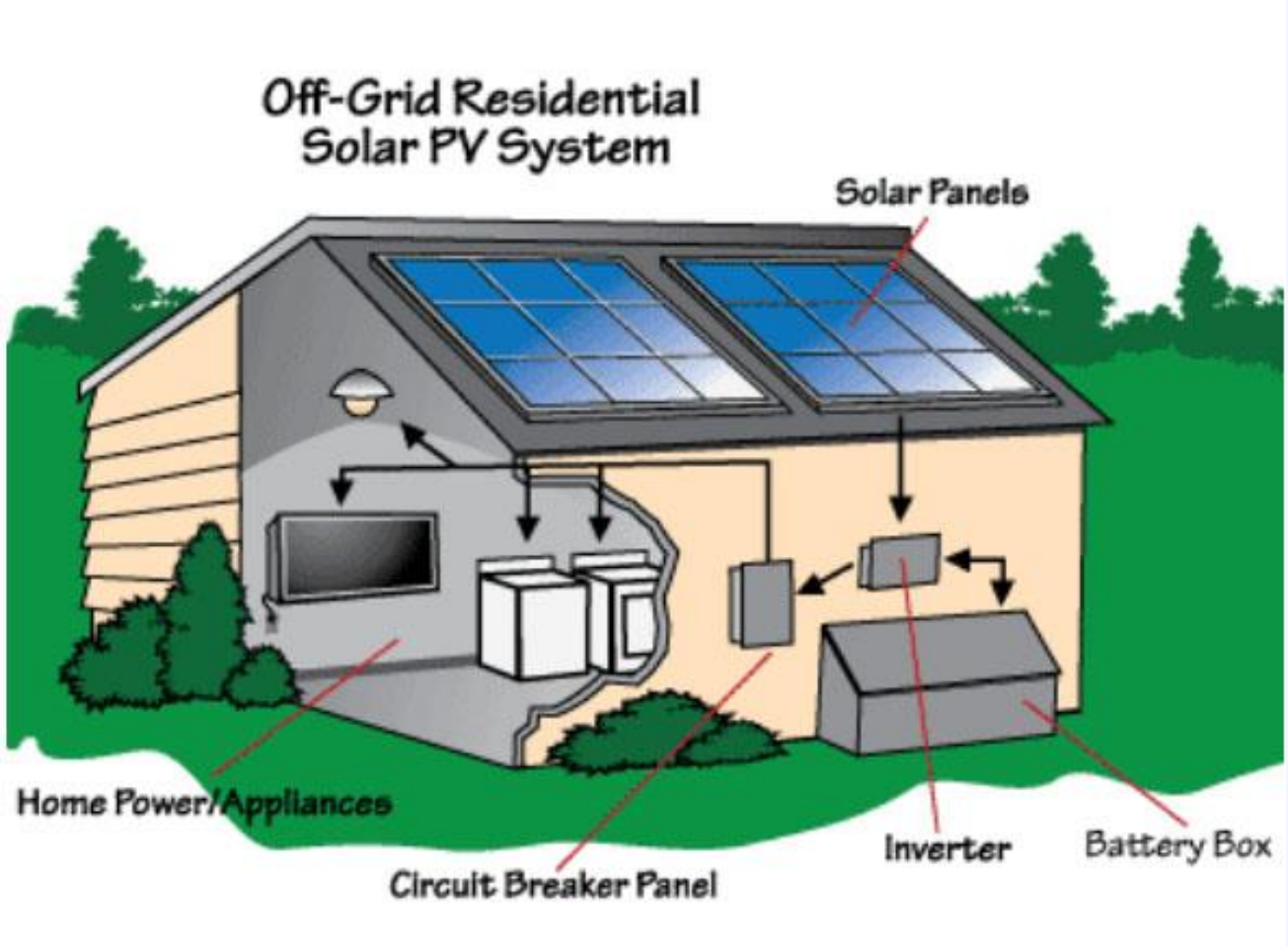
Production

Kilowatt-hour (kWh)

System Components



System Components – Off-Grid



Some Basic Terminology

Residence
5 kW

Factory
1 MW+

Office
50 – 500 kW

Utility
2 MW+

Solar Development in the US

As of 2014, the US solar industry installed

645,000 solar installations

of which

93% were residential projects

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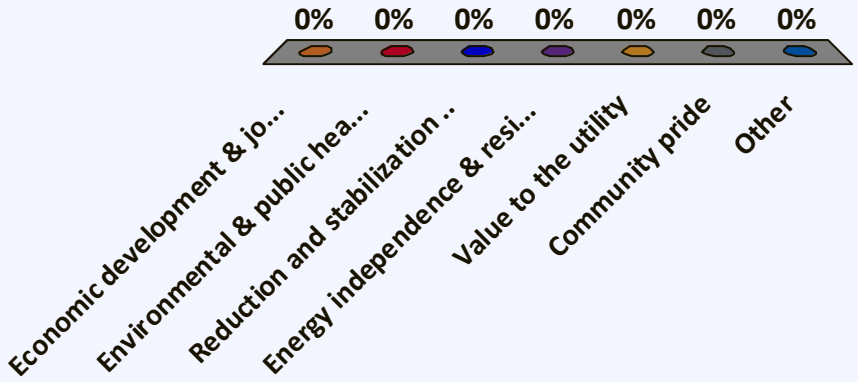
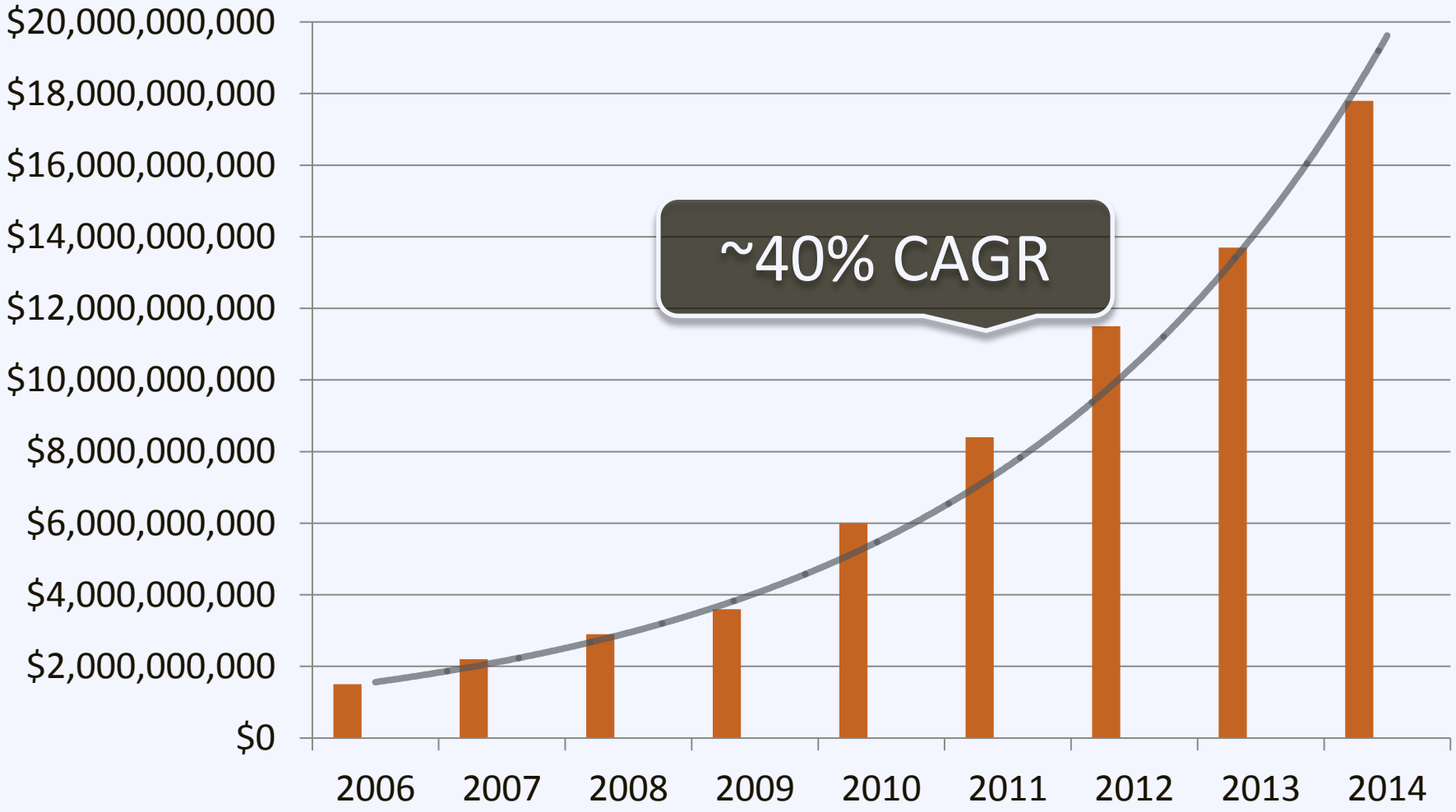
Source: SEIA 2014 Year In Review Report

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

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



Benefits: Solar Economic Growth



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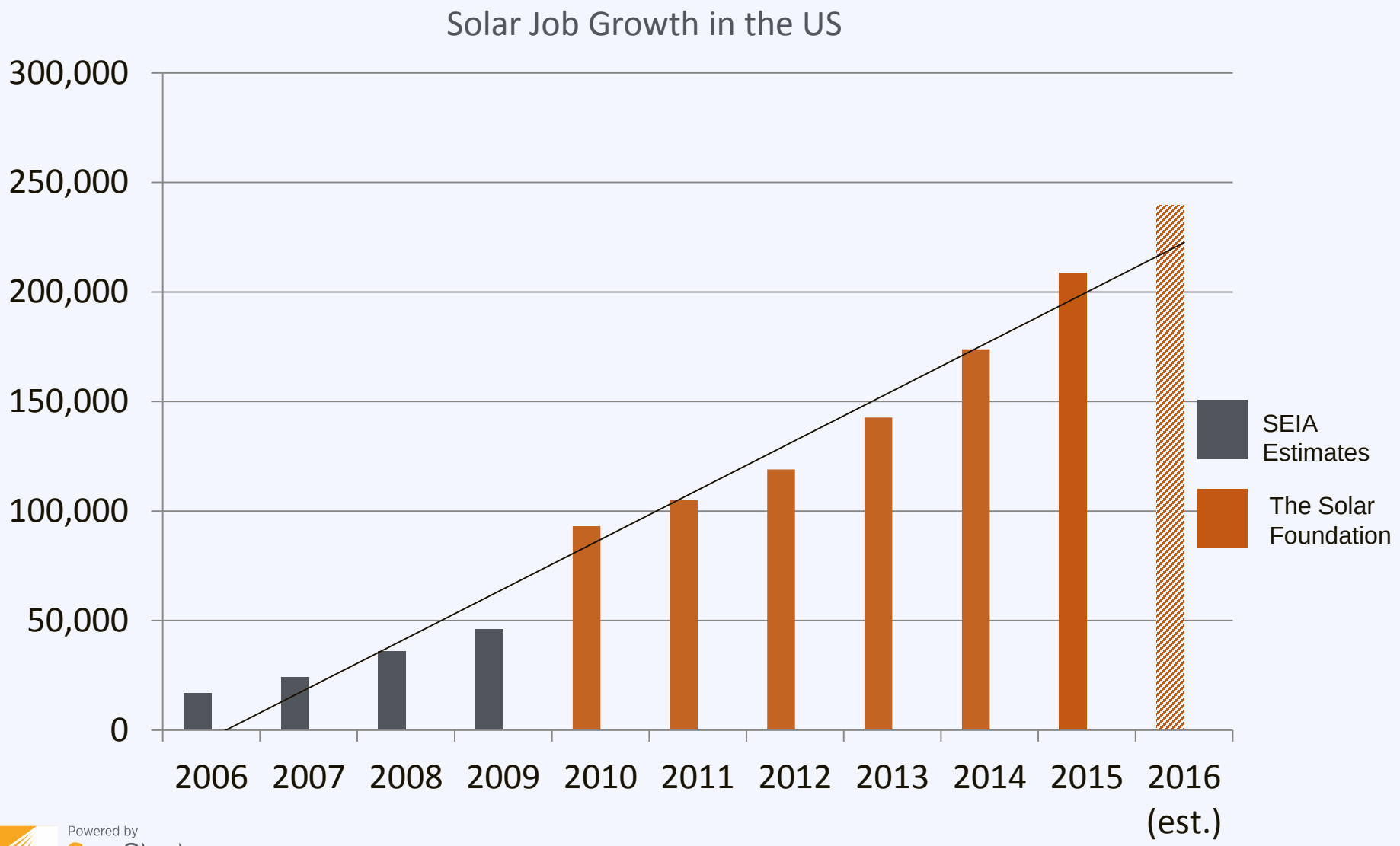
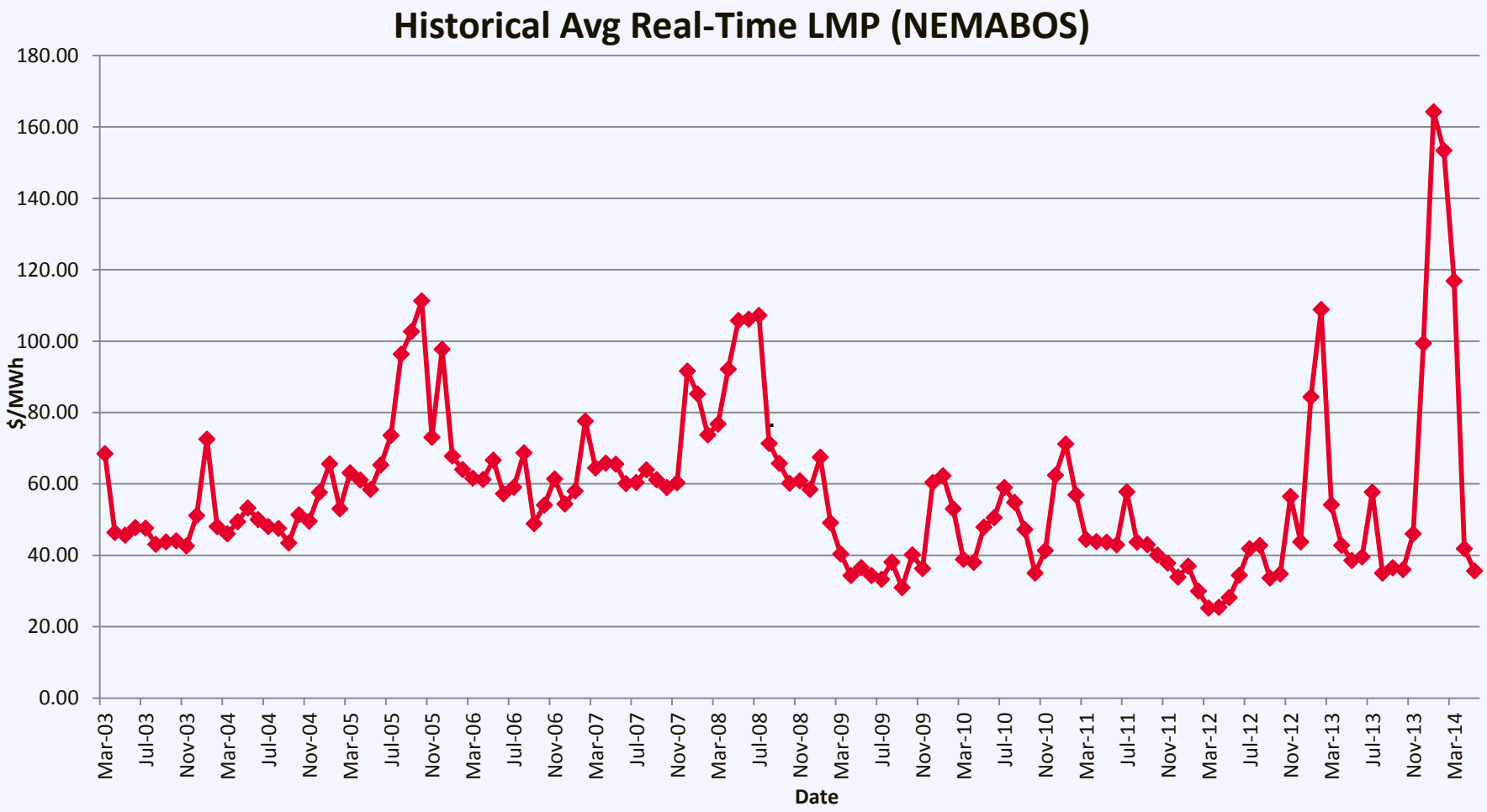
Source: SEIA/GTM Research – 2009/2010/2011/2012 Year in Review Report
http://www.seia.org/research-resources/us-solar-market-insight

Benefits: Solar Job Growth



Source: SEIA Estimates (2006-2009), The Solar Foundation's *National Solar Jobs Census* report series

Benefit: Stabilize Energy Prices



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Source: NEPOOL

Smart Investment for Homeowners

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

an average of $11,000

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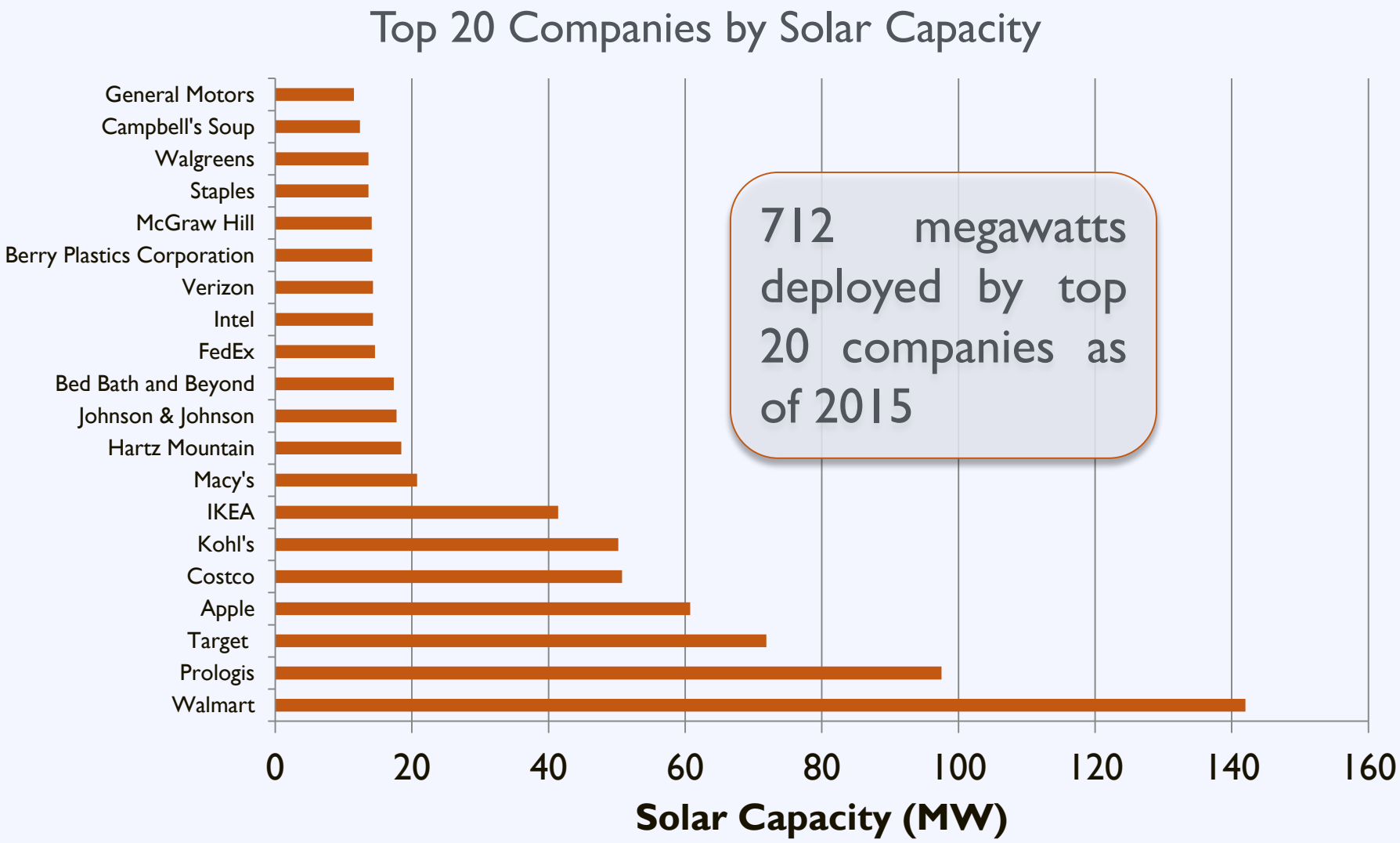
Source: LBNL, *Selling Into the Sun* (2015), non-California homes

Smart Investment for Businesses



Source: SEIA Solar Means Business 2015

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Smart Investment for Governments

Source: Borrego Solar

Smart Investment for Schools

Current:

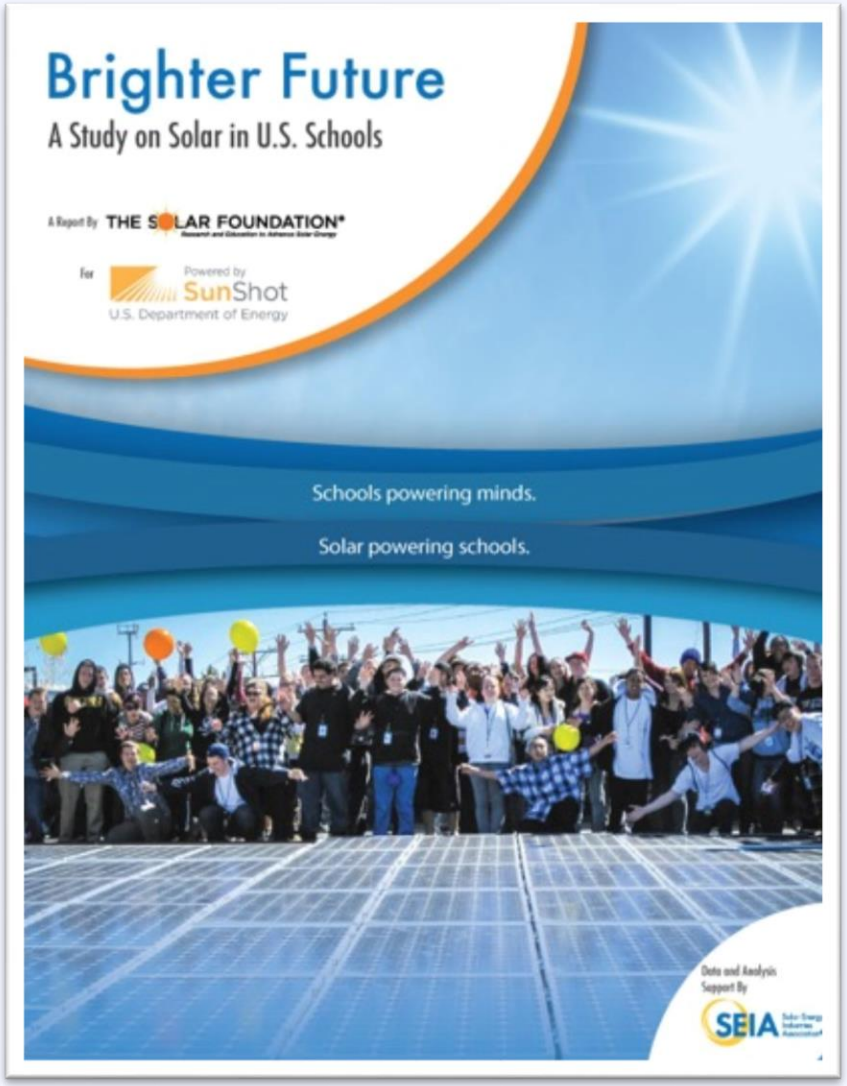
× 3,752

$ = $77.8m

Potential:

× 40,000 – 72,000

$ = $800m



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Source: The Solar Foundation (http://schools.tsfcensus.org)

Agenda

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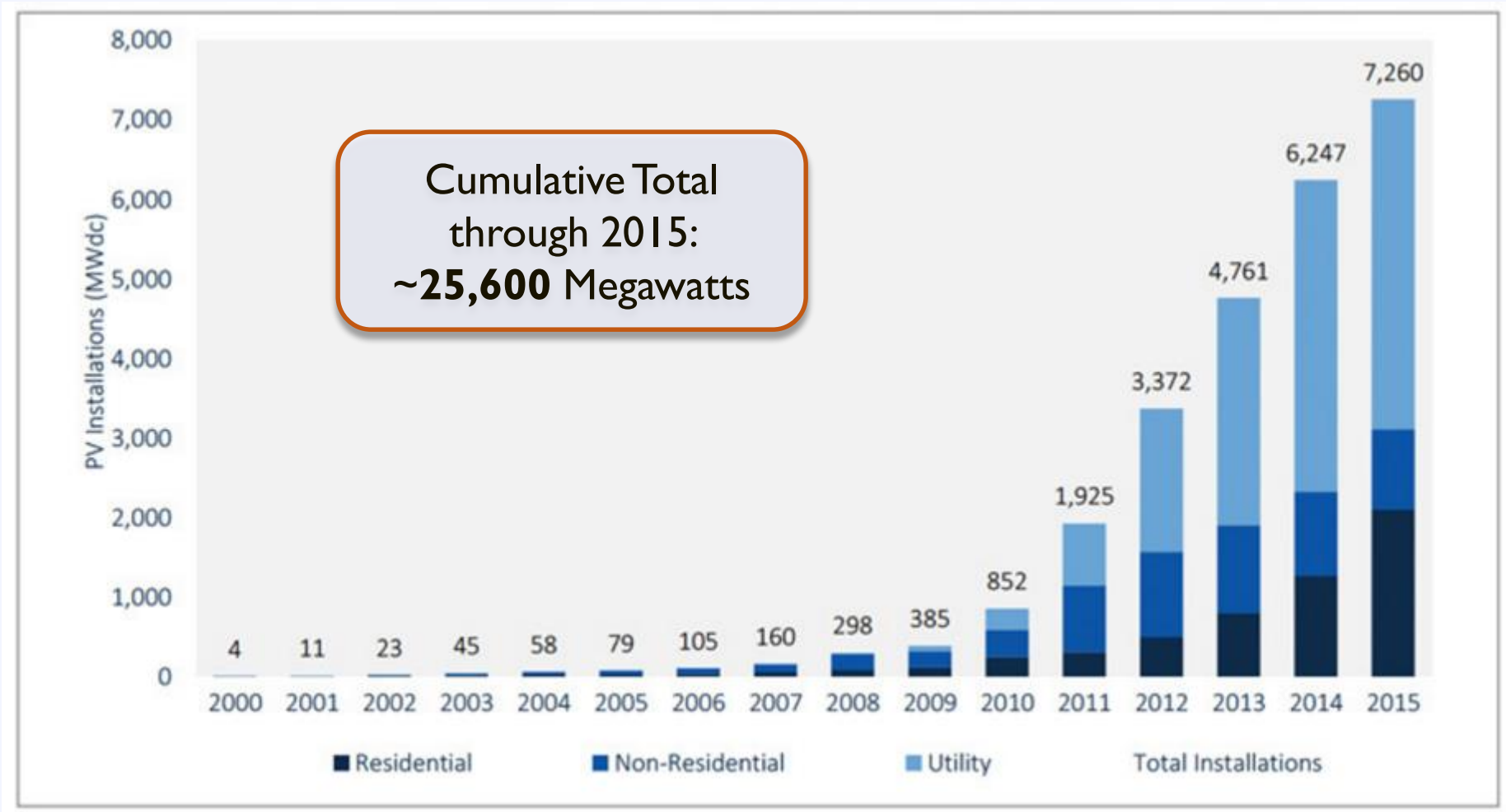
2:50 – 3:00	Solar Powering Your Community: Next Steps

US Solar Market – *annual* installations



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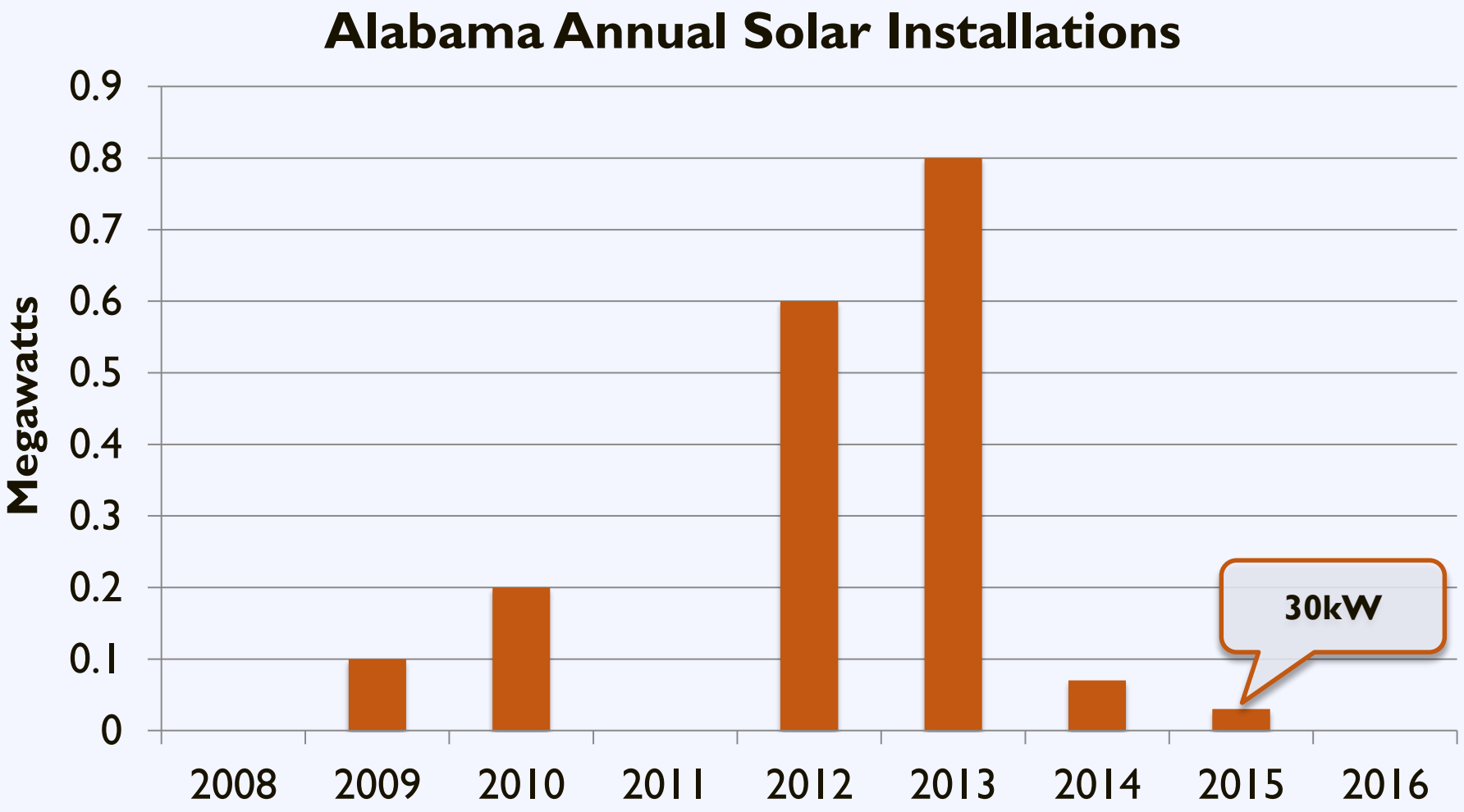
Source: SEIA/GTM Research, U.S. *Solar Market Insight: 2015 Year-in-Review*

Alabama Solar Market



SEIA/GTM Research U.S. Solar Market Insight 2015 Year in Review SEIA. Solar Spotlight: Michigan (2016)

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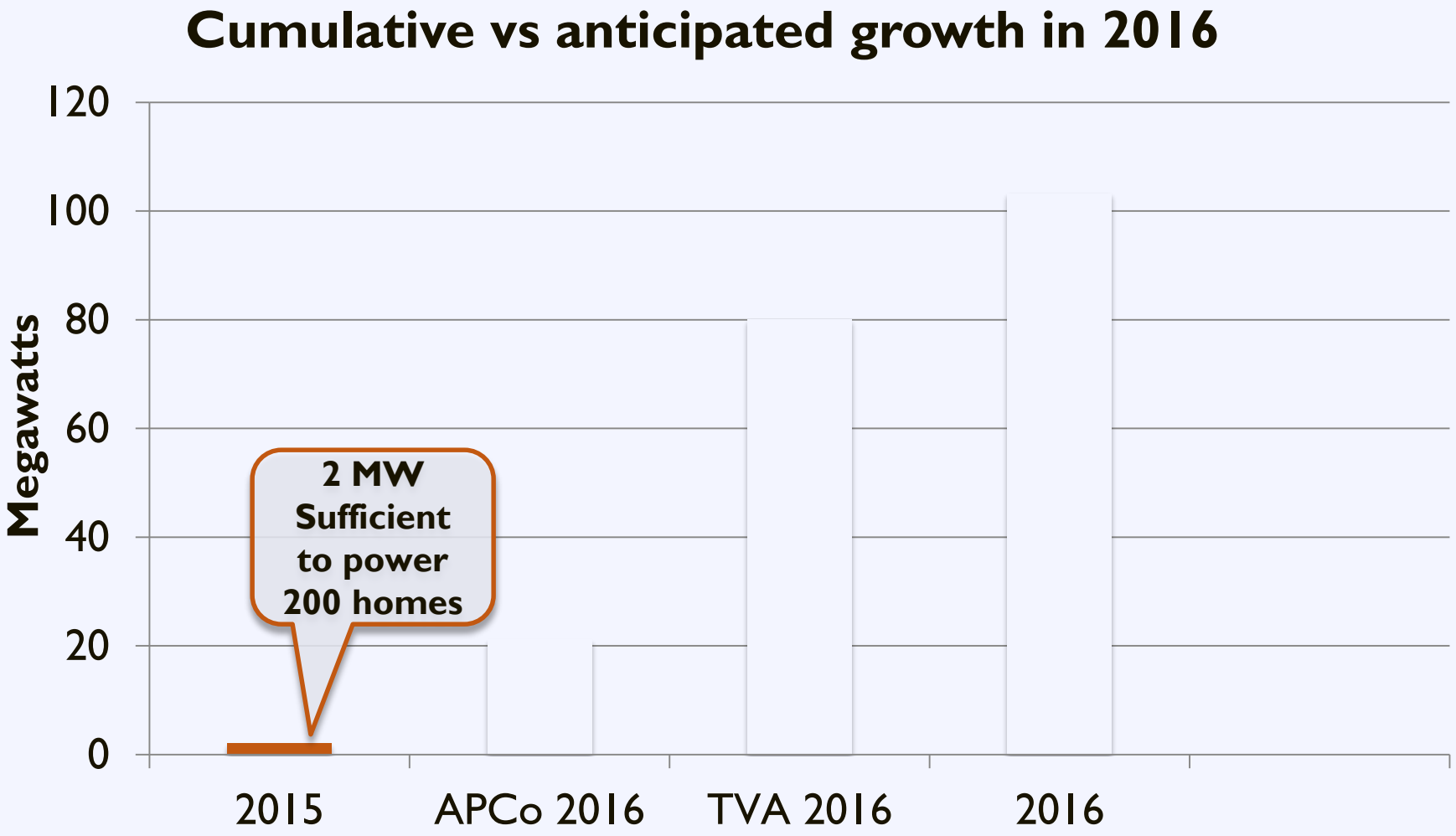

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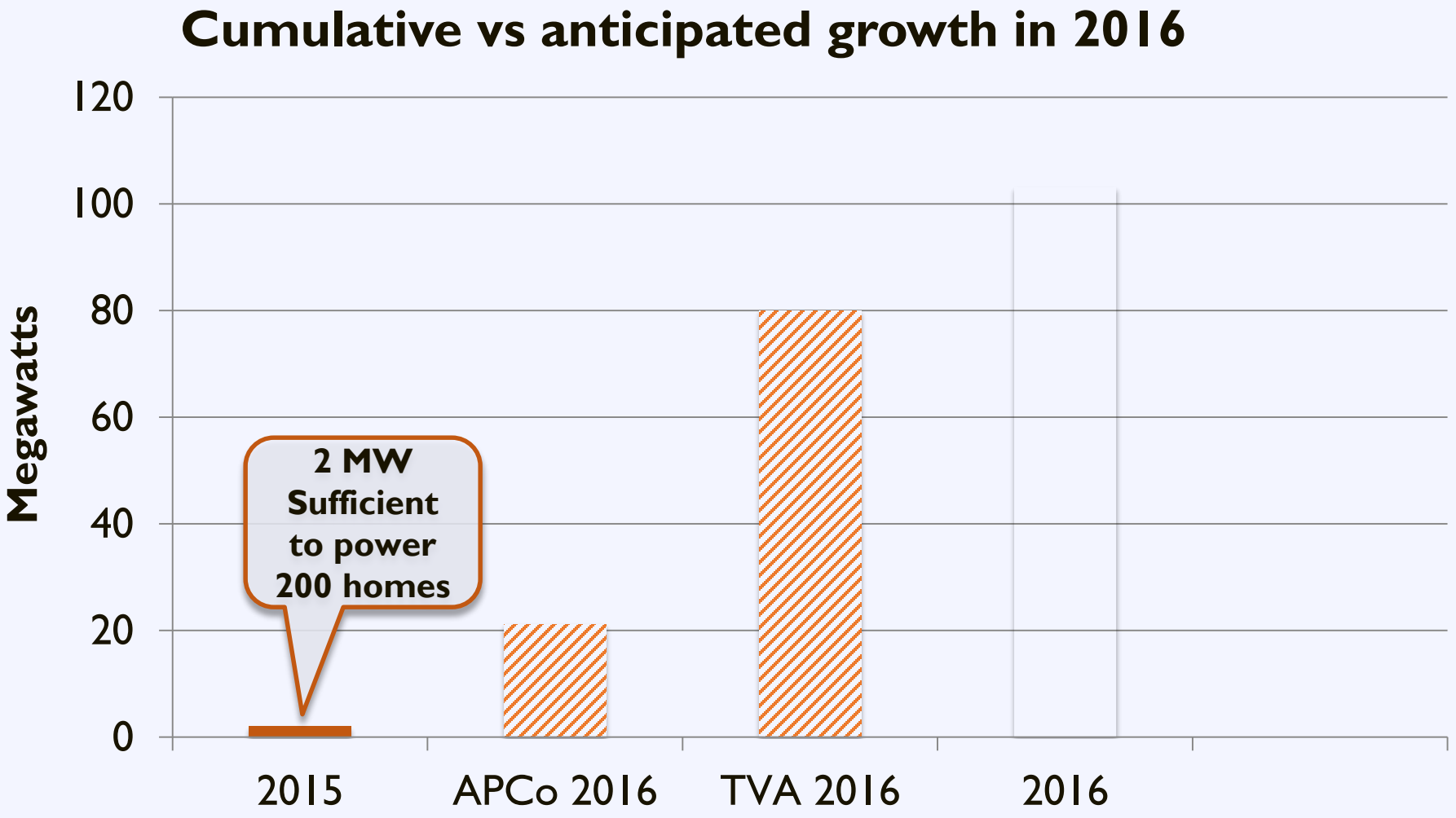

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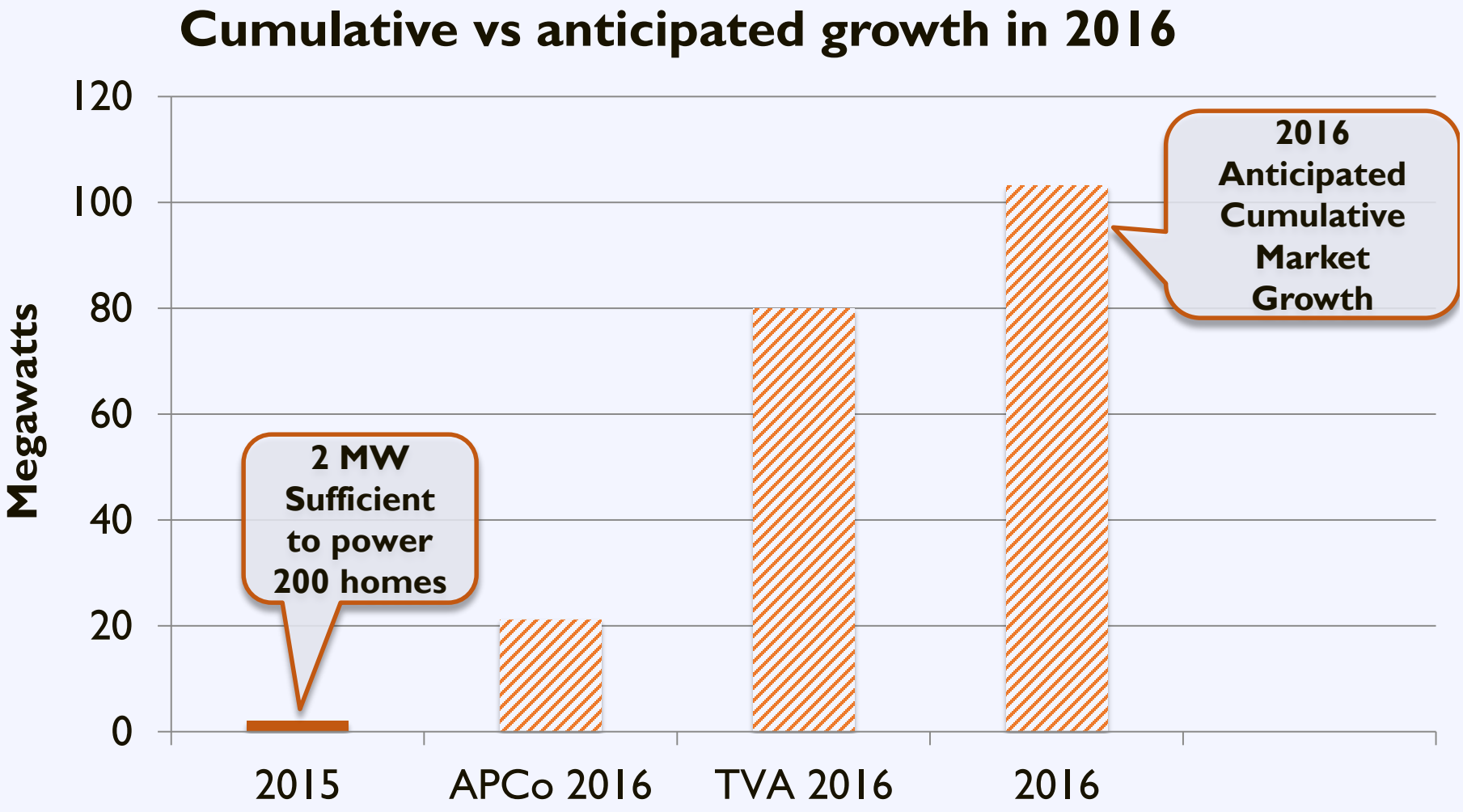

SEIA/GTM Research U.S. Solar Market Insight 2015 Year in Review SEIA. Solar Spotlight: Michigan (2016)

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Solar Jobs in Alabama

In 2015, Alabama had

290 solar jobs

Projections call for

22% growth in 2016

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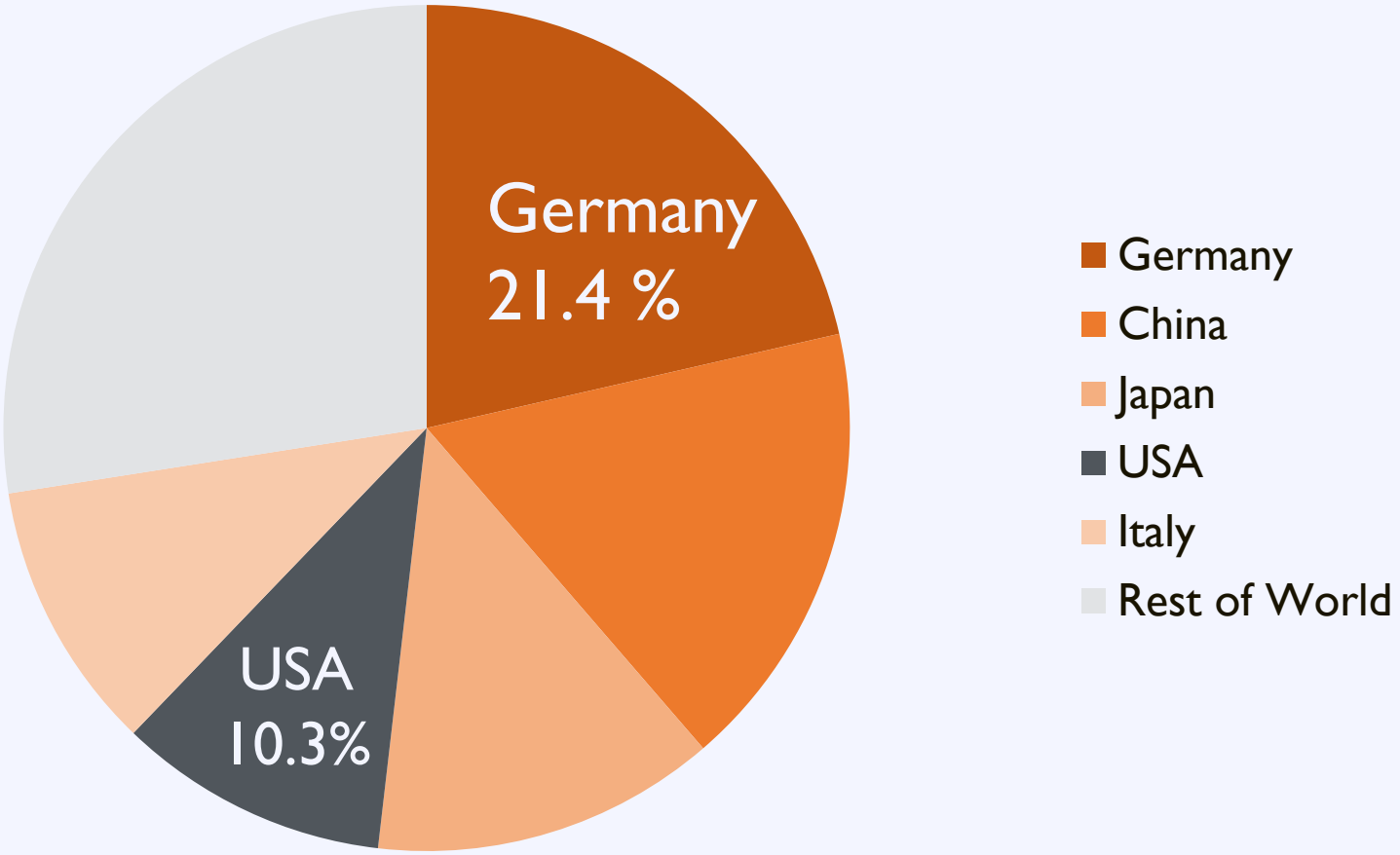
The Solar Foundation – National Solar Jobs Census (2015)

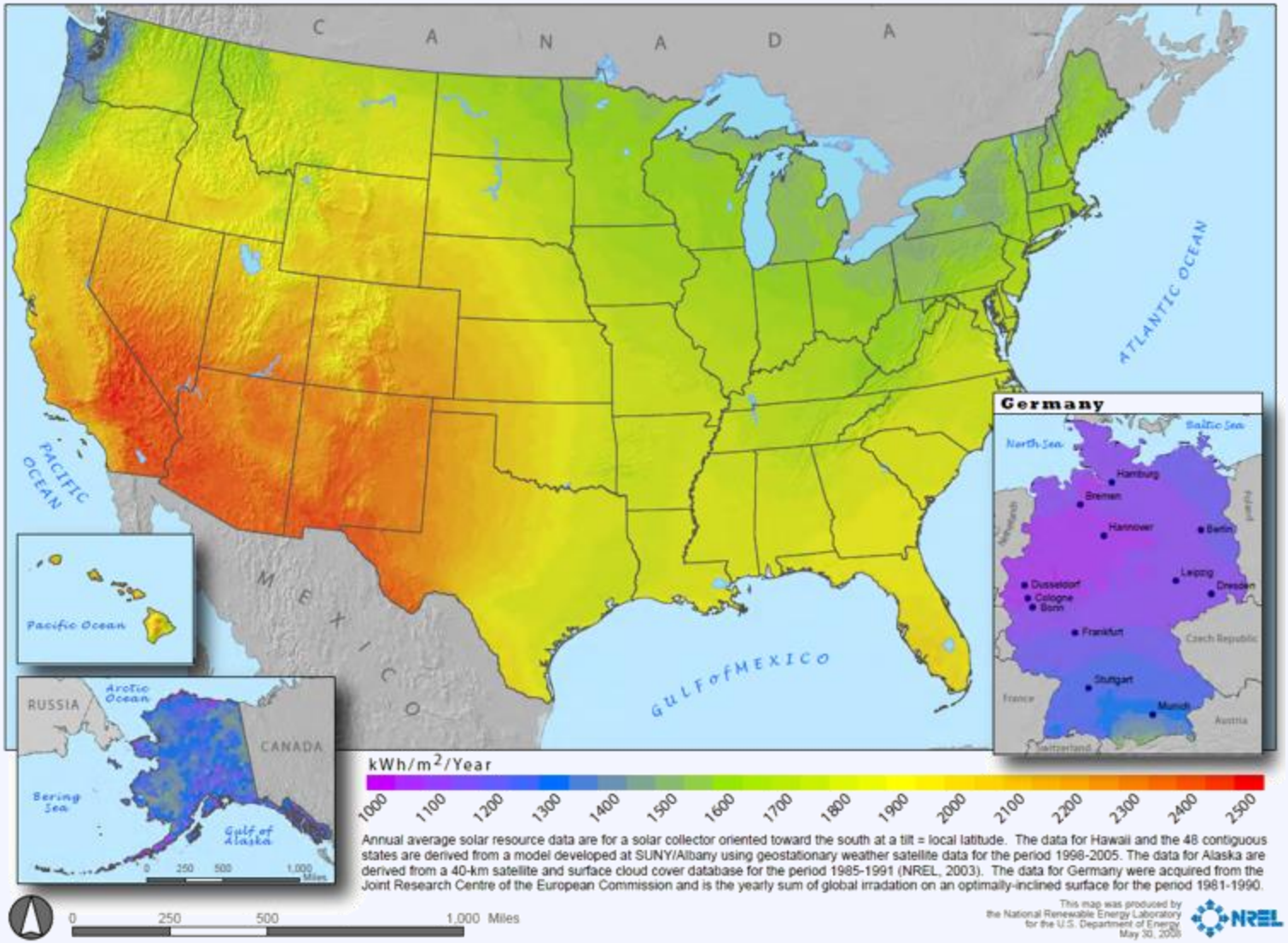
World Solar Market

Top 5 Countries Solar Operating Capacity (2014)



Source: REN 21, 2015

US Solar Resource



Annual average solar resource data are for a solar collector oriented toward the south at a tilt = local latitude. The data for Hawaii and the 48 contiguous states are derived from a model developed at SUNY/Albany using geostationary weather satellite data for the period 1998-2005. The data for Alaska are derived from a 40-km satellite and surface cloud cover database for the period 1985-1991 (NREL, 2003). The data for Germany were acquired from the Joint Research Centre of the European Commission and is the yearly sum of global irradiation on an optimally-inclined surface for the period 1981-1990.

This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy May 30, 2008

NREL

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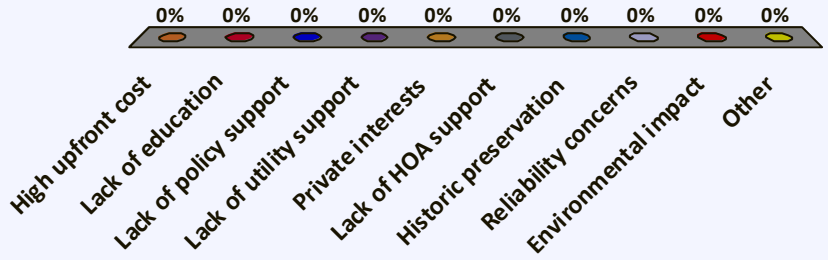
U.S. Department of Energy

Source: National Renewable Energy Laboratory

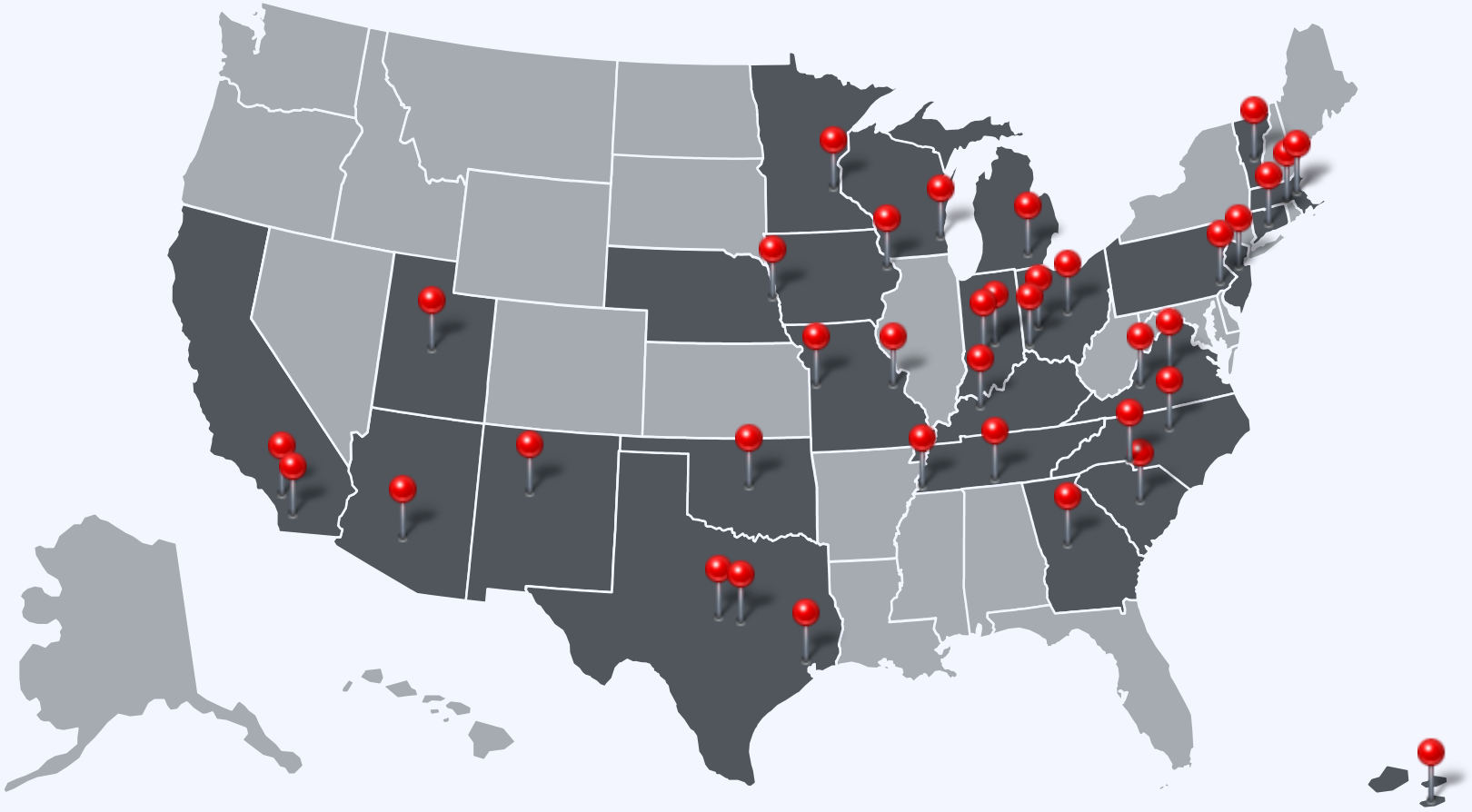
What are the top 3 barriers to solar adoption in your community?

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?



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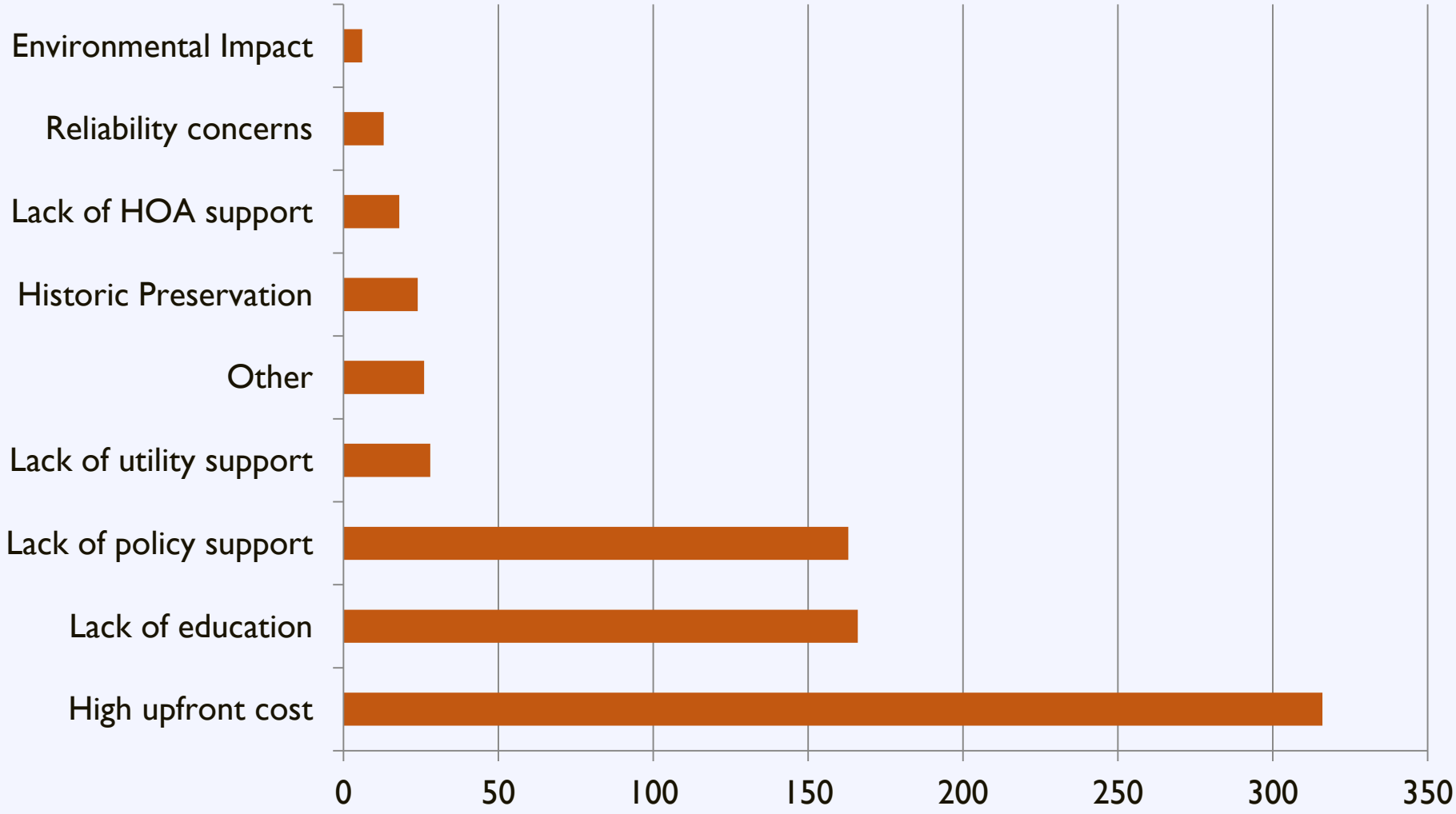
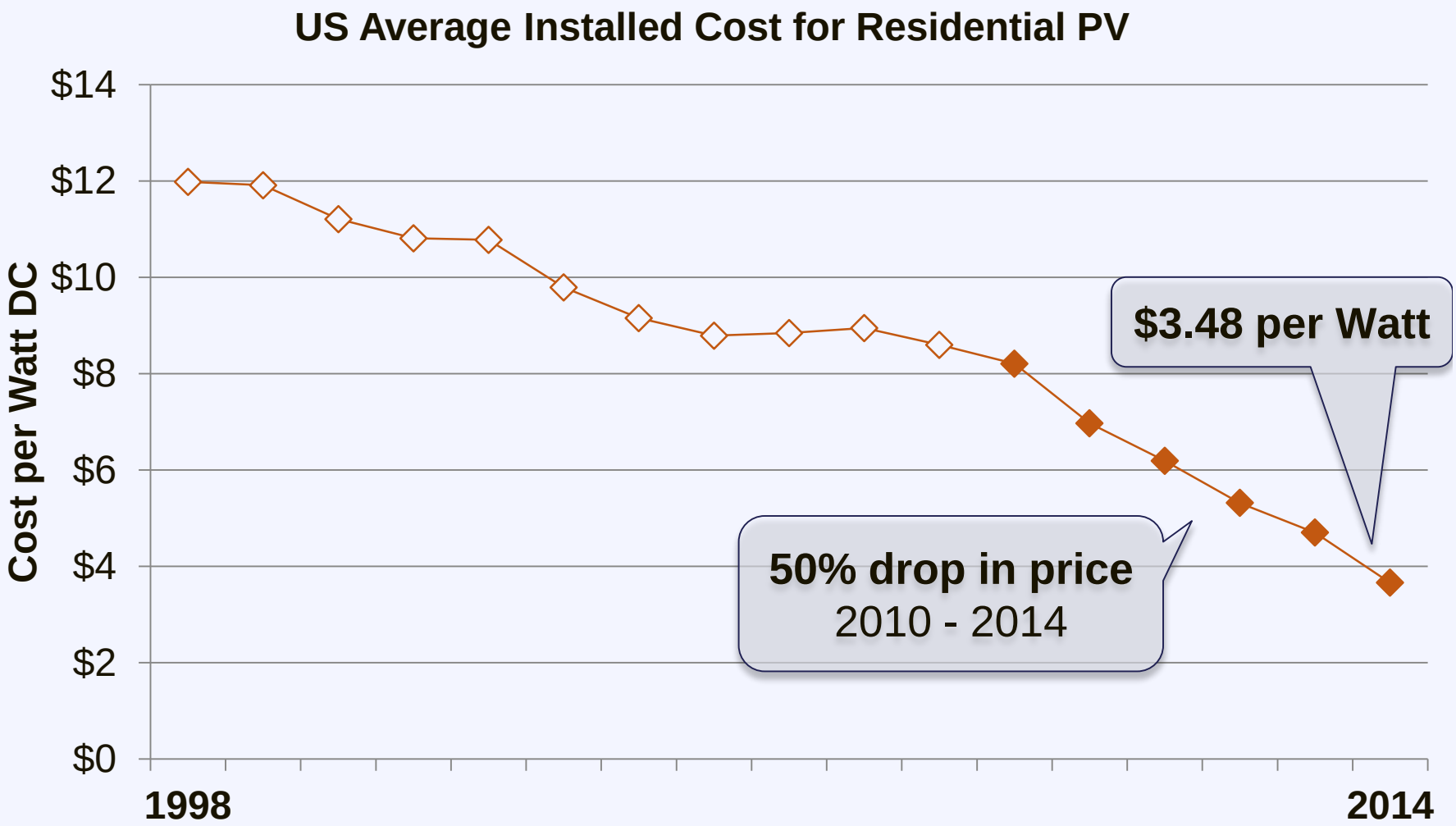
Activity: Addressing Barriers

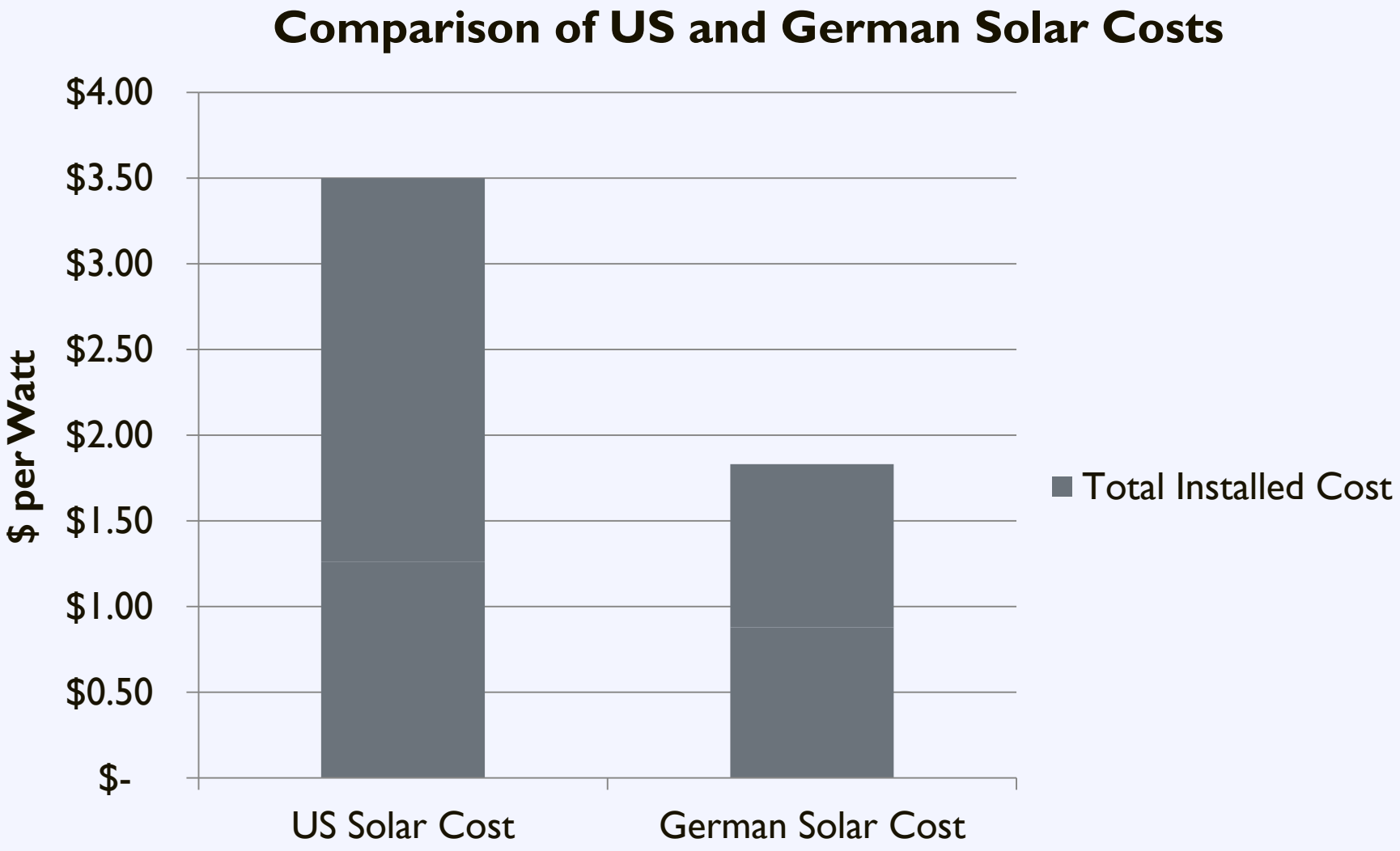


The Cost of Solar PV



Tracking the Sun VI: The Installed Cost of Photovoltaics in the US from 1998-2013 (LBNL); Solar Energy industry Association, Solar Market Insight Report 2014 Q4

The Cost of Solar in the US



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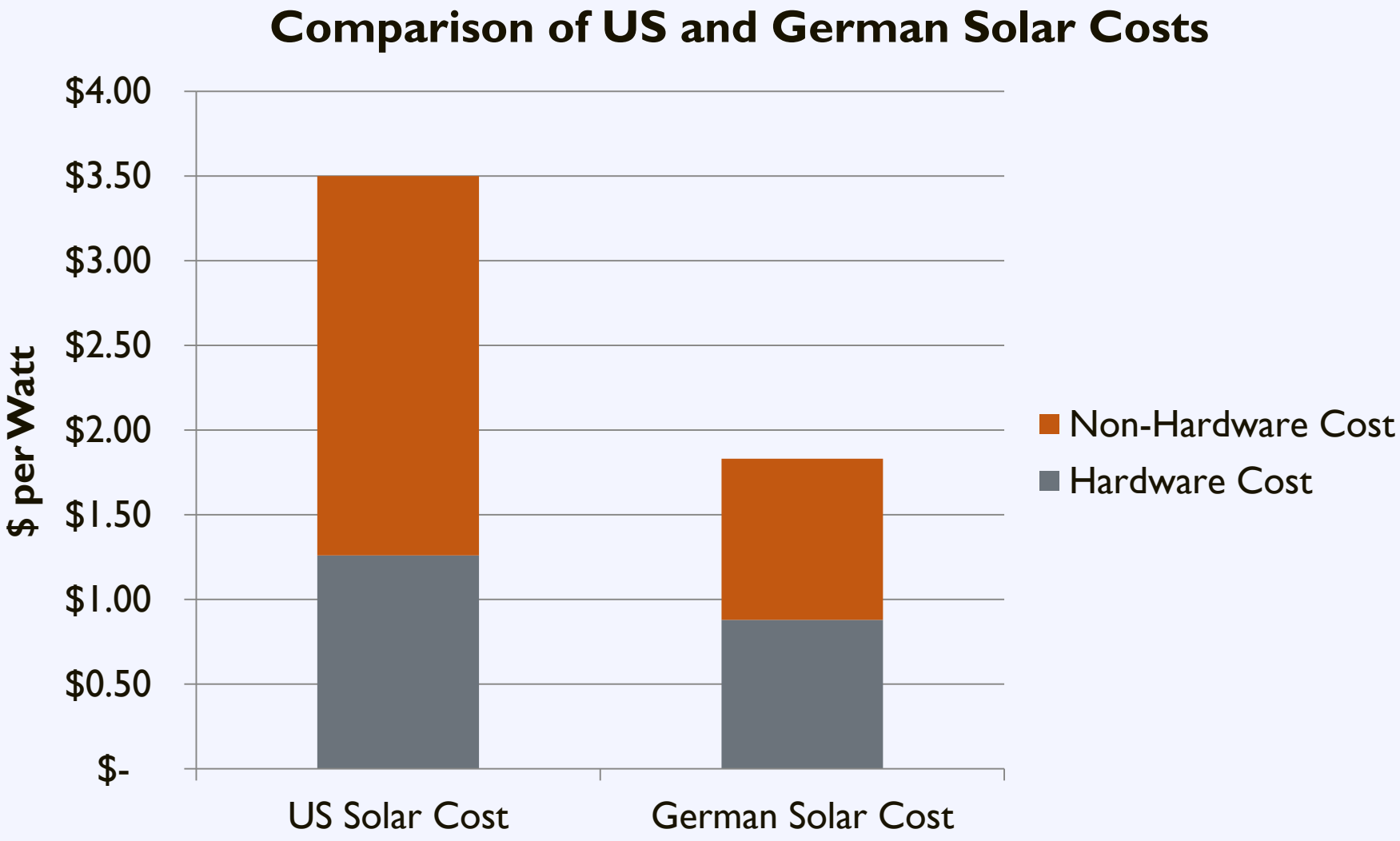
Source: SEIA/GTM Research U.S. Solar Market Insight Report Year-in-Review 2015; Fraunhofer ISE Recent Facts about Photovoltaics in Germany 2015; http://energy.gov/eere/sunshot/soft-costs

The Cost of Solar in the US



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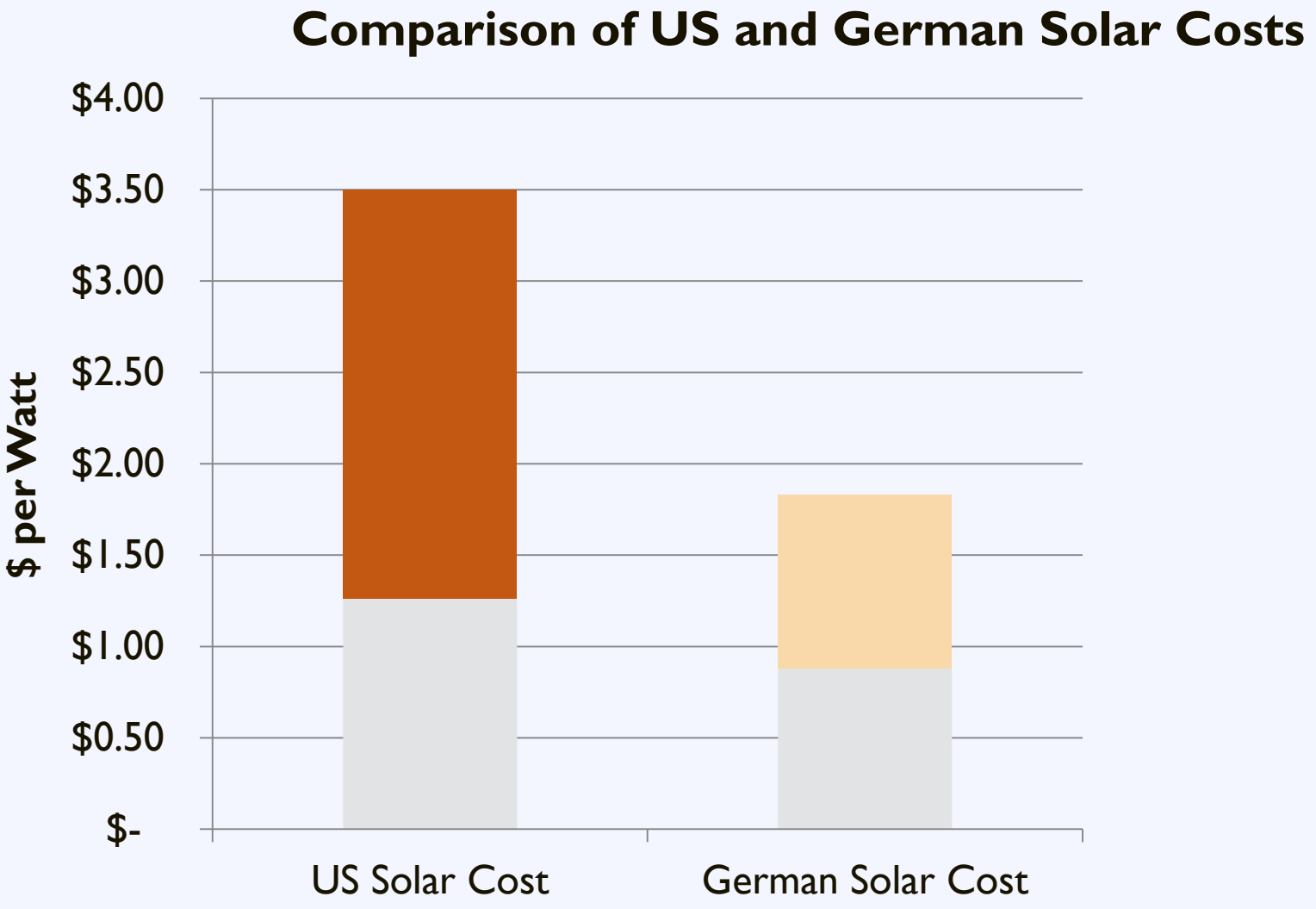

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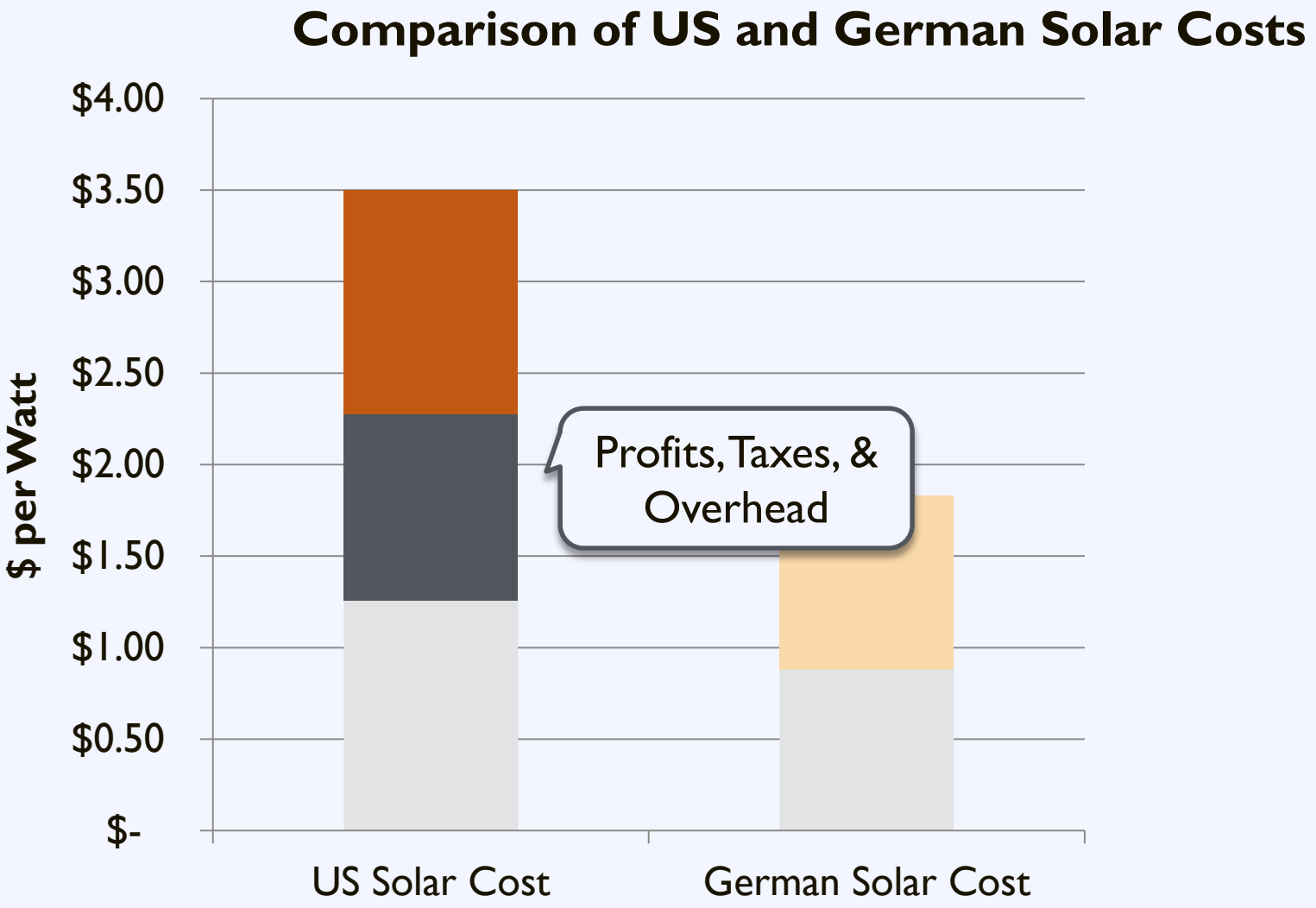

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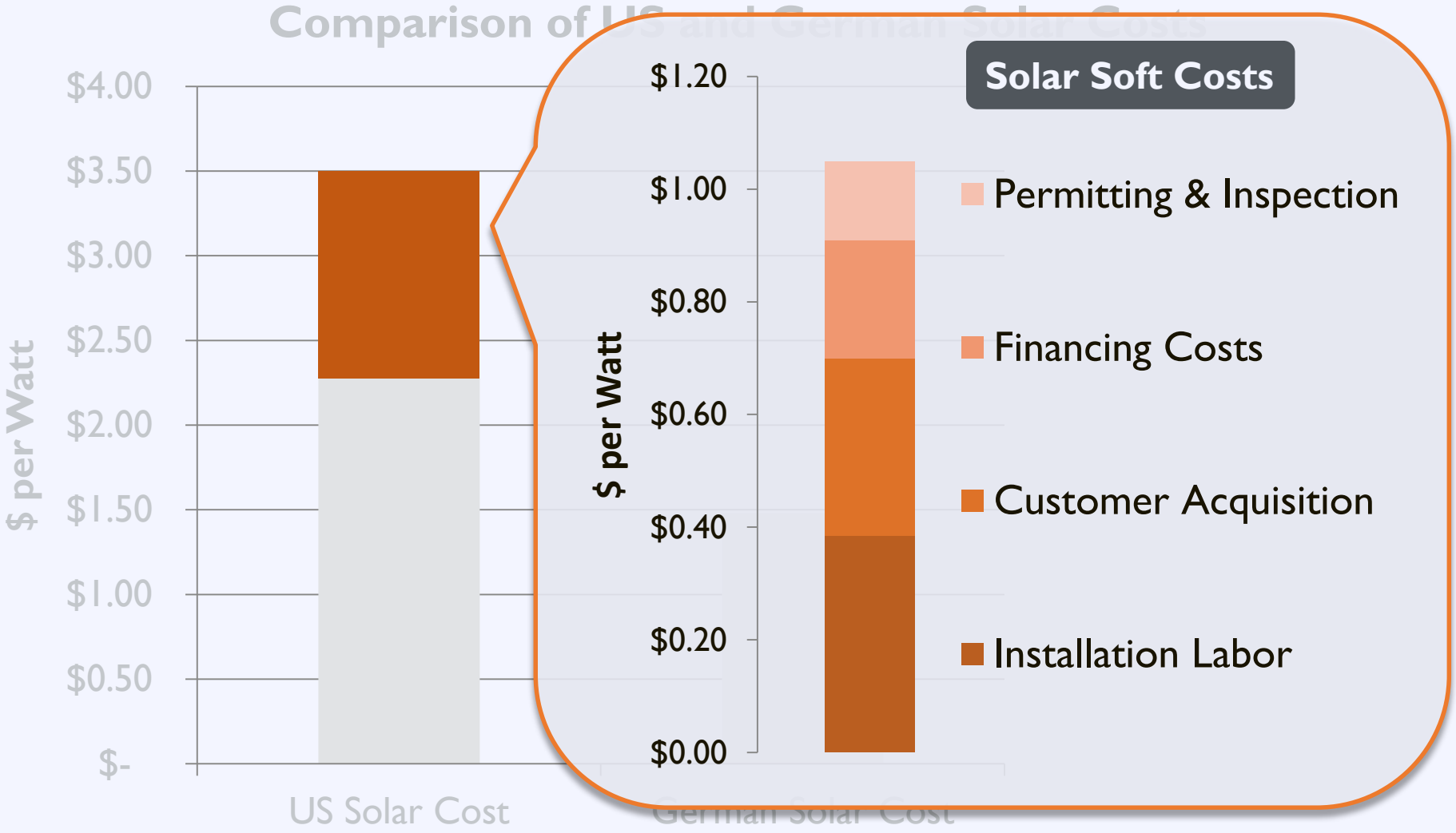
Source: NREL (http://www.nrel.gov/docs/fy14osti/60412.pdf)
LBNL (http://emp.lbl.gov/sites/all/files/lbnl-6350e.pdf)(http://www1.eere.energy.gov/solar/pdfs/sunshot_webinar_20130226.pdf)

The Cost of Solar in the US



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

Challenge: Installation Time

New York City's *Goal*

100 days

from inception to completion

Germany Today

8 days

from inception to completion

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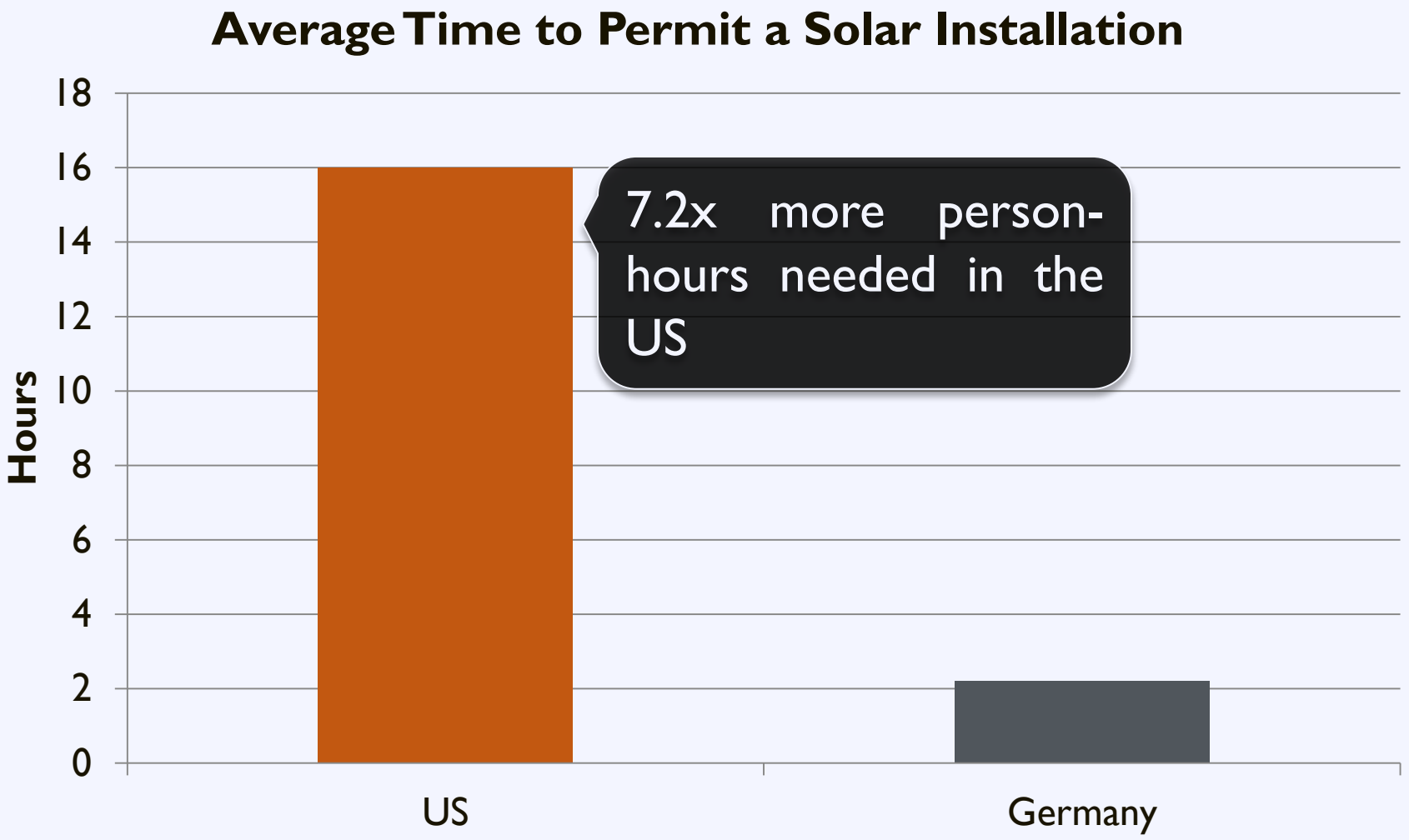
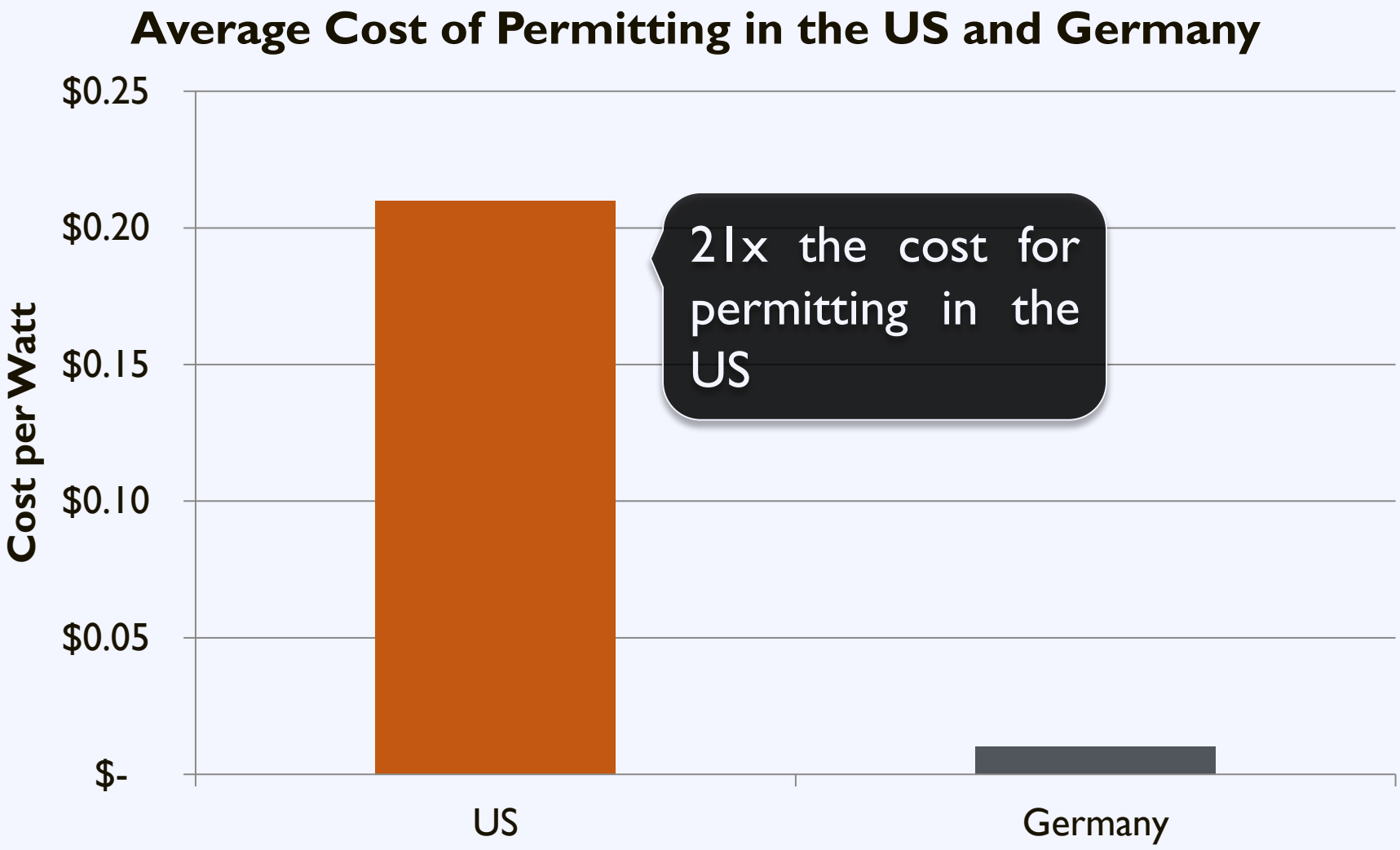
Photon Magazine

Time to Installation



Source: NREL, LBNL

Permitting Costs



Source: NREL, LBNL

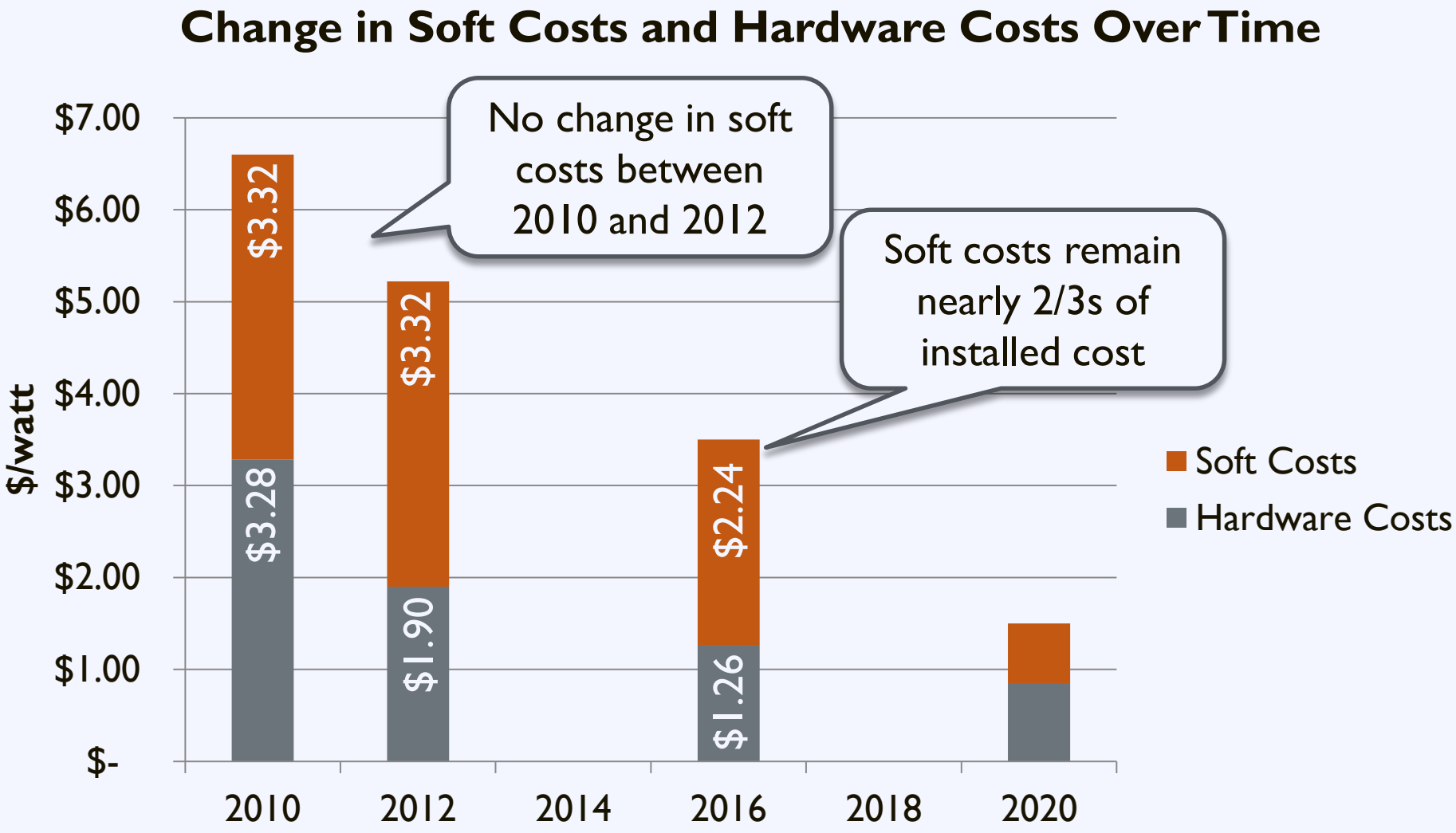
Germany's Success

Consistency and Transparency

through

Standardized Processes

The Cost of Solar in the US



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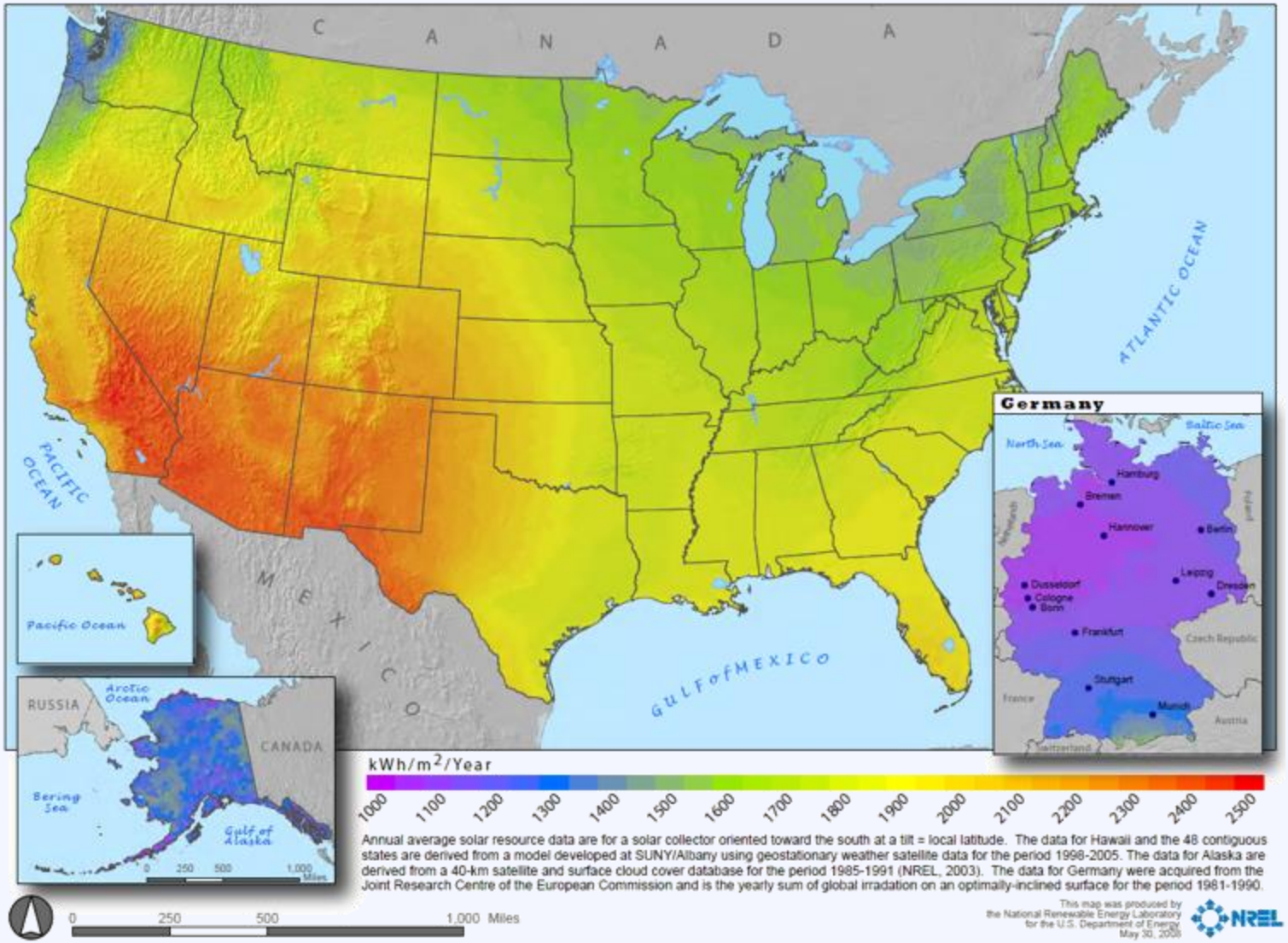
Why is Solar Policy Important?

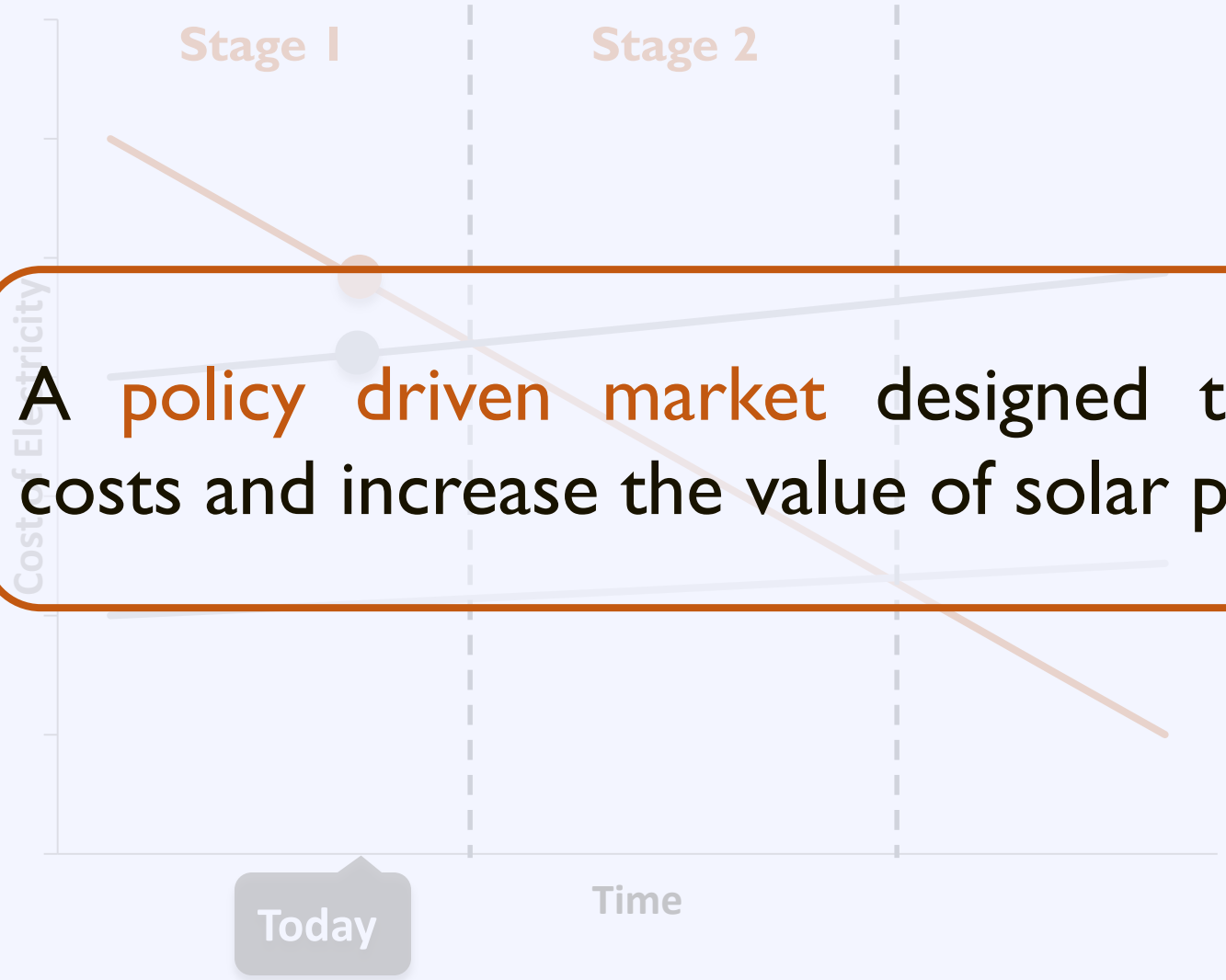


Source: National Renewable Energy Laboratory

Why is Solar Policy Important?

Source: U.S. Energy Information Administration

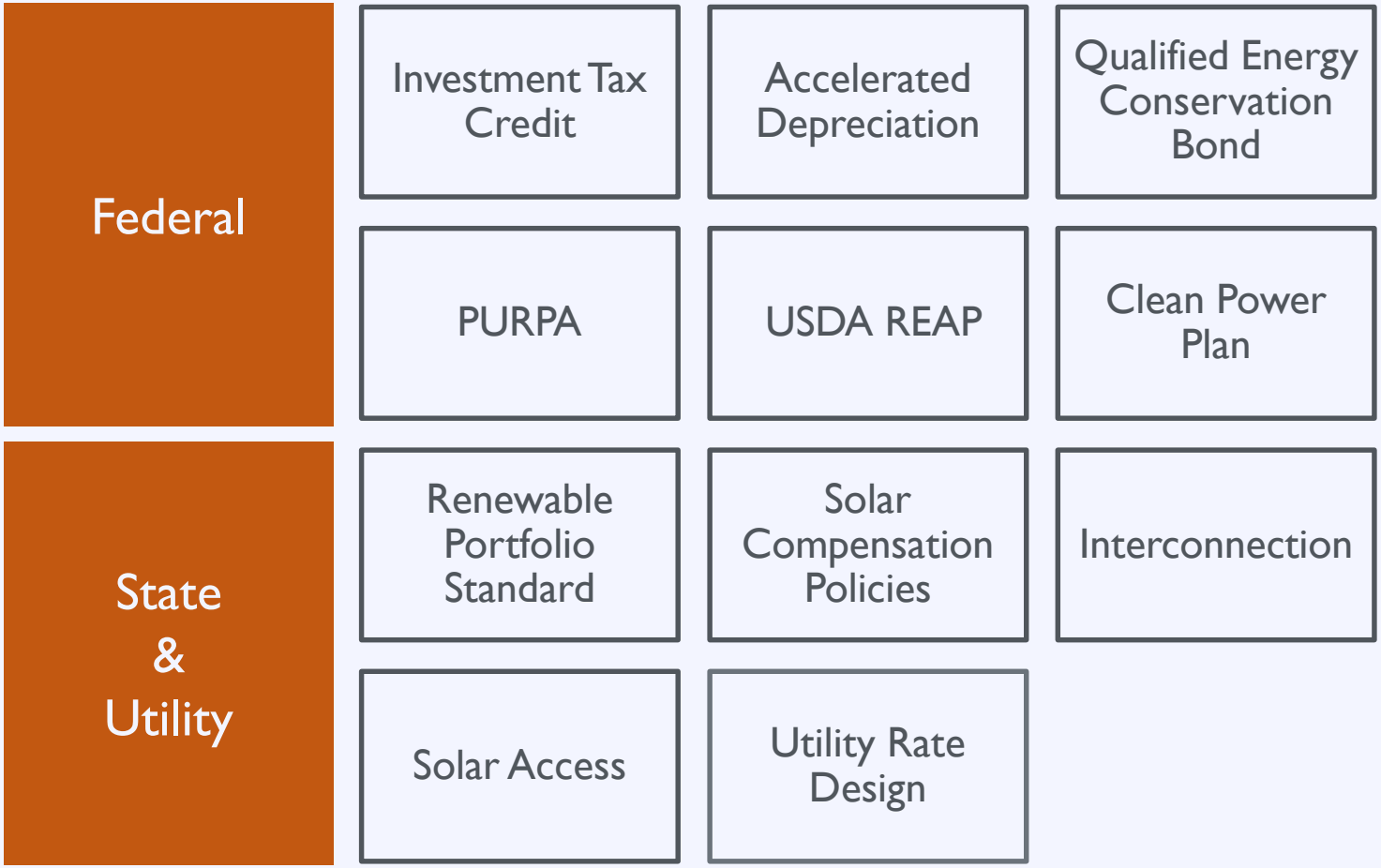
Solar Market: Trends



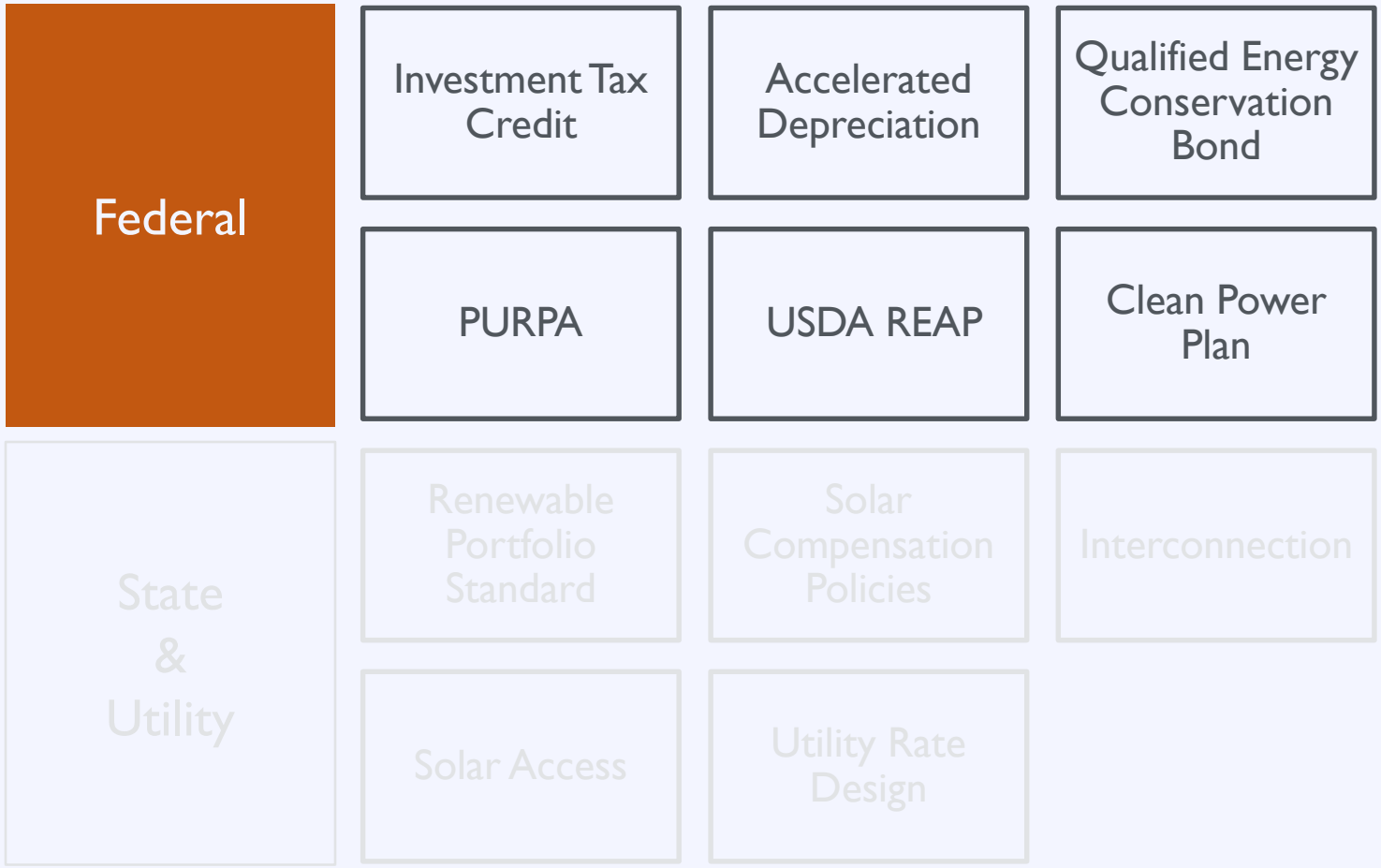
A policy driven market designed to mitigate costs and increase the value of solar production

Source: Solar Electric Power Association

A Policy Driven Market



A Policy Driven Market



A Policy Driven Market

Investment Tax Credit

Type: Tax Credit

Eligibility: For-Profit Organizations & Individual Taxpayers

Value: 30% of the installation cost through 2019 (26% for 2020, 22% for 2021)

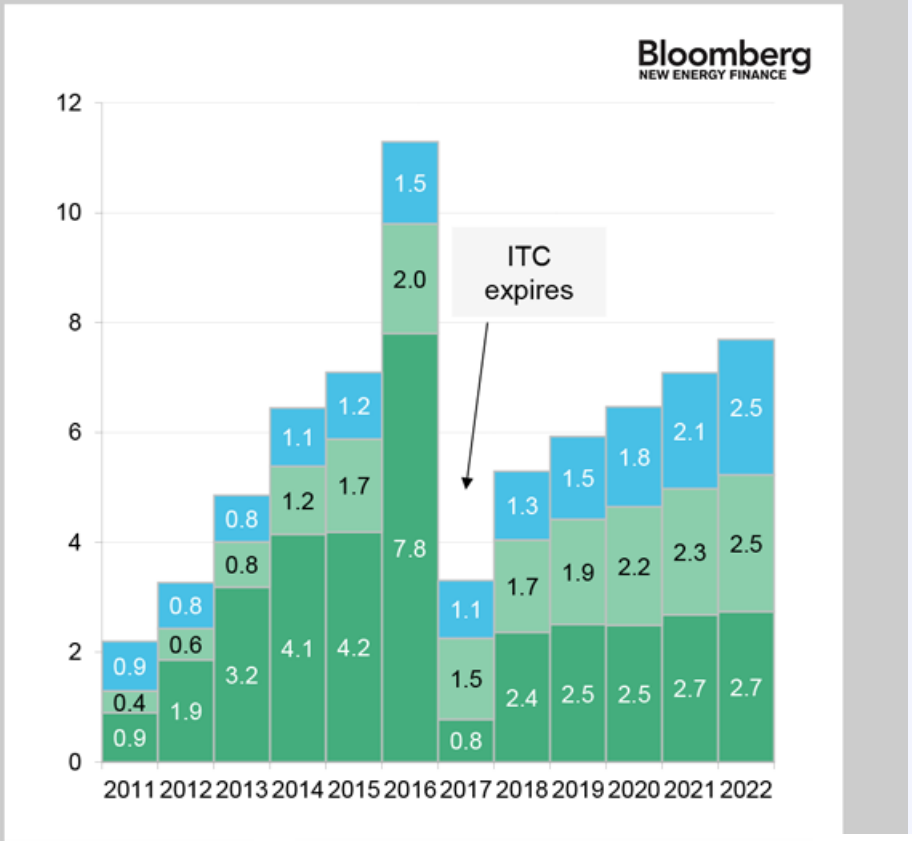
Availability: Residential - Expires 12/31/2021

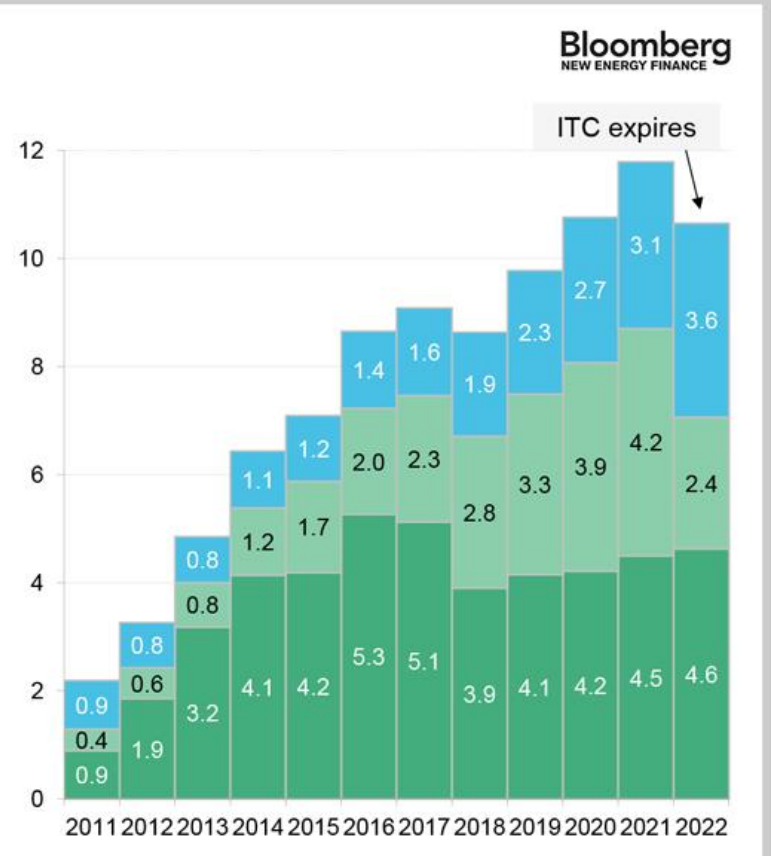
Commercial - Permanent 10% Credit

Credit available if construction commences before end of year

Source: Database of State Incentives for Renewables and Efficiency

Investment Tax Credit





Utility Residential Commercial and industrial

Projection with ITC extended, more than 69 GW of new solar power would be built across America between 2016 and 2022, representing **a 22 GW increase over previous policy. Utility 10 GW, Commercial 5 GW, Residential 7GW**

A Policy Driven Market

Accelerated Depreciation

Type: Accelerated Depreciation (Modified Accelerated Cost-Recovery System, or MACRS)

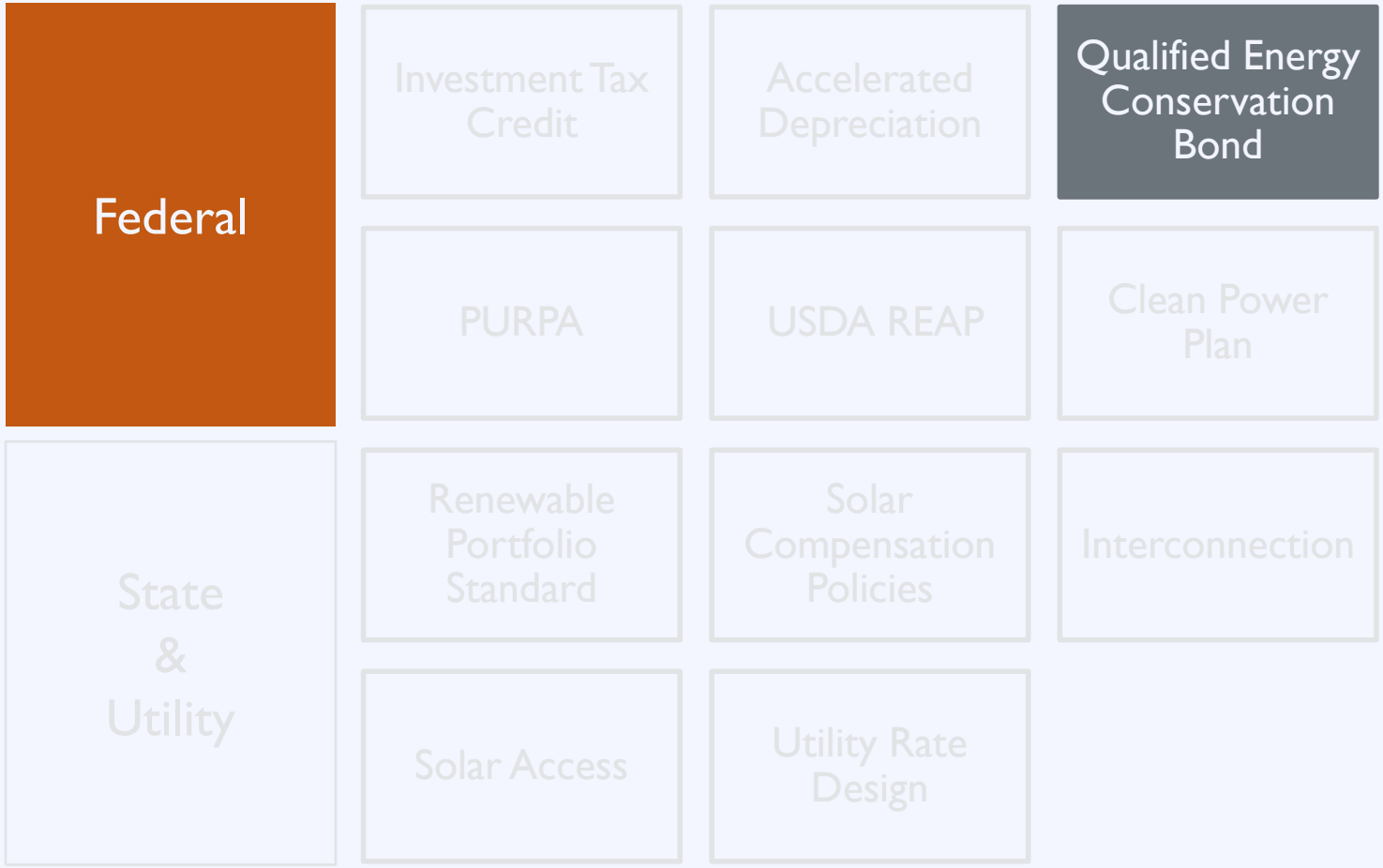
Eligibility: For-Profit Organization

Value: Depreciate solar asset over 5 years (vs. lifetime of system)

Bonus depreciation offered through 2019

- 50% bonus through 2017
- 40% bonus in 2018
- 30% bonus in 2019

A Policy Driven Market



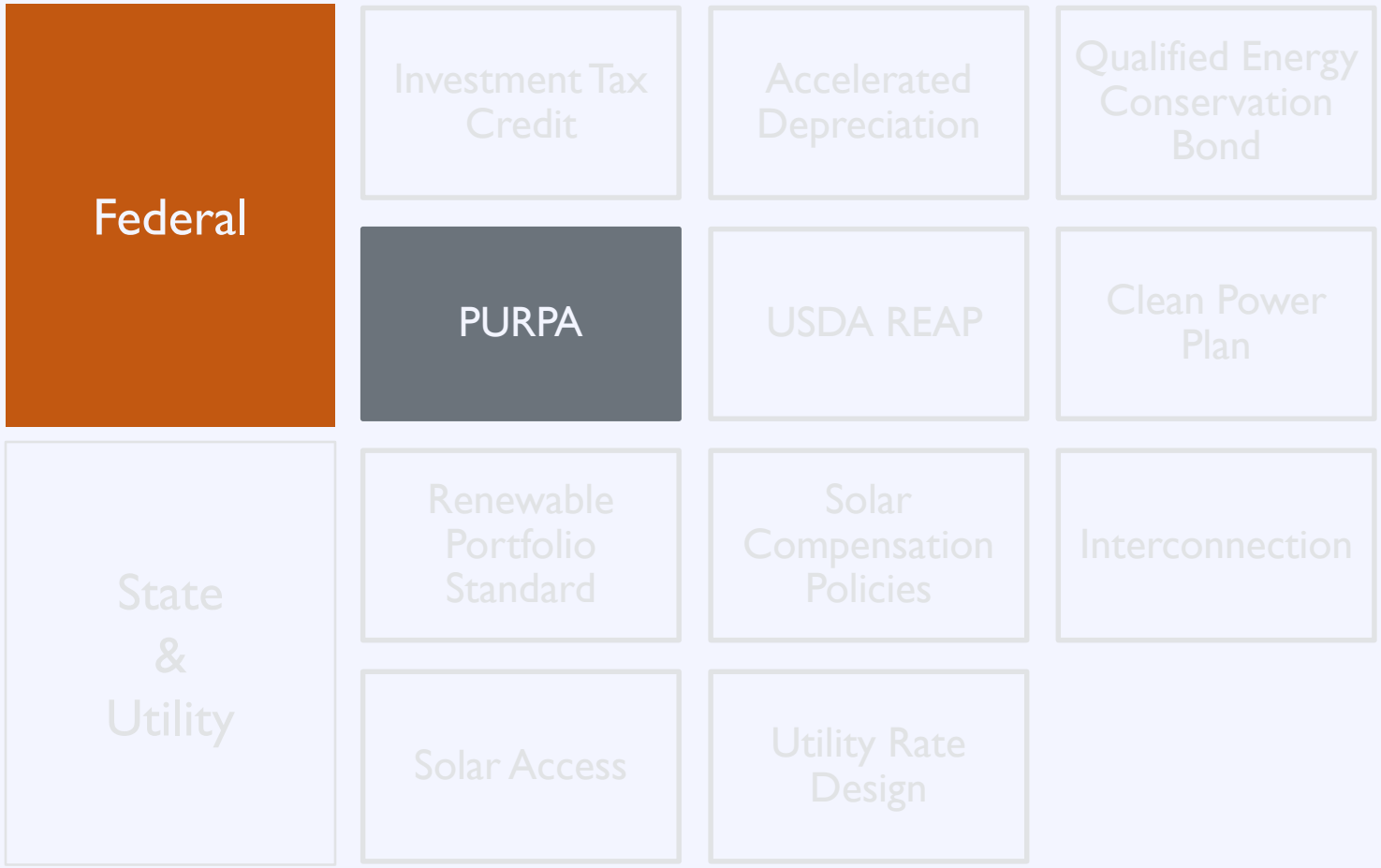
Qualified Energy Conservation Bond

Local Government	Amount	Use
Total Allocated	$48,364,000	
Total Used	$39,325,325	Increasing building efficiency of municipal facilities and schools (Montgomery County Commission, City of Trussville, City of Scottsboro, City of Foley, City of Vestavia Hills, Madison County Board of Education)
Total Remaining	**$9,038,674**	

Powered by SunShot U.S. Department of Energy

Source: Energy Programs Consortium (February 2016)

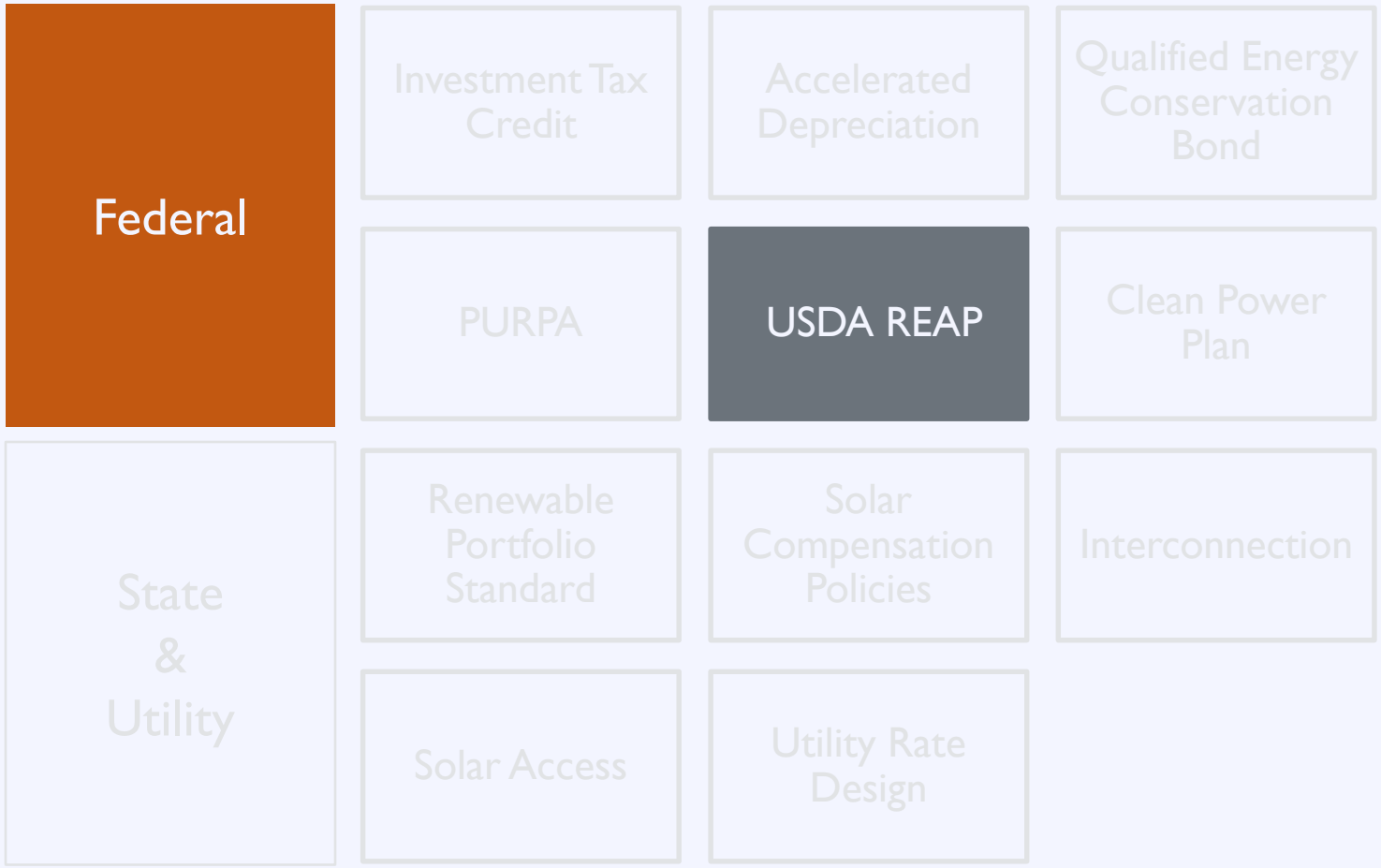
A Policy Driven Market



PURPA

- Public Utility Regulatory Policies Act (PURPA)
  - Federal law requiring utilities to interconnect renewable or CHP generators up to 80 MW ("Qualifying Facilities" or "QFs") and compensate for power produced at avoided cost rate
  - Also requires utilities to offer standard contracts to generators up to 100 kW unless a competitive market exists

A Policy Driven Market



USDA REAP

- USDA Rural Energy for America Program (REAP)
  - Guaranteed loan financing and grant funding for agricultural producers & rural small businesses to install renewable energy systems
  - Grants: $2,500-$500,000
  - Loan Guarantees: $5,000-$25 million
    - Up to 85% loan guarantee

Source: http://www.rd.usda.gov/programs-services/rural-energy-america-program-renewable-energy-systems-energy-efficiency

USDA REAP

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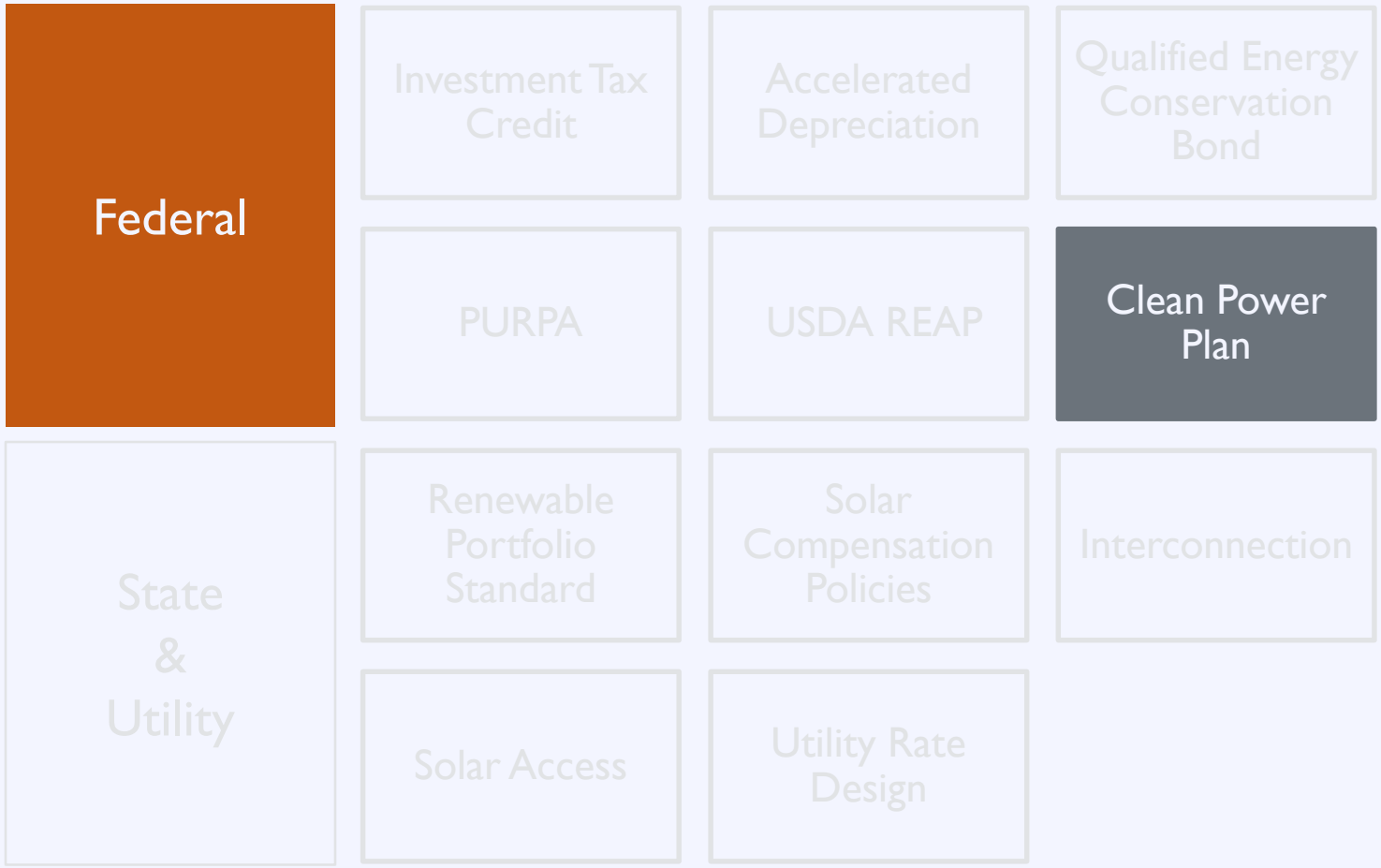
U.S. Department of Energy

A Policy Driven Market



Clean Power Plan

- On February 9, 2016, the Supreme Court stayed implementation of the Clean Power Plan pending judicial review. The Court's decision was not on the merits of the rule.
- Alabama is part of a large coalition of states opposing the Clean Power Plan and has suspended the state's development of a compliance strategy

Clean Power Plan

- The Clean Air Act – under section 111(d) – creates a partnership between EPA, states, tribes and U.S. territories – with EPA setting a goal and states and tribes choosing how they will meet it.
- EPA is establishing interim and final carbon dioxide (CO_2) emission performance rates for natural gas and fossil fuel electric generating units (EGUs):

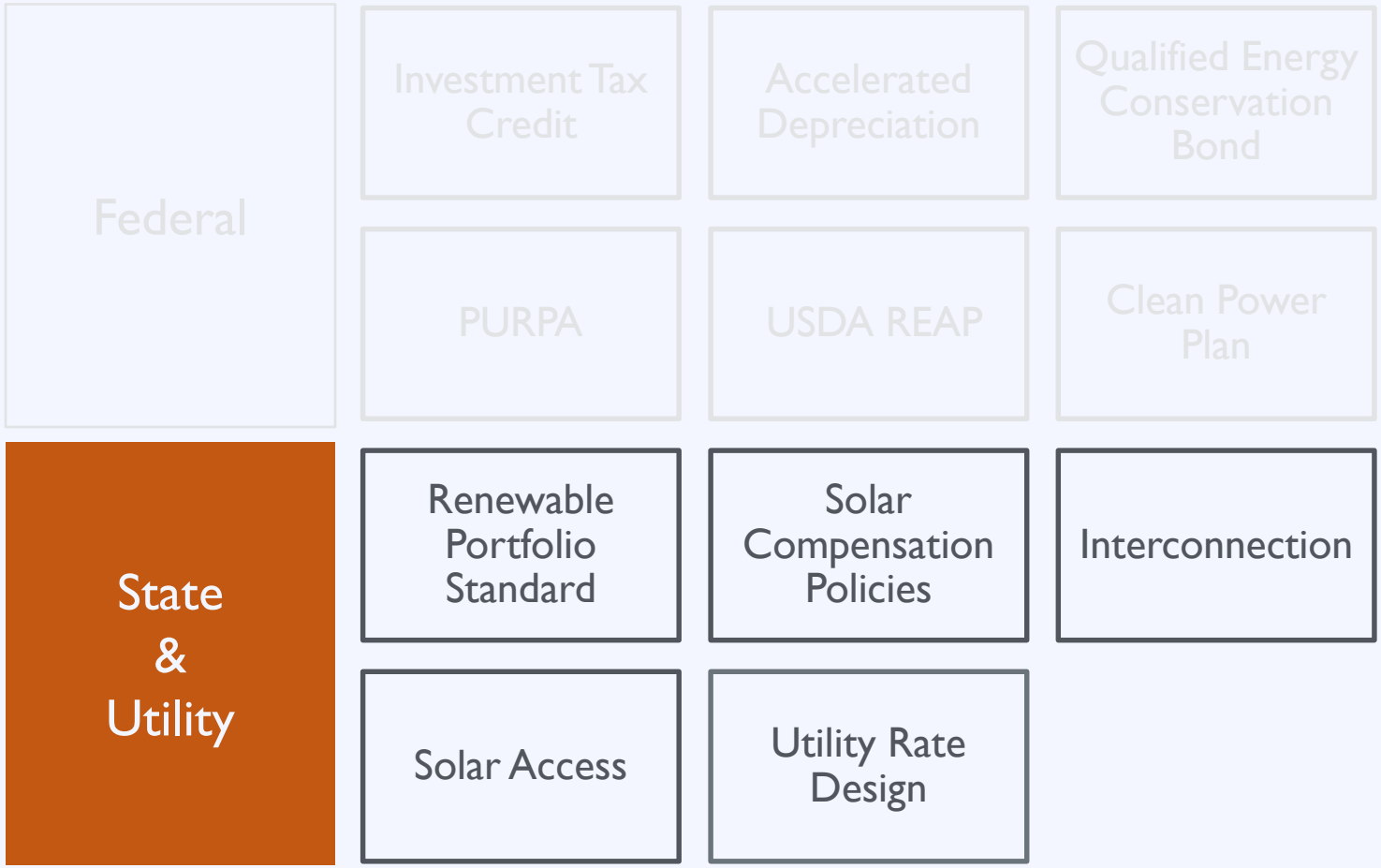
Clean Power Plan

- To maximize the range of choices available to states, there are three metrics:
  - A rate-based state goal measured in pounds per megawatt hour (lb/MWh);
  - A mass-based state goal measured in total short tons of CO2;
  - A mass-based state goal with a new source complement measured in total short tons of CO2.

Clean Power Plan

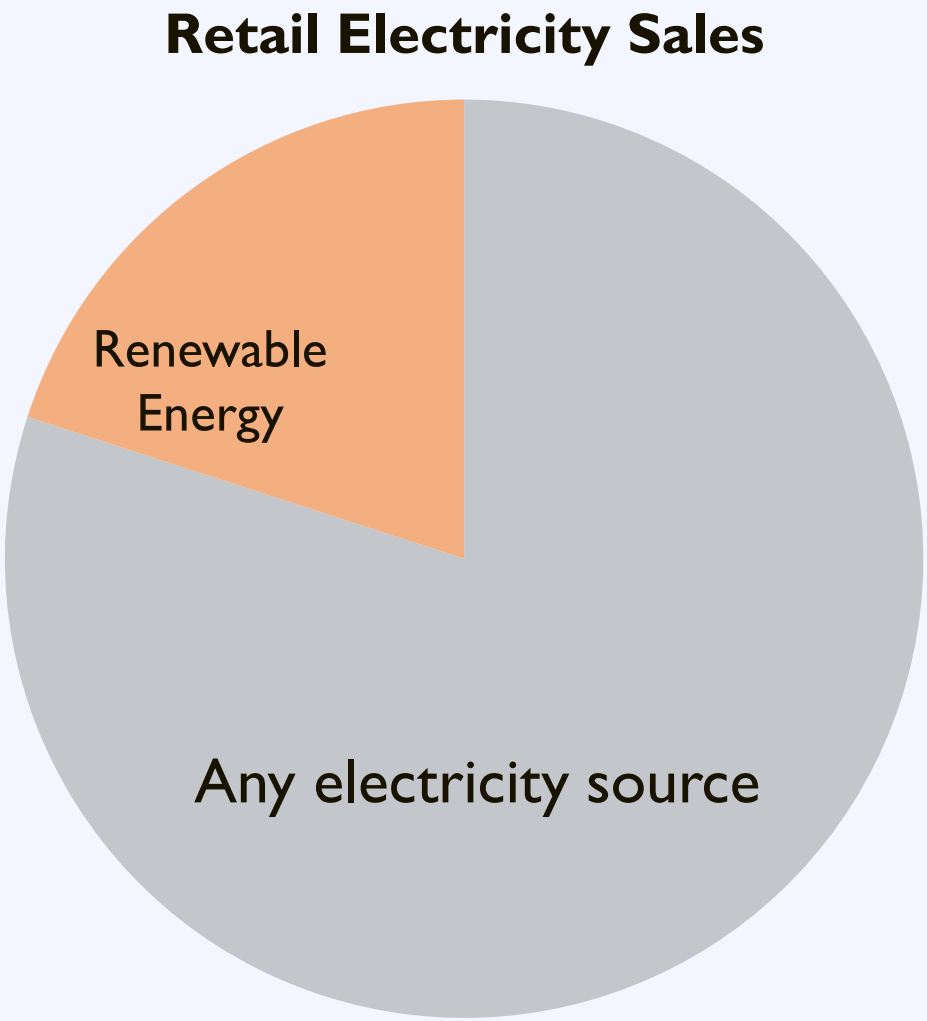
- States then develop and implement plans that ensure that the power plants in their state – either individually, together or in combination with other measures – achieve the interim CO2 emissions performance rates over the period of 2022 to 2029 and the final CO2 emission performance rates, rate-based goals or mass-based goals by 2030.

A Policy Driven Market

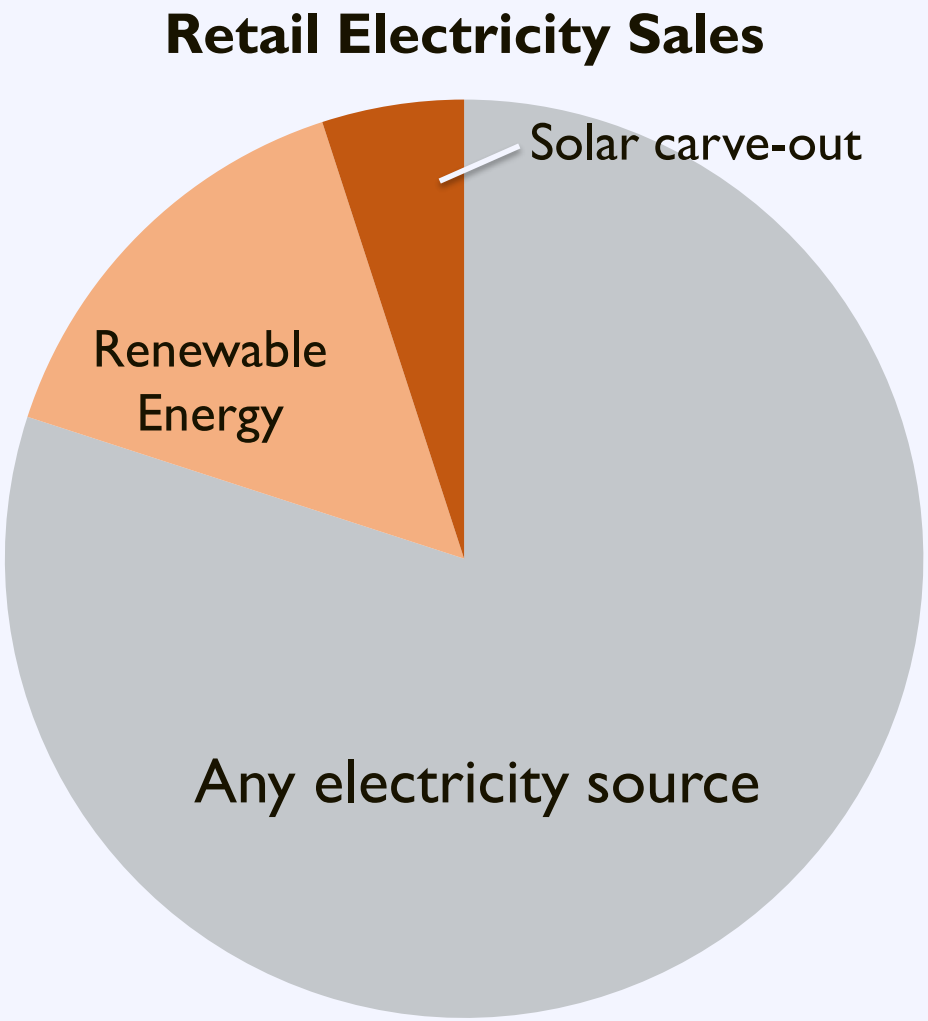


A Policy Driven Market

Renewable Portfolio Standard



Renewable Portfolio Standard



RPS Impacts: Solar Deployment

RPS and Solar/DG Status of Top Ten Solar States by Cumulative Installed Capacity (as of Q1 2015)

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

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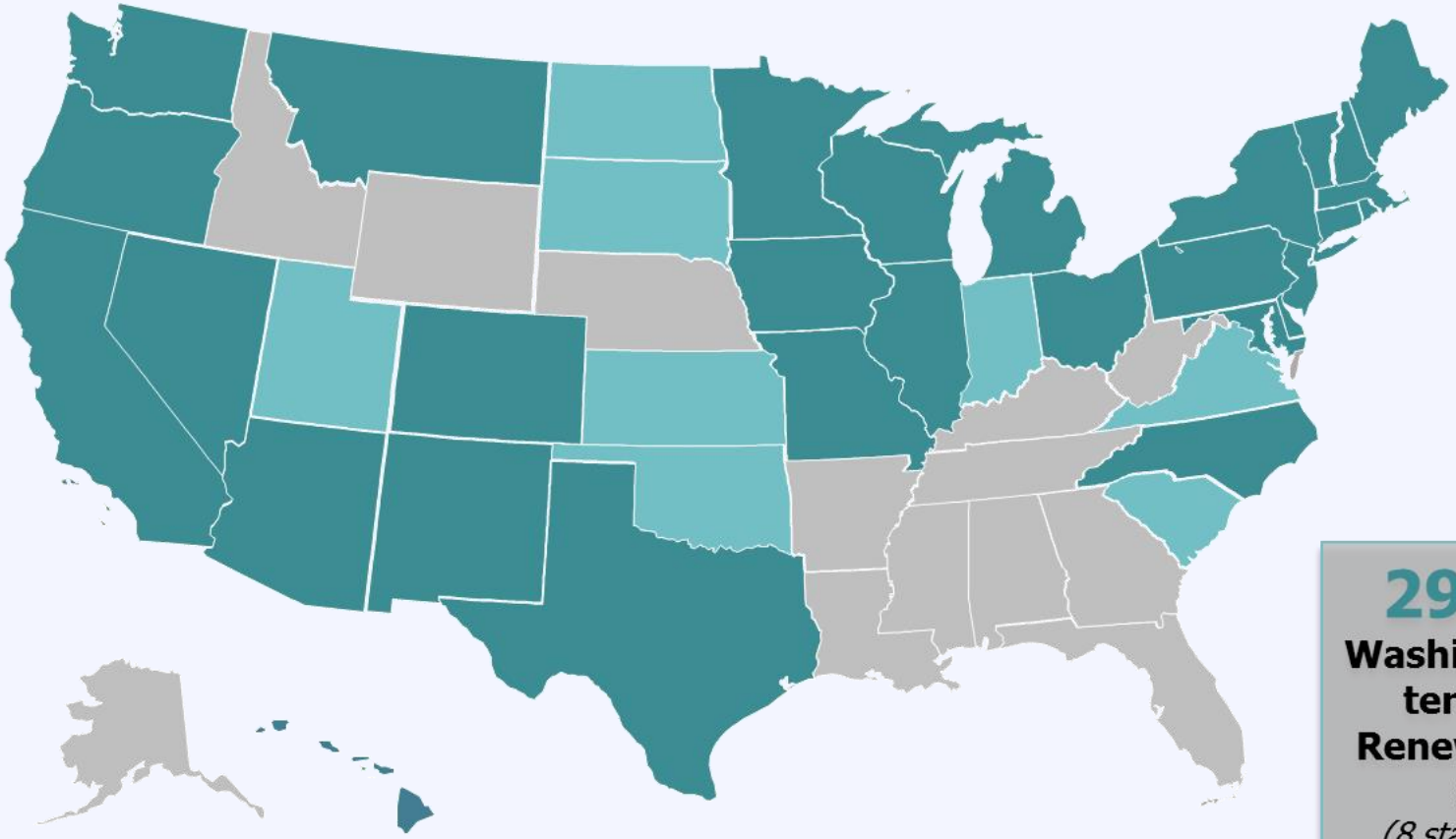
Source: DSIRE Solar (http://dsireusa.org/documents/summarymaps/Solar_DG_RPS_map.pdf); Solar Energy Industries Association/ GTM Research *Solar Market Insight 2013 Year-in-Review*

Renewable Portfolio Standard

www.dsireusa.org / March 2016



Renewable Portfolio Standard

Renewable Portfolio Goal

29 states+

Washington DC and 3 territories have Renewable Portfolio Standards

(8 states and 1 territory have renewable portfolio goals).

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U.S. Department of Energy

A Policy Driven Market

Net Metering: Market Share

More than **95%** of distributed PV Installations are net-metered

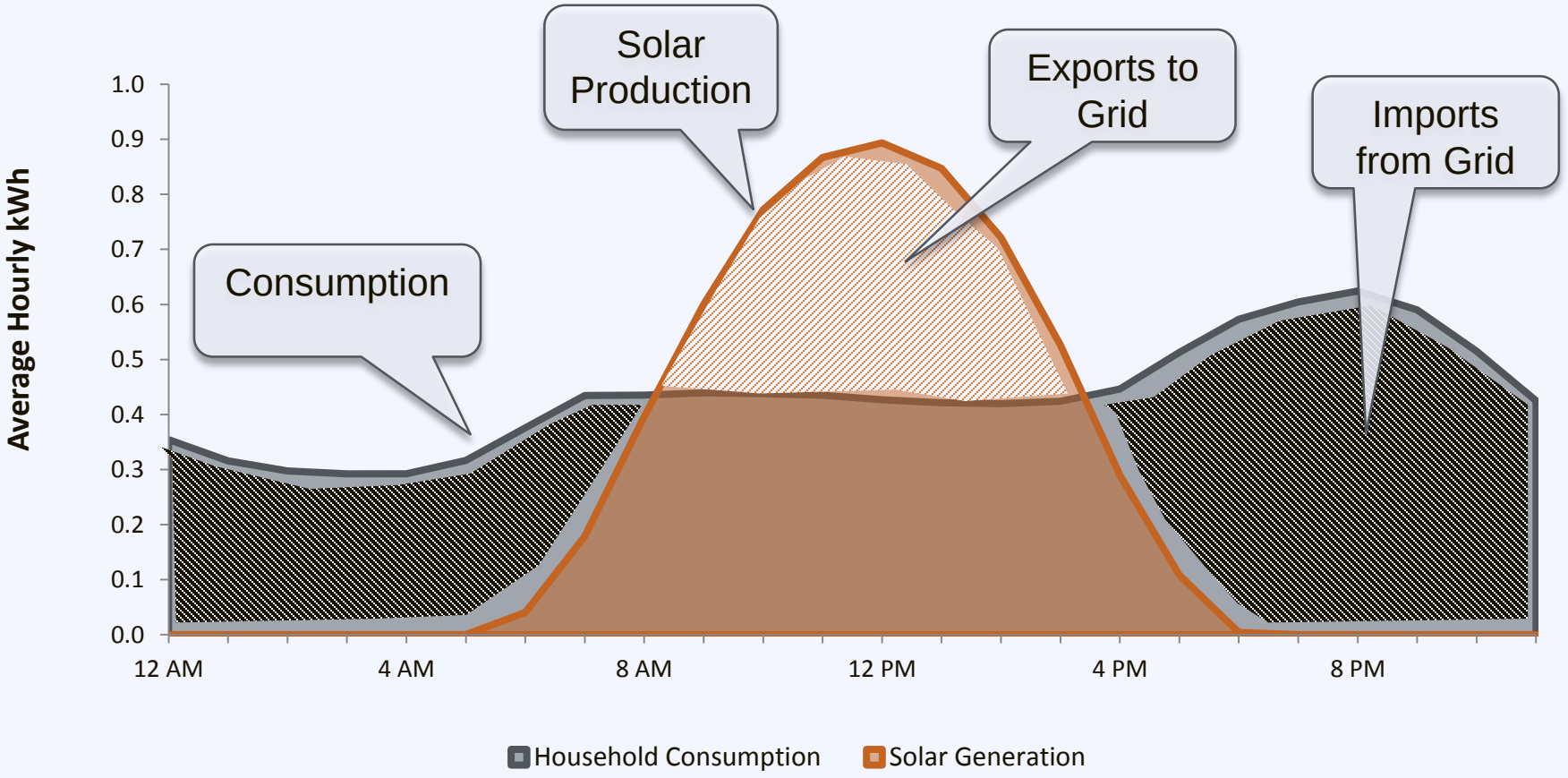
Powered by SunShot U.S. Department of Energy

Source: IREC, *U.S. Solar Market Trends 2013* (http://www.irecusa.org/annual-u-s-solar-market-trends-report/)

Net Metering

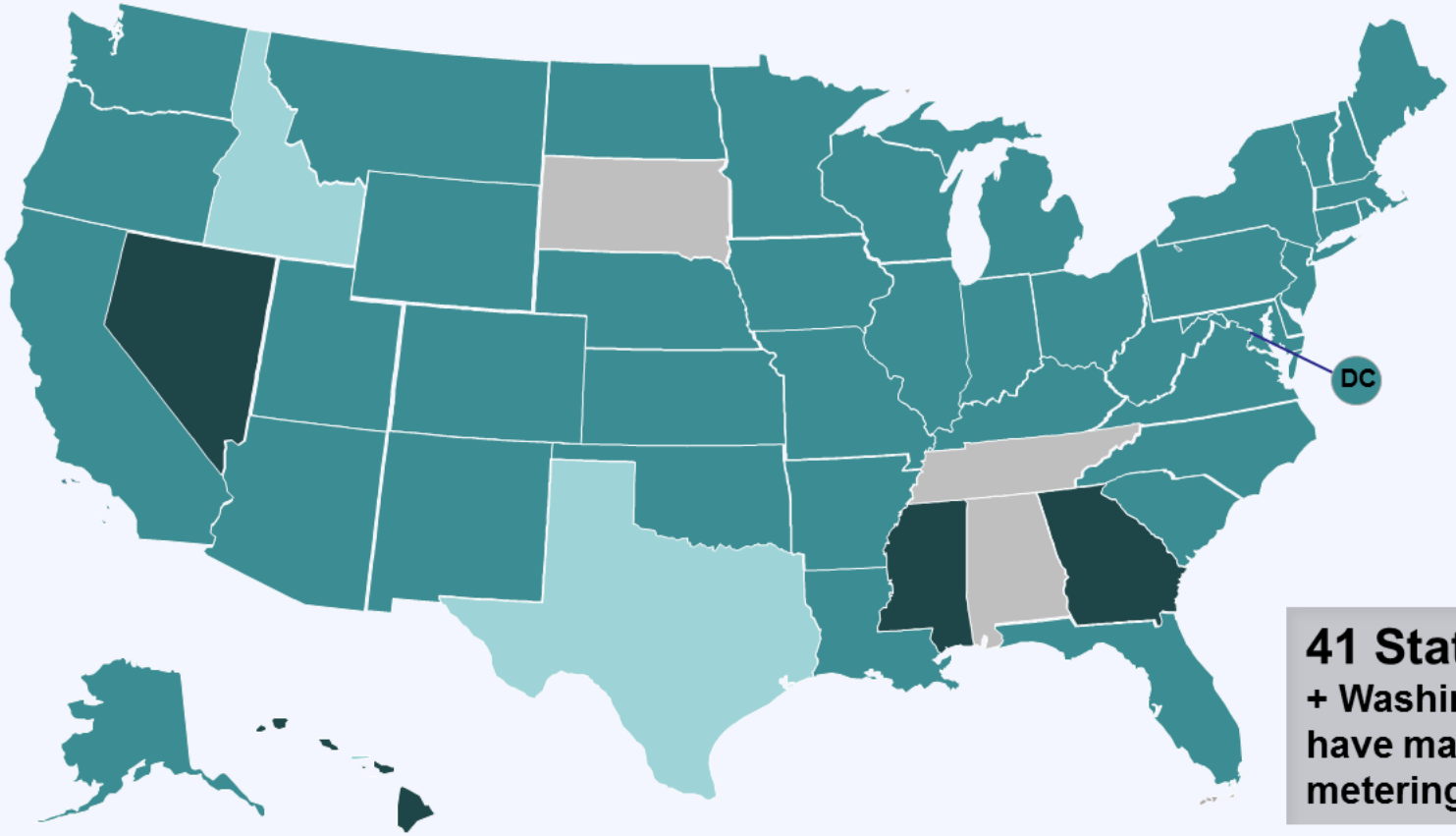
Net metering allows customers to export power to the grid during times of excess generation, and receive credits that can be applied to later electricity usage.

Net Metering



Net Metering

www.dsireusa.org / March 2016



41 States
+ Washington DC have mandatory net metering rules.

State-developed mandatory rules for certain utilities (41 states + DC)

No statewide mandatory rules, but some utilities allow net metering (2 states)

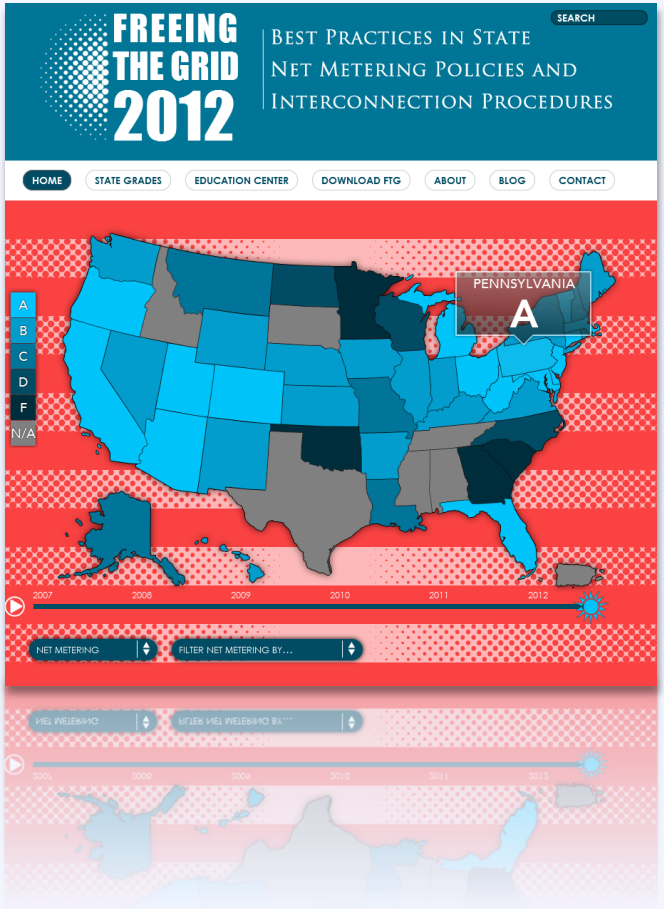
Statewide distributed generation compensation rules other than net metering (4 states)

Net Metering: Resources

Resource **Freeing the Grid**

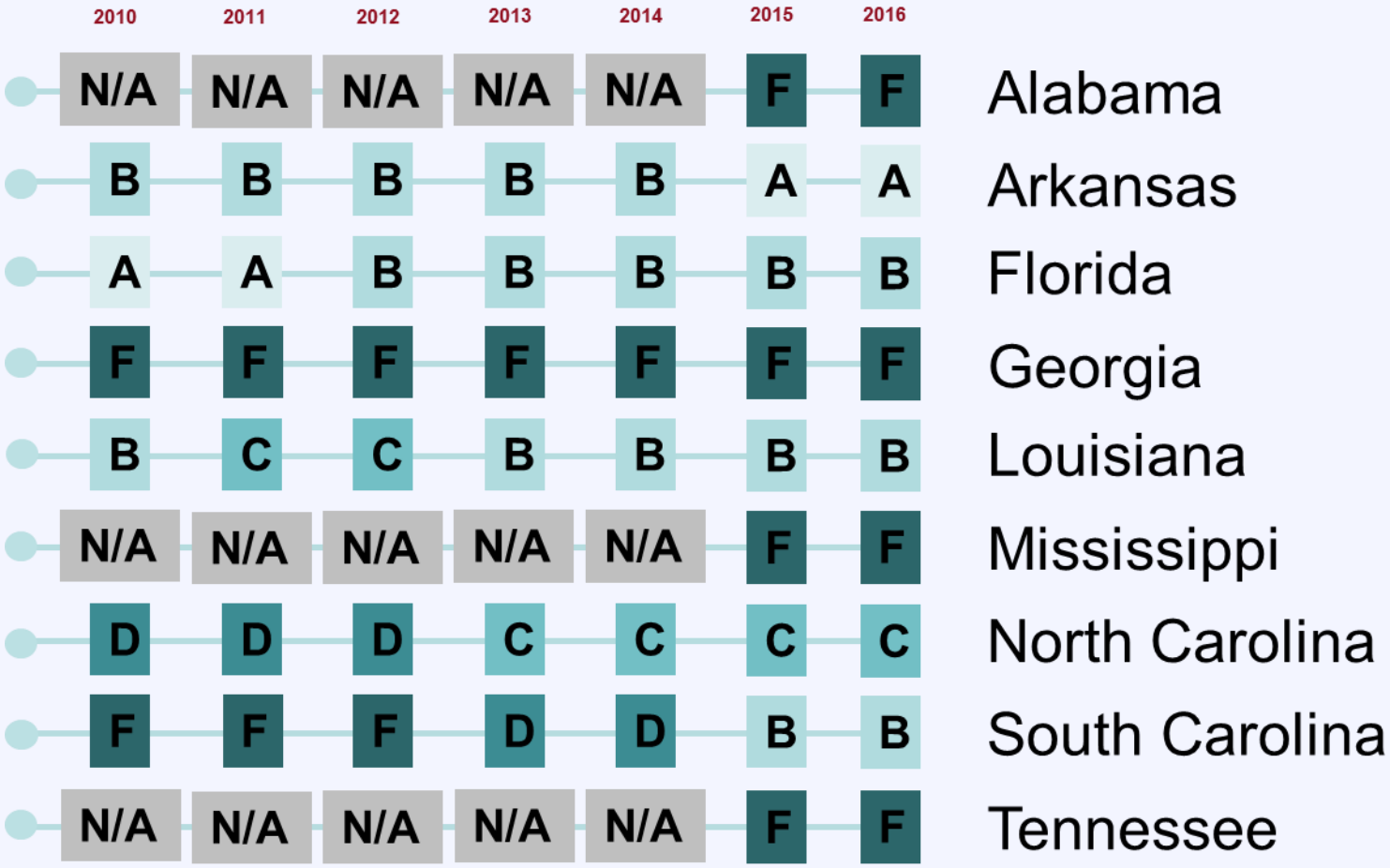
Provides a "report card" for state policy on net metering and interconnection

http://freeingthegrid.org/



Net Metering

Freeing the Grid Southeastern State Policy Grades 2010-2016



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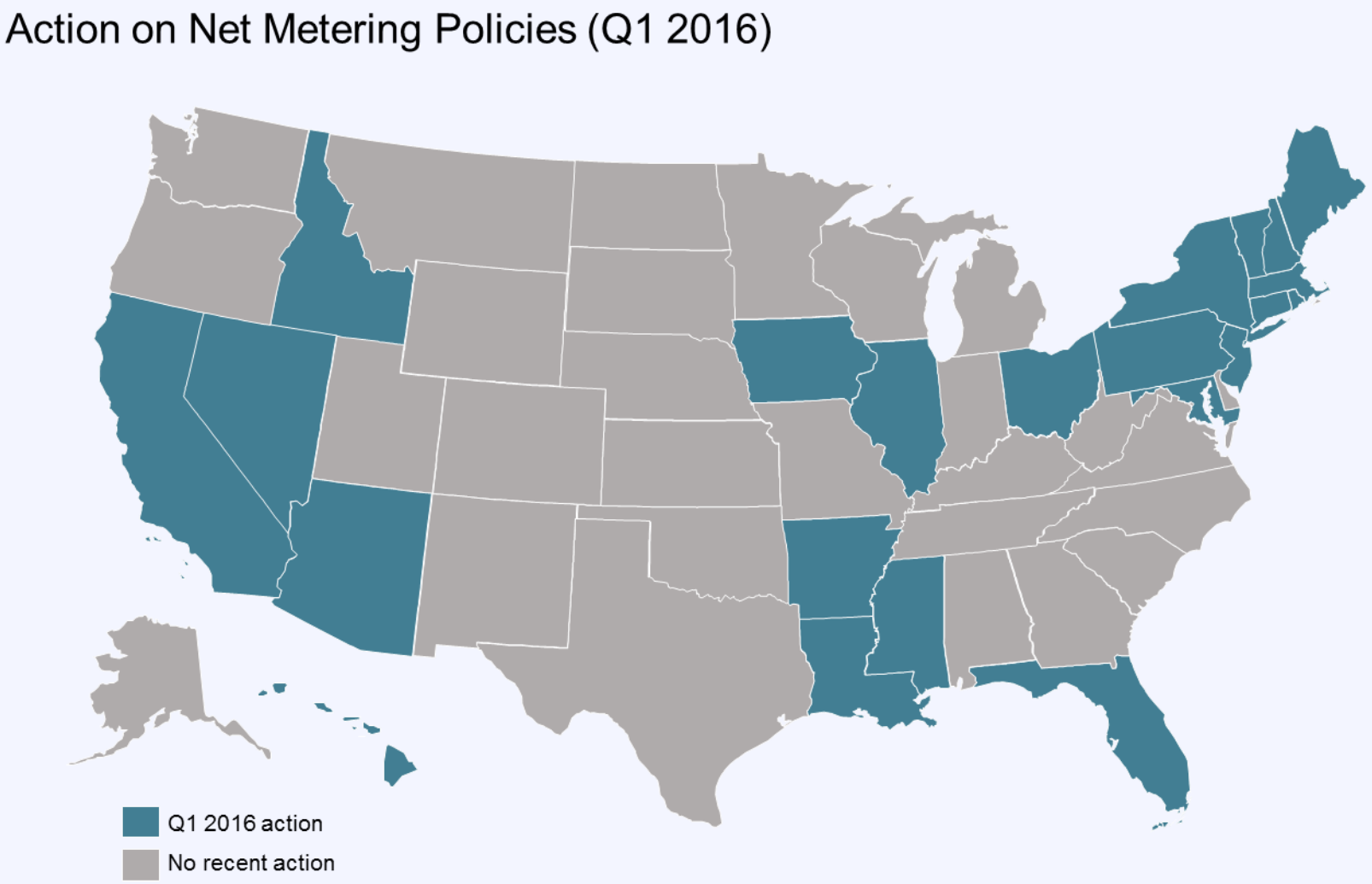
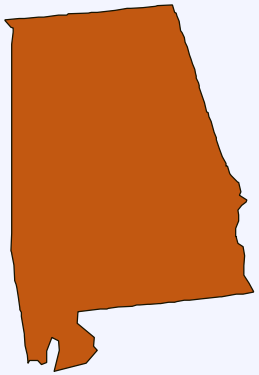
Net Metering



Source: The 50 States of Solar Q1 2016 Quarterly Update

Solar Compensation: Alabama

- Alabama is one of six states without a statewide net metering policy
- Huntsville is part of Tennessee Valley Authority (TVA) territory
- TVA is a federal entity – produces power and sells to public power utilities (i.e., Huntsville Utilities)



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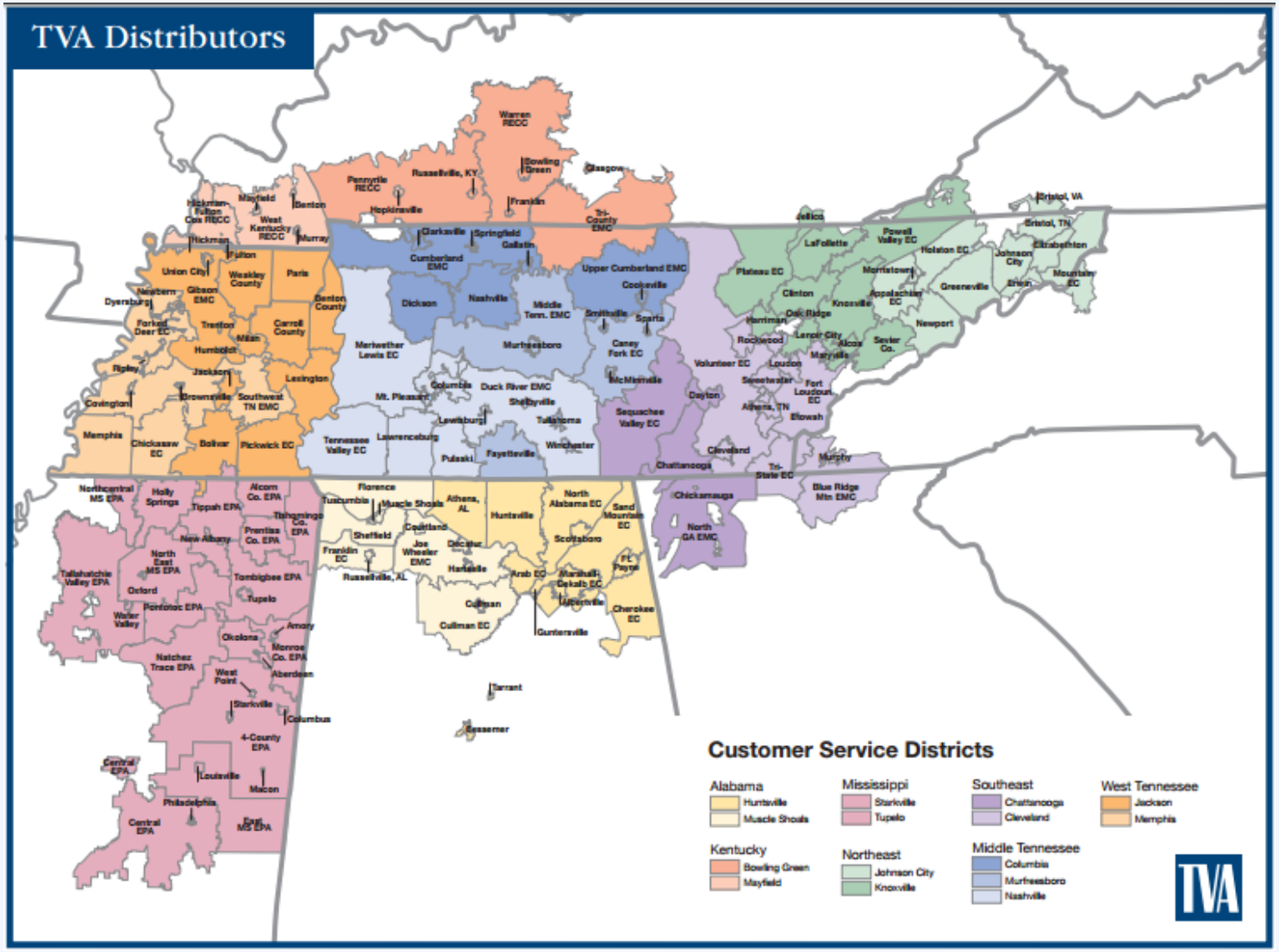
Tennessee Valley Authority



TVA Green Power Providers

- Green Power Providers performance-based incentive program
  - Retail rate credit for generation
  - Systems up to 50 kW
  - Limited program capacity (2016 program capacity is 5 MW for residential, 5 MW for non-residential)

https://www.tva.com/file_source/TVA/Site%20Content/Energy/Renewables/GPP%20Guidelines_2016%20FINAL.pdf

TVA Distributed Solar Solutions

- Systems over 50 kW and up to 5 MW
- Limited program capacity (10 MW)
- TVA purchases output at contracted price for 20-year term

TVA DG-IV Process

- TVA recently studied the value of solar ("Distributed Generation – Integrated Value")
- Puts value of solar below retail rate
- Is a starting point – other values that are not included may be in a more formal analysis

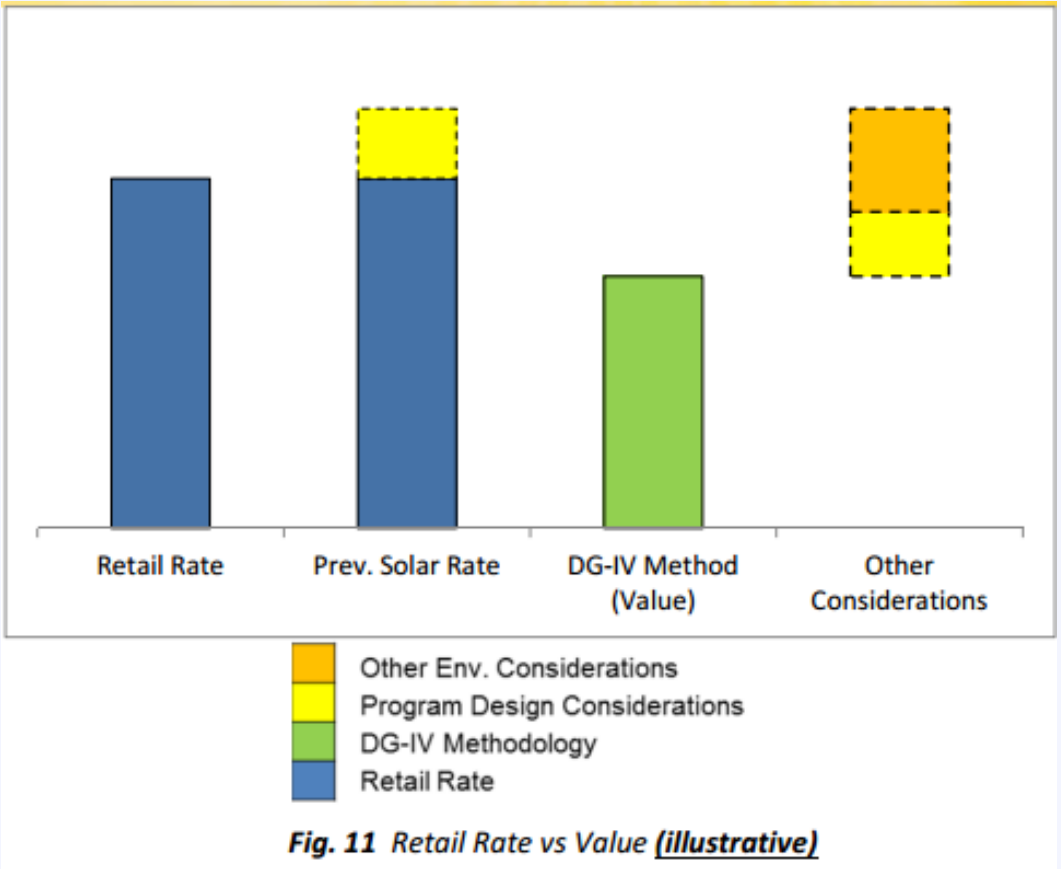


Fig. 11** Retail Rate vs Value **(illustrative)

https://www.tva.gov/file_source/TVA/Site%20Content/Energy/Renewables/dgiv_document_october_2015-2.pdf

A Policy Driven Market

Interconnection

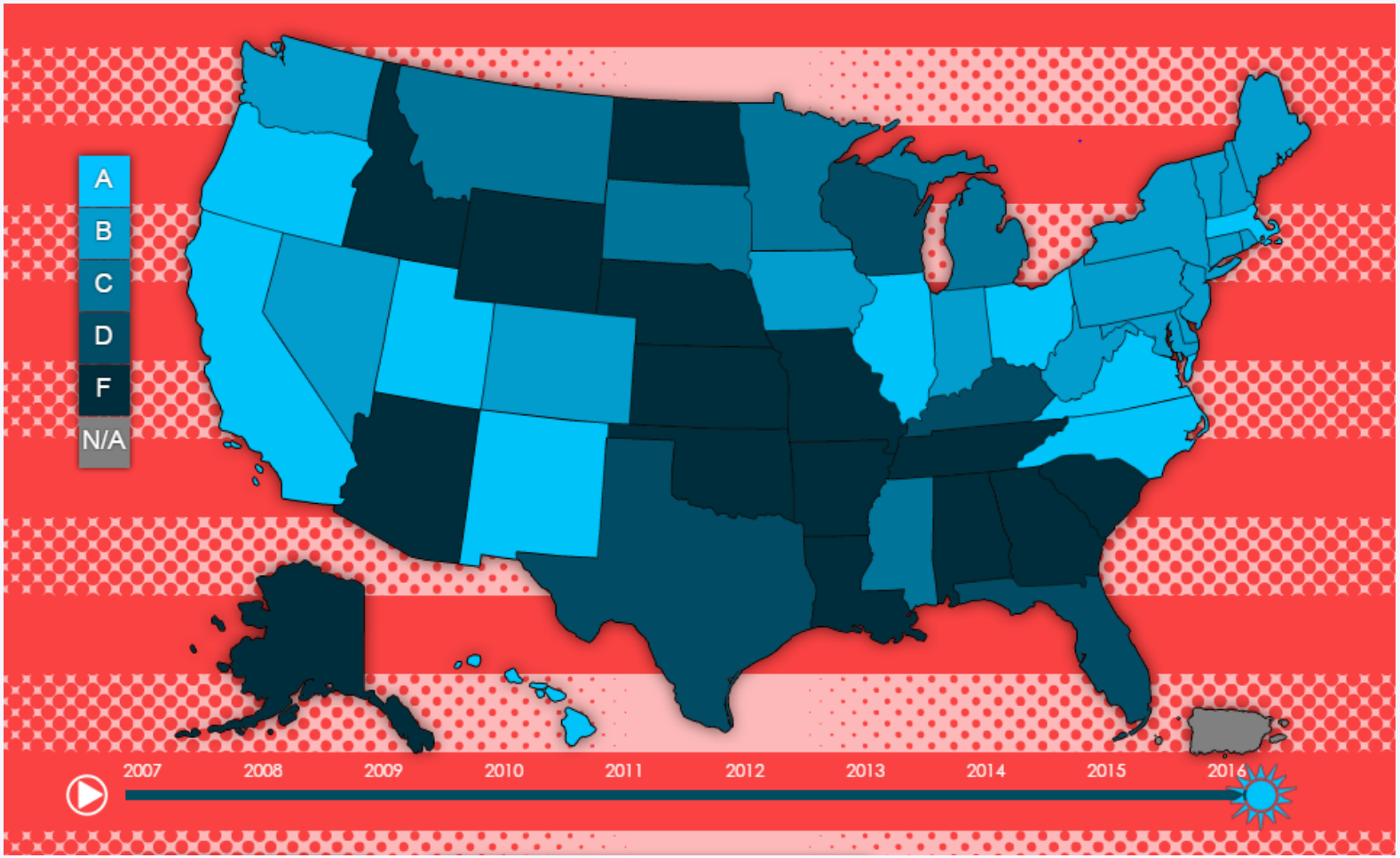
Standardized interconnection rules require utilities to provide a fair and transparent pathway for customer-generators and other developers of distributed energy resources to interconnect with the utility's grid.

Interconnection

- A 2015 NREL study analyzed 5 of the major solar markets in the U.S. and found that the median time for utility interconnection was **53 days**
  - Median times in CA and AZ: 50 days and 54 days
  - Only 7 states received an "A" grade from Freeing the Grid on their interconnection standards

Photon Magazine; NREL – Ardani et al. 2015 (http://www.nrel.gov/docs/fy15osti/63556.pdf)

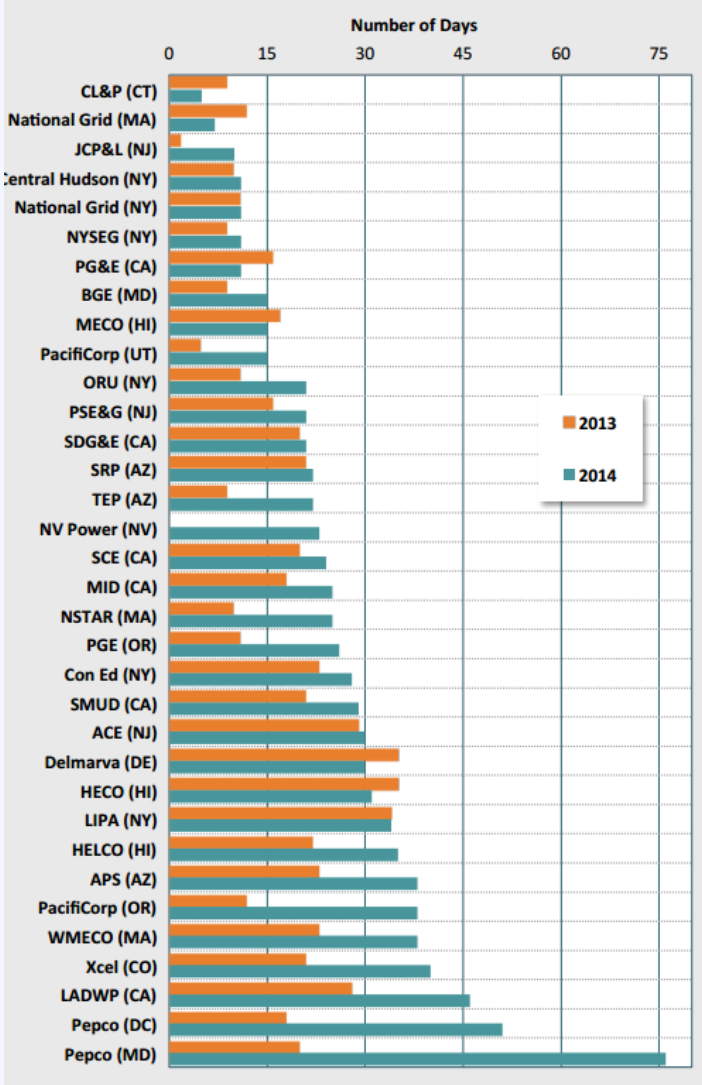
Interconnection: Alabama



Source: Freeing the Grid

Interconnection

- In 2013, the average PTO waiting period ranged from two days for JCP&L (NJ) to 35 days for Delmarva (DE).
- In 2014, the average PTO waiting period ranged from five days for CL&P (CT) to 76 days for Pepco (MD).
- The average PTO waiting period per utility rose 68% in 2014 compared to 2013. Of the 33 utilities surveyed for both years, 25 utilities took more time to process PTO approval in 2014 than in 2013.



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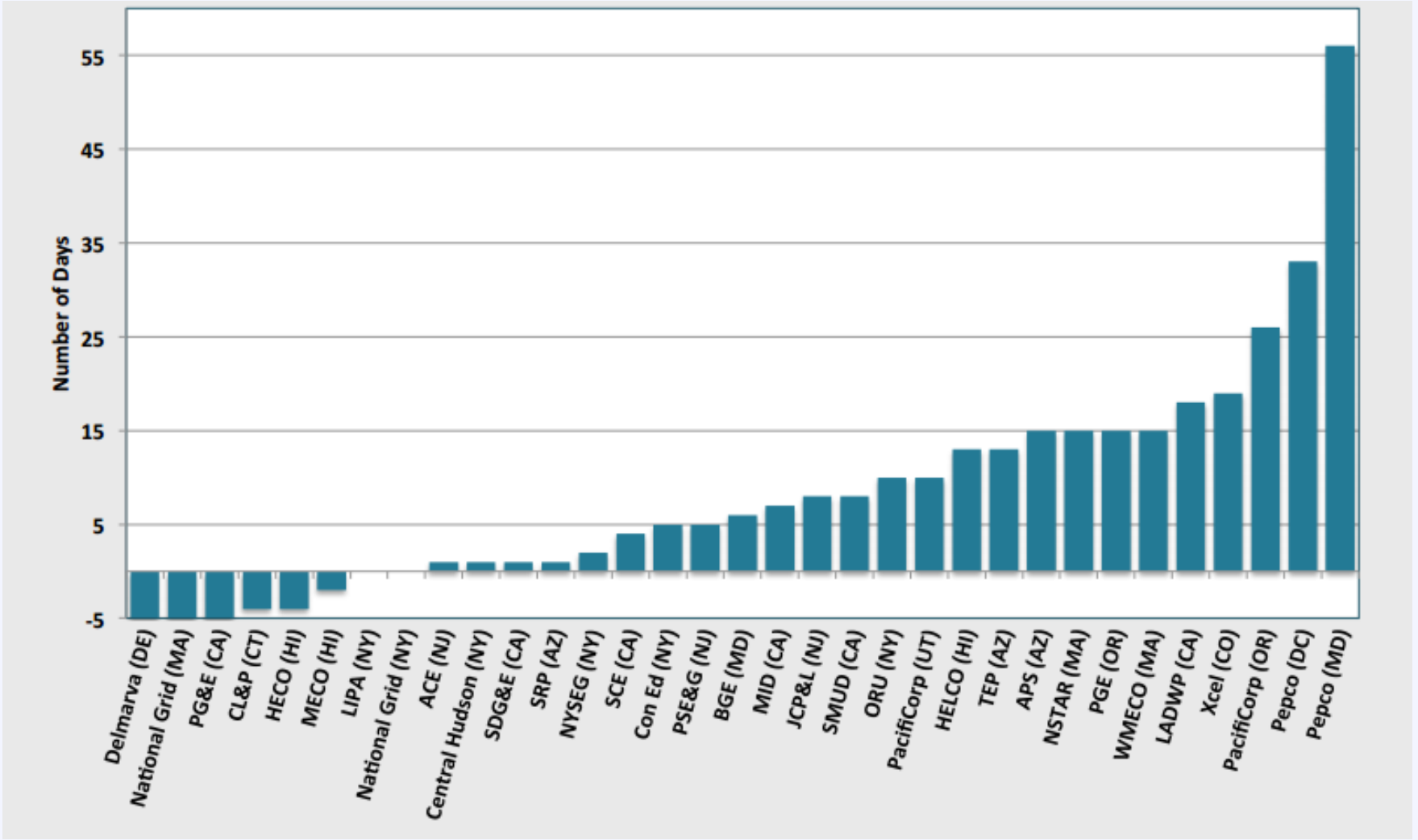
http://eq-research.com/wp-content/uploads/2015/07/IC-PTO-Timeline-Report-7-2015.pdf

Interconnection



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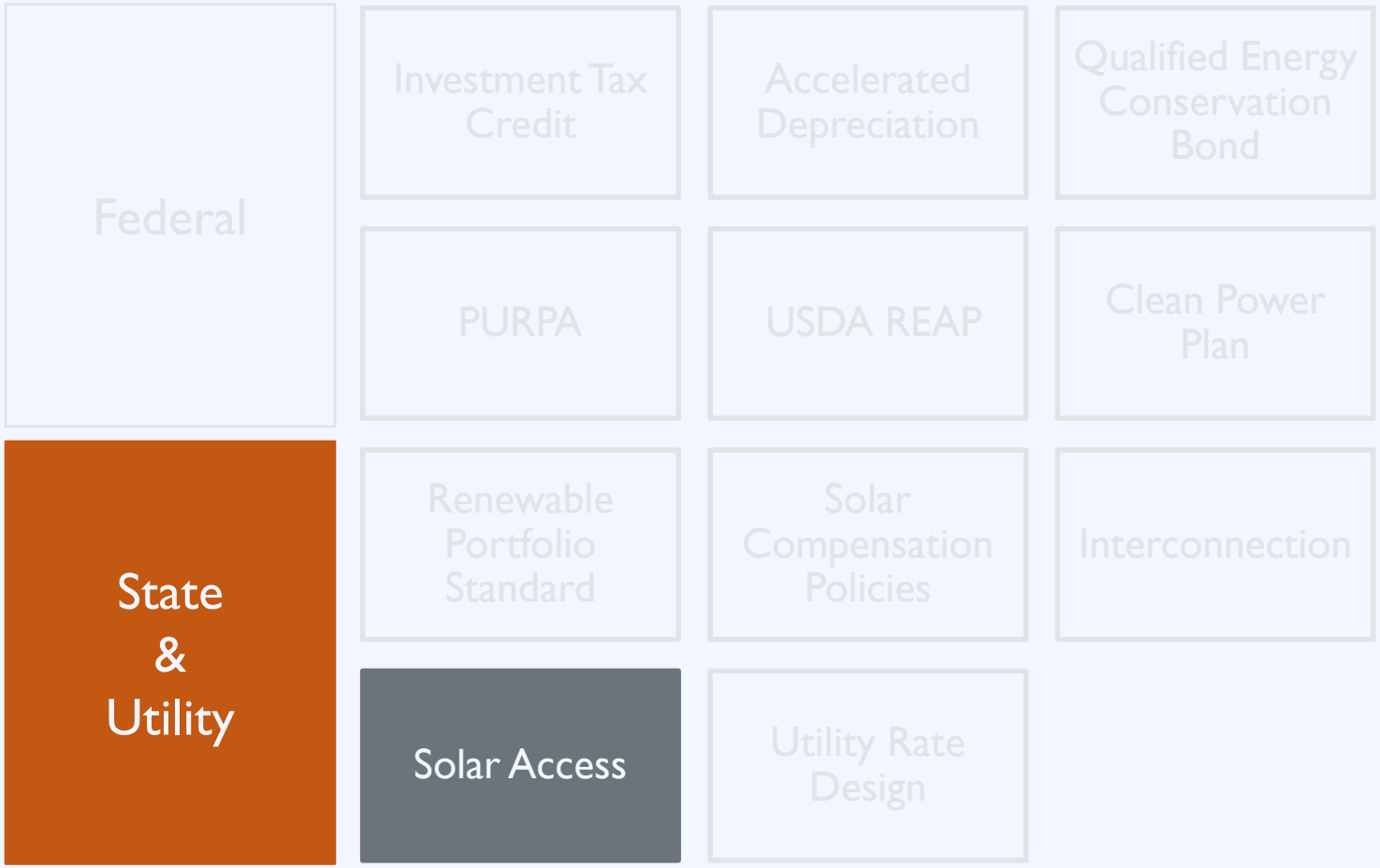
http://eq-research.com/wp-content/uploads/2015/07/IC-PTO-Timeline-Report-7-2015.pdf

A Policy Driven Market



Solar Access

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

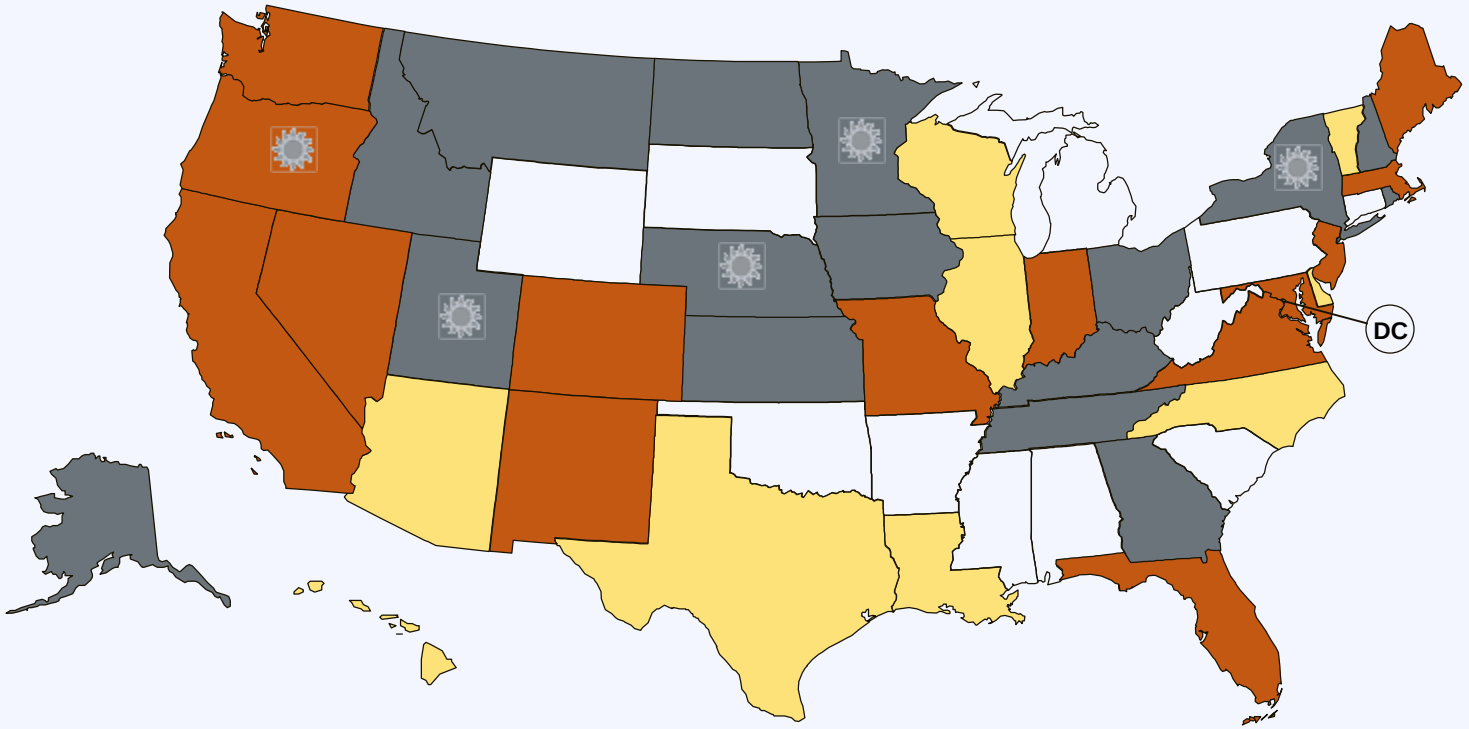
Source: Google Earth

Solar Access

Solar Access Laws:

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

Solar Access



Solar Easements Provision

Solar Rights Provision

Solar Easements and Solar Rights Provisions

U.S. Virgin Islands

Local option to create solar rights provision

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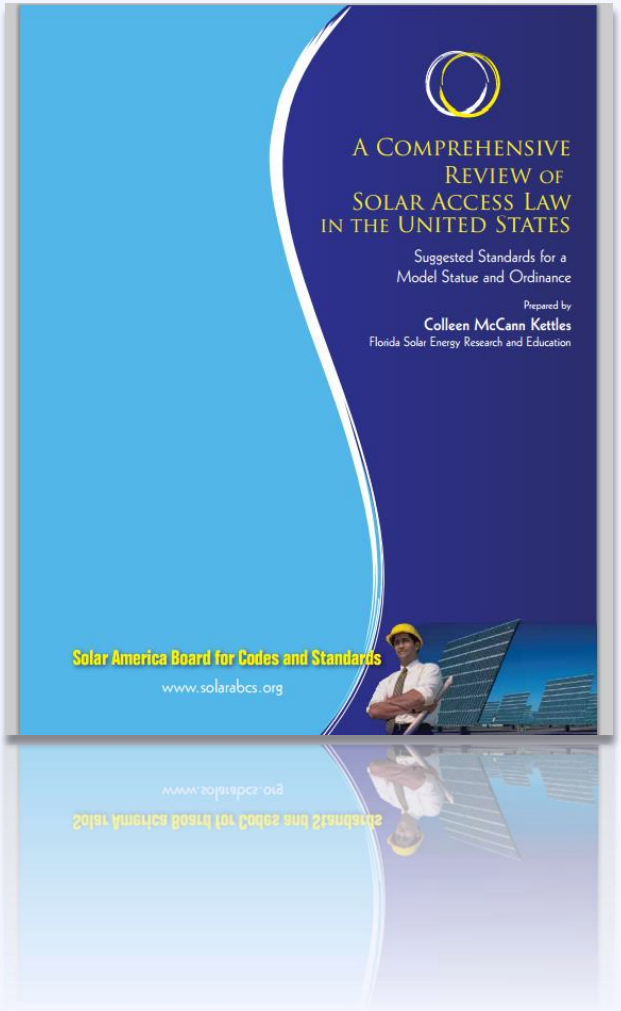
Source: Database of State Incentives for Renewables & Efficiency (www.dsireusa.org)

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



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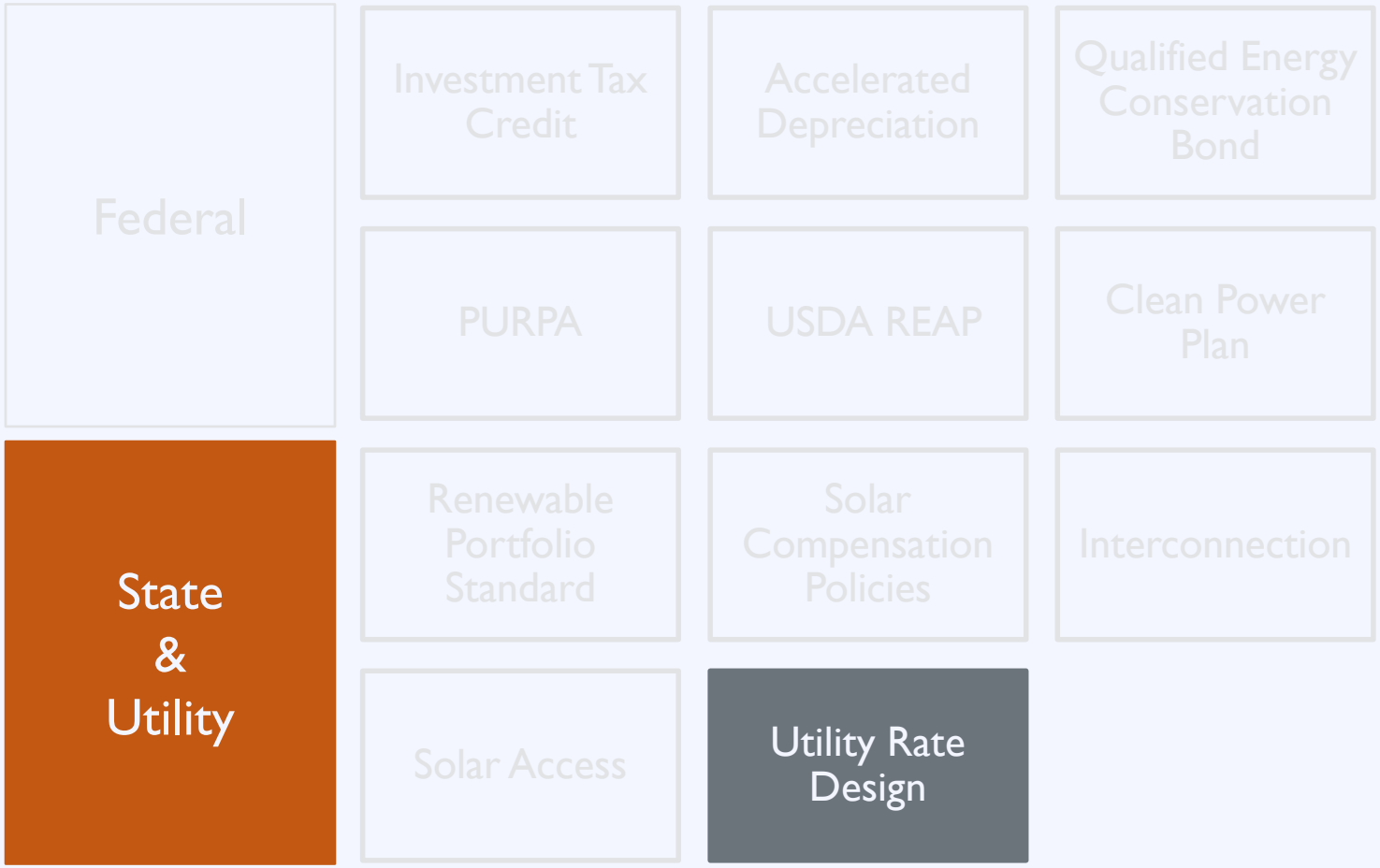
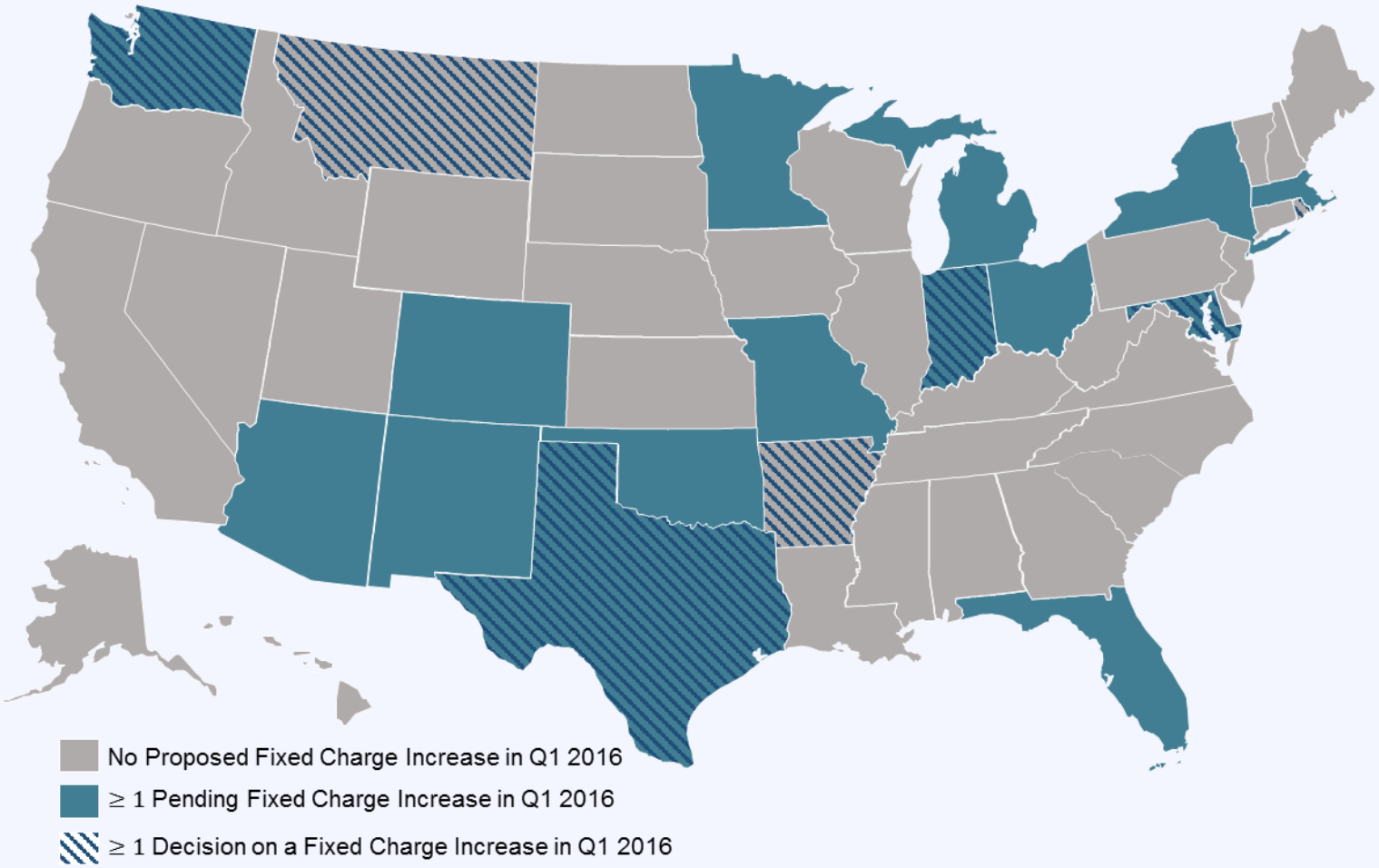
A Policy Driven Market

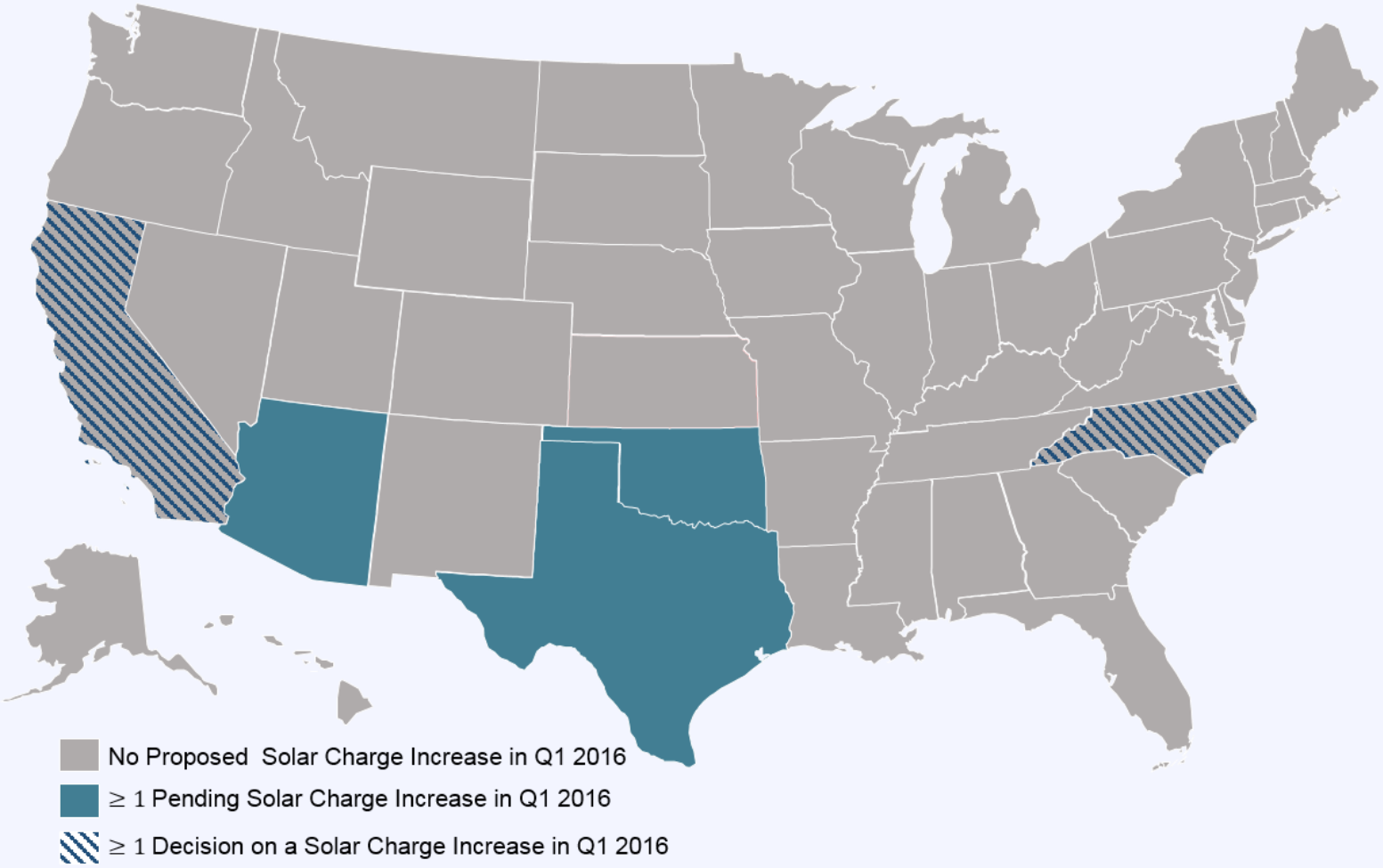


Utility Rate Design



Source: NCCETC, 50 States of Solar Q1 2016 Quarterly Report

Utility Rate Design



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Source: NCCETC, 50 States of Solar Q1 2016 Quarterly Report

Utility Rate Design

- Huntsville Utilities proposed a residential fixed charge increase in April 2016
- The proposal was rejected by the City Council
- Difference between municipal utility regulation and investor-owned utility regulation

Agenda

10:20 – 10:50	Putting Solar Energy on the Local Policy Agenda
10:50 – 11:20	State of the Local Solar Market
11:20 – 11:50	Federal, State, and Utility Policy Drivers
11:50 – 12:15	*Break and Lunch*
12:15 – 12:45	Planning for Solar: Getting Your Community Solar Ready
12:45 – 1:20	Solar Market Development Tools
1:20 – 1:30	*Break*
1:30 – 2:15	Local Speakers
2:15 – 3:00	Developing a Solar Policy Implementation Plan
3:00 – 3:30	Networking Opportunity

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Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Solar in Development Regulation

Effective Solar Permitting Process

Solar Market Development Tools

Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Visioning & goal setting

Effective Solar Permitting Process

Solar Market Development Tools

Visioning: Scales & Contexts

Every community is different!

Is solar on residential rooftops appropriate for your community?

Visioning: Scales & Contexts

Every community is different!

Is solar on commercial rooftops appropriate for your community?

Visioning: Scales & Contexts

Every community is different!

Is solar on historic structures appropriate for your community?

Visioning: Scales & Contexts

Every community is different!

Is solar on brownfields appropriate for your community?

Visioning: Scales & Contexts

Every community is different!

Is solar on greenfields appropriate for your community?

Visioning: Scales & Contexts

Every community is different!

Is solar on parking lots appropriate for your community?

Visioning: Scales & Contexts

Every community is different!

Is building-integrated solar appropriate for your community?

Planning for Solar Development

Communitywide Comprehensive Plan

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

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U.S. Department of Energy

Source: American Planning Association

City of Huntsville Sustainability Goals

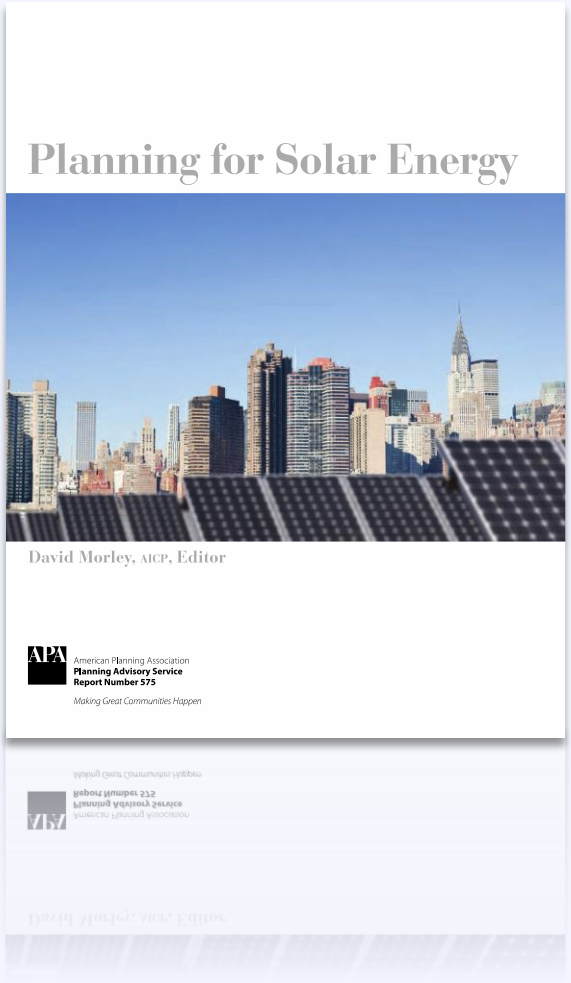
- Become the sustainable energy leader in Southeast
- Make it easier for businesses to access sustainable energy
- Help residents get access to sustainable energy
- Improve community resiliency

Technical Resources

Resource **Planning for Solar Energy**

A guide for planners on determining and implementing local solar goals, objectives, policies, and actions

www.planning.org



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Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Solar in Development Regulation

Effective Solar Permitting Process

Solar Market Development Tools

Zoning Standards

Section	Topics to Address
Definitions	Define technologies & terms
Applicability	Primary vs. accessory use
Dimensional Standards	• Height • Size • Setbacks • Lot coverage
Design Standards	• Signage • Disconnect • Screening • Fencing

Source: American Planning Association

Zoning Standards: Small Solar

Typical Requirements:

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

Zoning Standards: Large Solar

Typical Requirements:

- Allowed for primary use in limited locations
- Requirements:
  - Height limits
  - Lot coverage
  - Setback
  - Fencing and Enclosure

Zoning Standards: Historic

Typical Requirements:

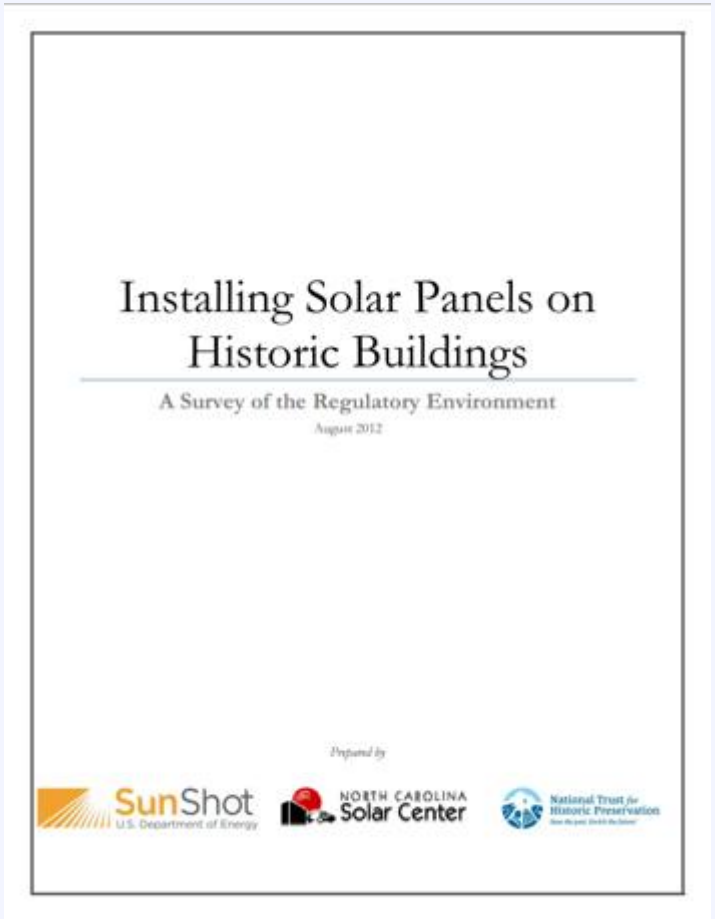
- Prevent permanent loss of "character defining" features
- Possible design requirements
  - Ground mounted
  - Flat roof with setback
  - Panels flush with roof
  - Blend color

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

Zoning Standards: Historic

Resource **North Carolina Clean Energy Technology Center**

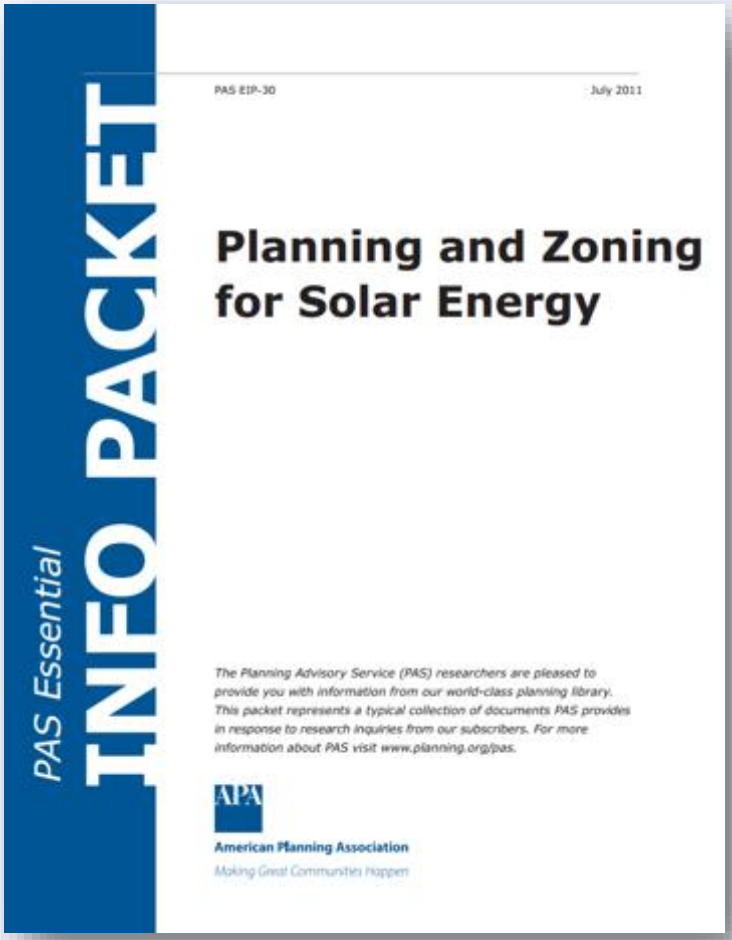
Provides sample design principles and example regulations incorporating historic preservation into sustainability and energy projects.



Zoning Standards: Model Ordinances

Resource **American Planning Association**

This Essential Info Packet provides example development regulations for solar.



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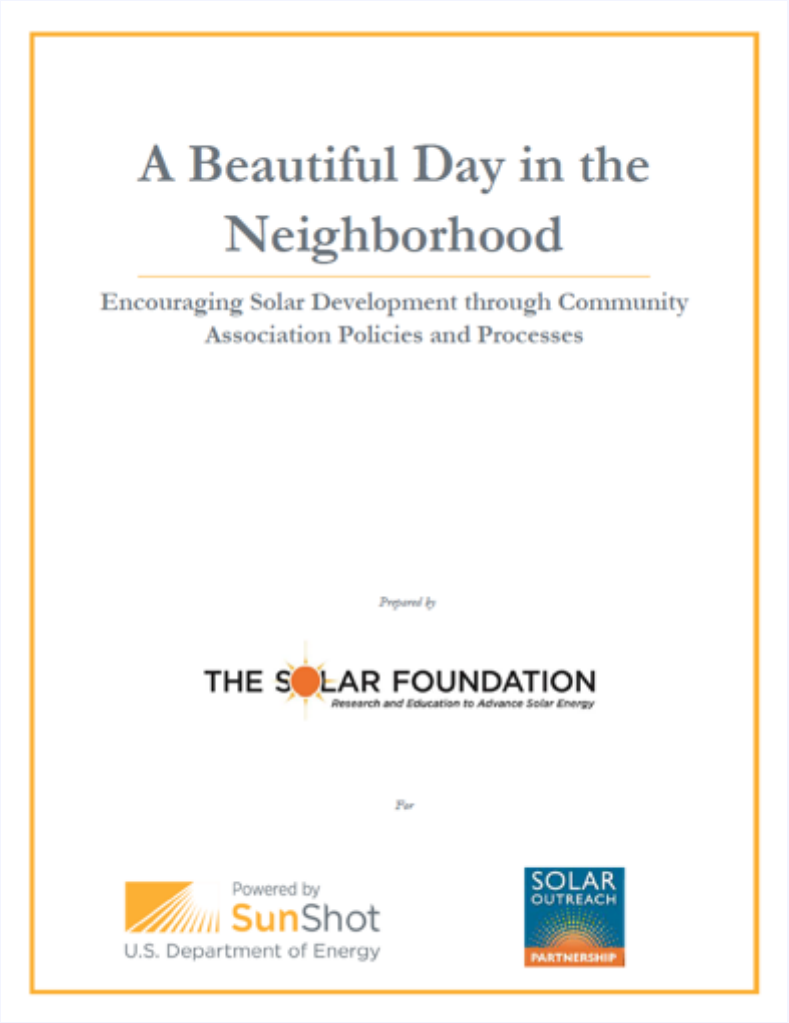
https://www.planning.org/pas/infopackets/open/pdf/30intro.pdf

Private Rules on Residential Solar

Resource **The Solar Foundation**

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



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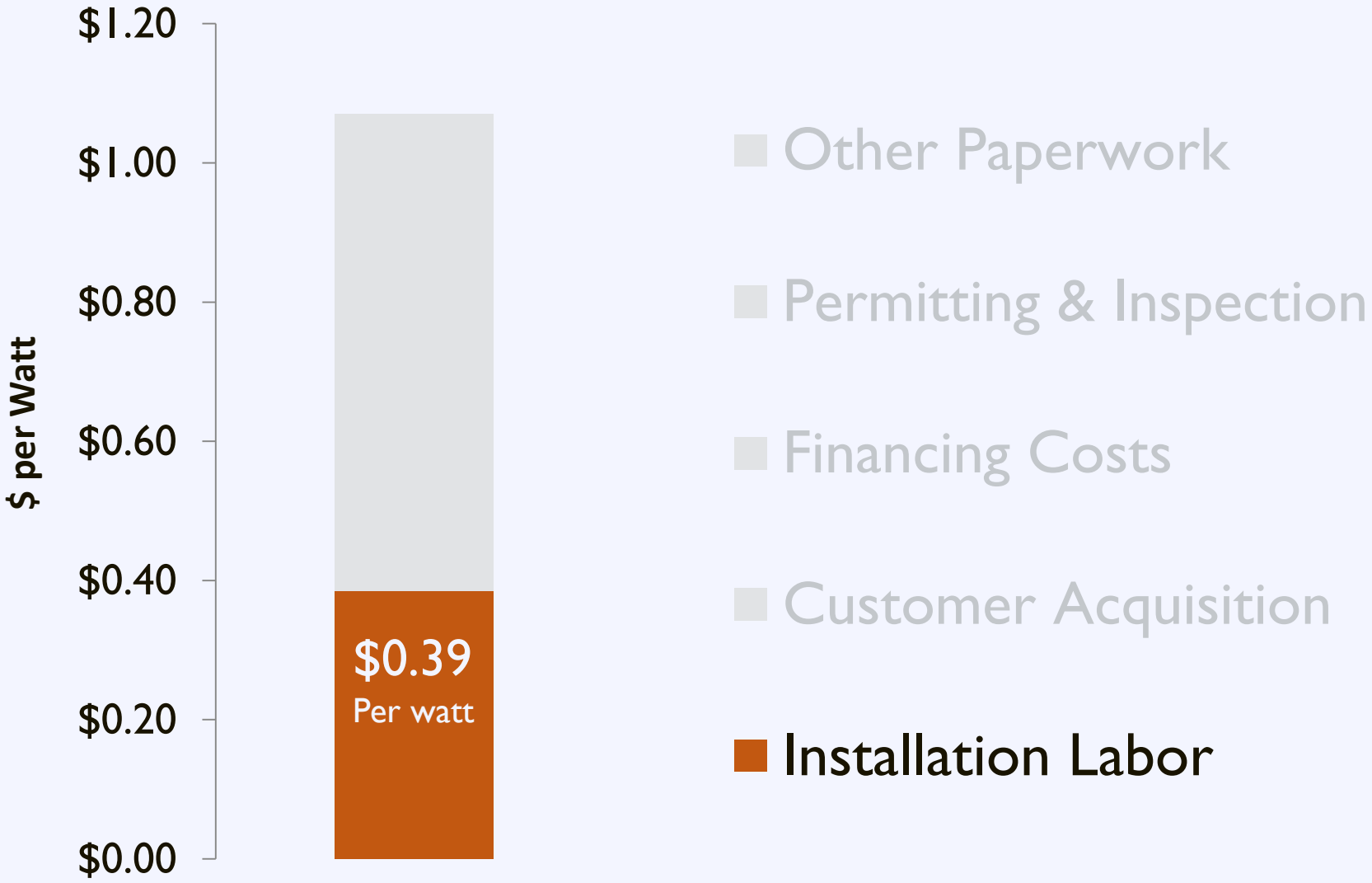
www.solaroutreach.org

Solar in HOAs: Best Practices

- ✓ Provide clear, unambiguous design guidelines
- ✓ Post rules and requirements online
- ✓ Provide a list of all required documents
- ✓ Waive design rules that significantly increase cost or decrease performance
- ✓ Allow exceptions from tree removal rules for solar

Installation Soft Costs



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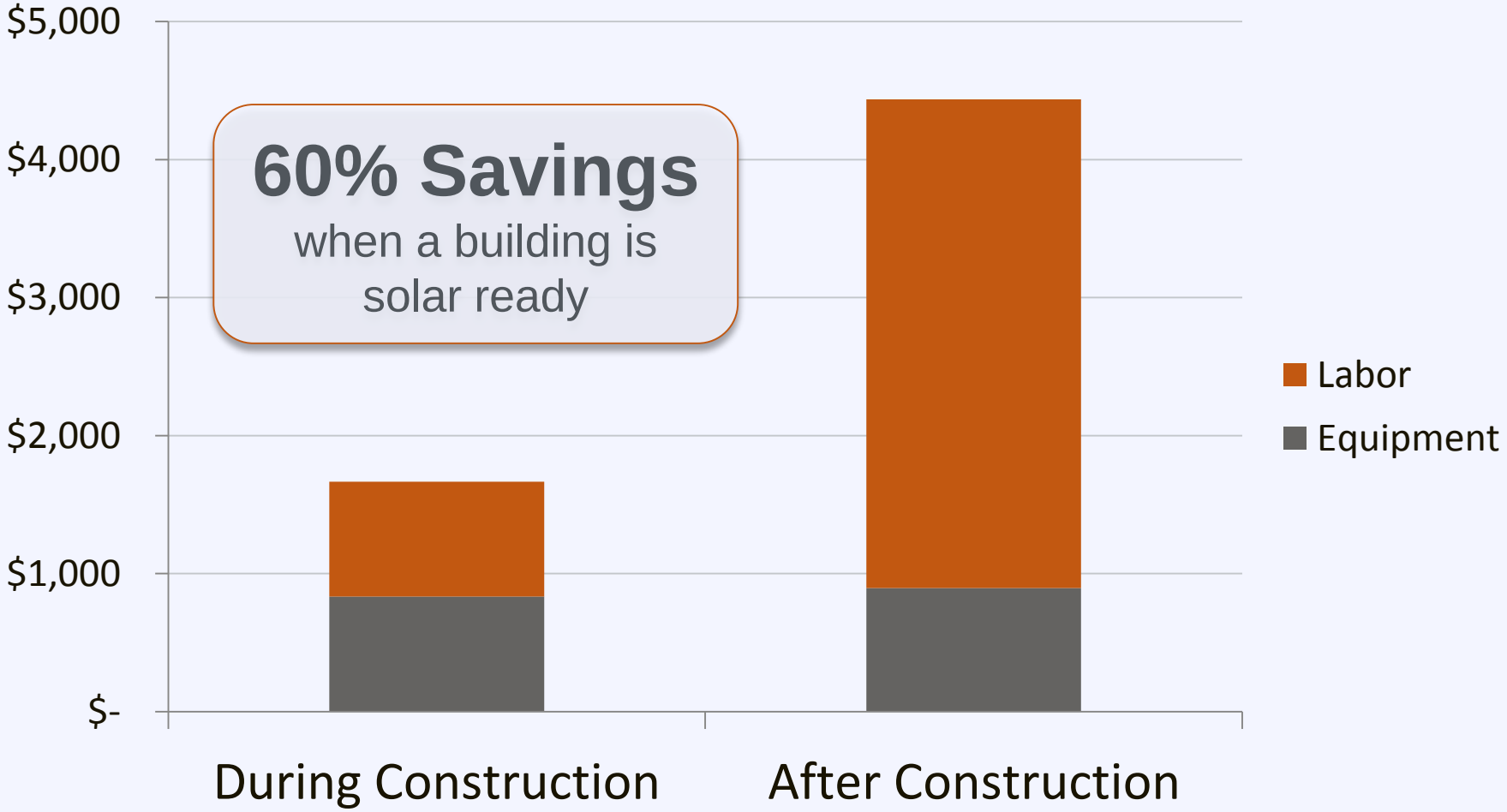
Update Building Code

Solar Ready Construction



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Source: Solar Ready: An Overview of Implementation Practices [Draft]. NREL, Feb. 18, 2011.

Update Building Code

Solar ready principles 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

Effective Local Solar Policy

Local Solar Policy

Planning for Solar

Solar in Development Regulation

Effective Solar Permitting Process

Solar Market Development Tools

Challenge: Inconsistency

18,000+ local jurisdictions

with unique zoning and permitting requirements

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

Challenge: Inconsistency

5,000+ utilities

with unique interconnection requirements

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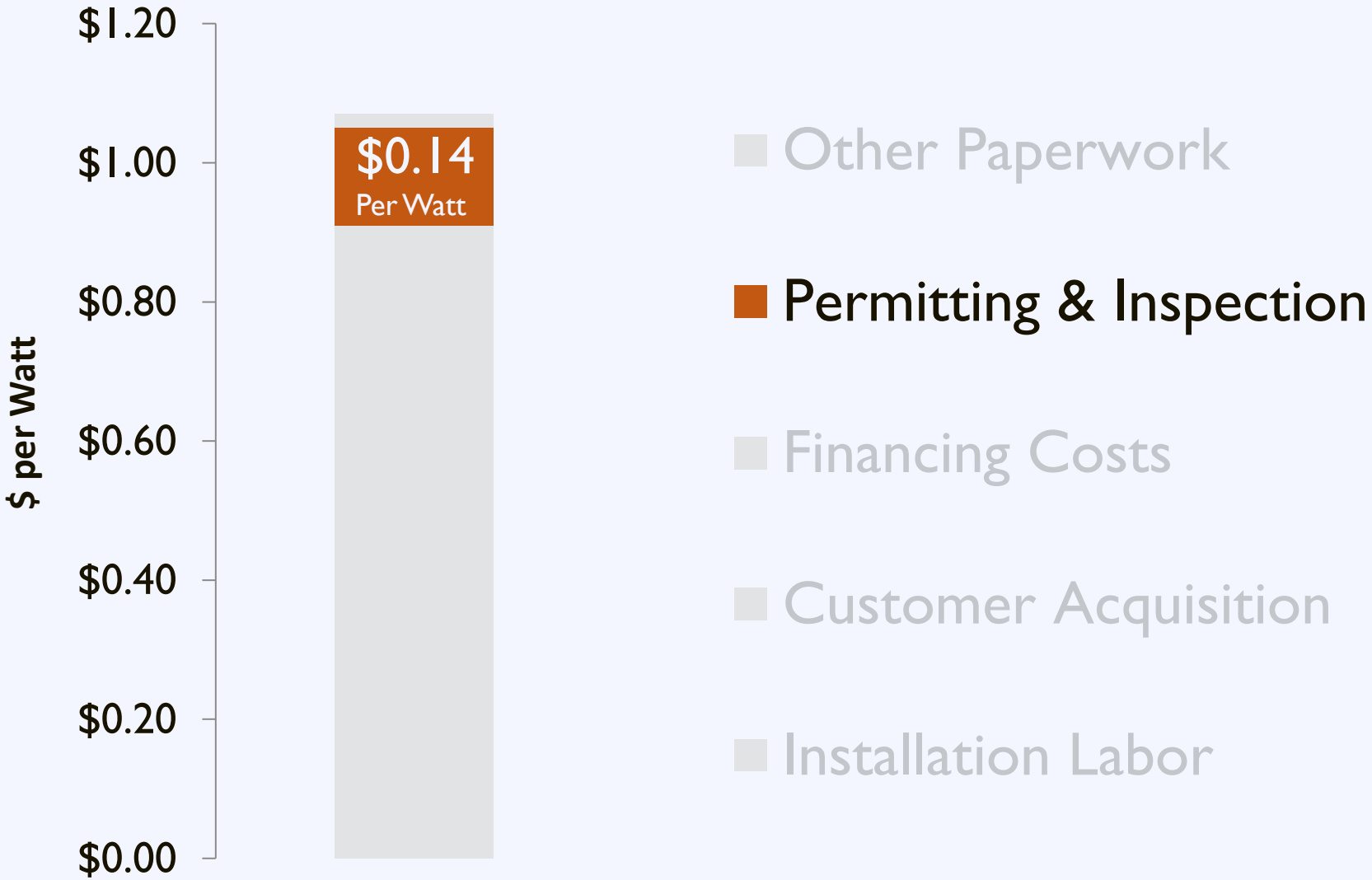
Source: Benchmarking Soft Costs for PV Systems, National Renewable Energy Laboratory

Consumer Challenges

Source: Forbes

Regulatory Barriers



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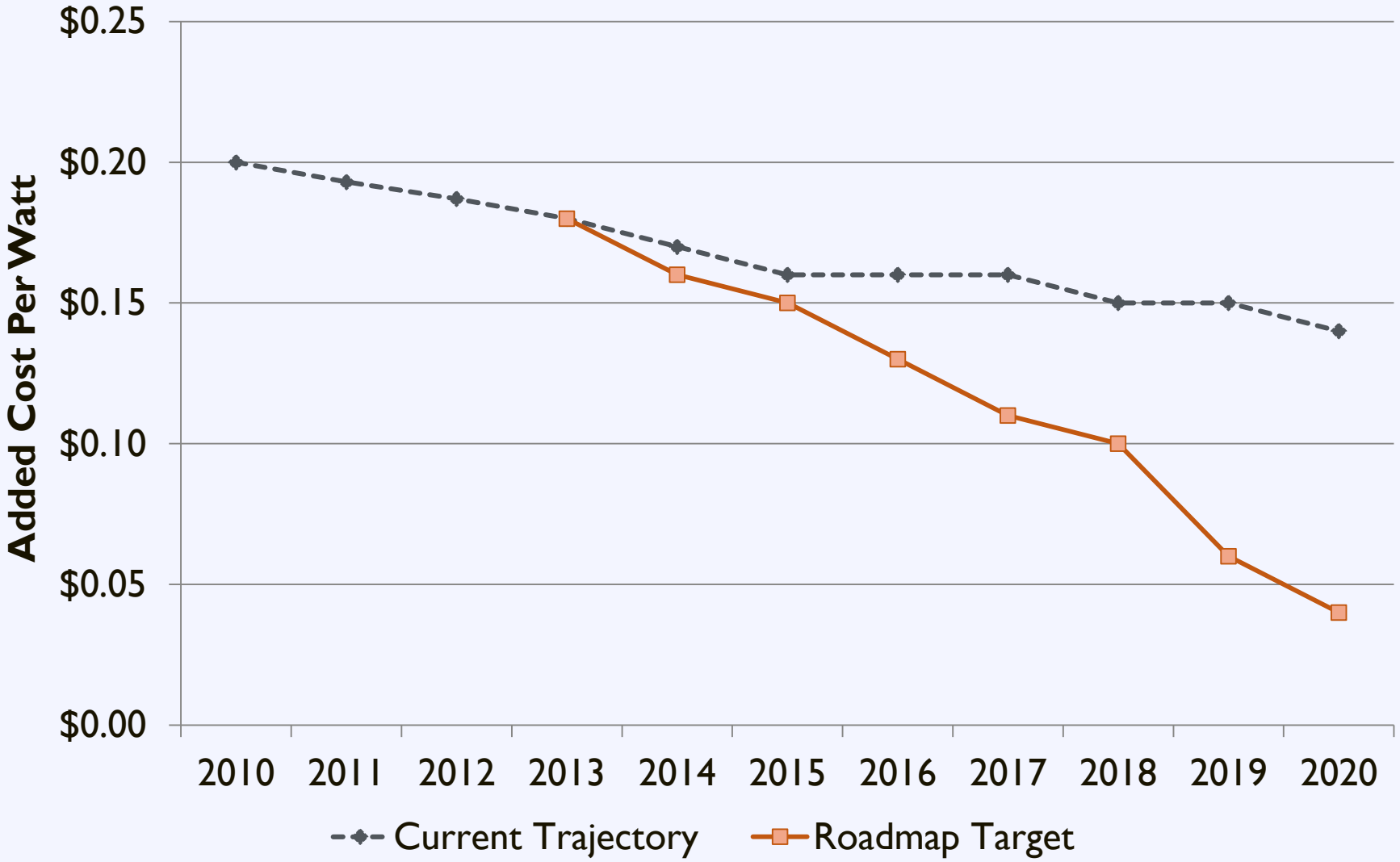
Planning & Permitting Roadmap



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Identifying Challenges

Solar Developer Perspective:

- Requirements can be unclear
- Application review can take a long time
- Fees can be expensive and inconsistent
- Inspections can require them to have a staffer available waiting for an inspector
- Inspectors are sometimes unfamiliar with solar

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

Identifying Challenges

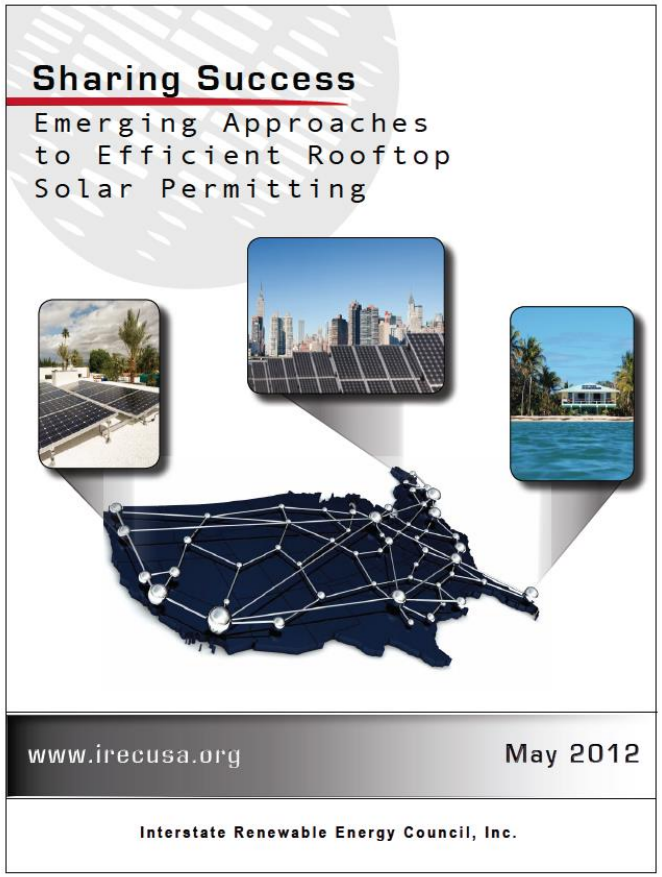
Local Government Perspective:

- Resource-constraints and many other priorities make focusing on solar difficult
- Inexperienced installers submit incomplete applications
- Installations do not match design drawings

Must balance government needs with encouraging solar energy!

Implementing Improvements

- Aim to **benefit both** local governments and solar installers when changing permitting processes.



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www.irecusa.org/sharing-success/

Solar Permitting Best Practices

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

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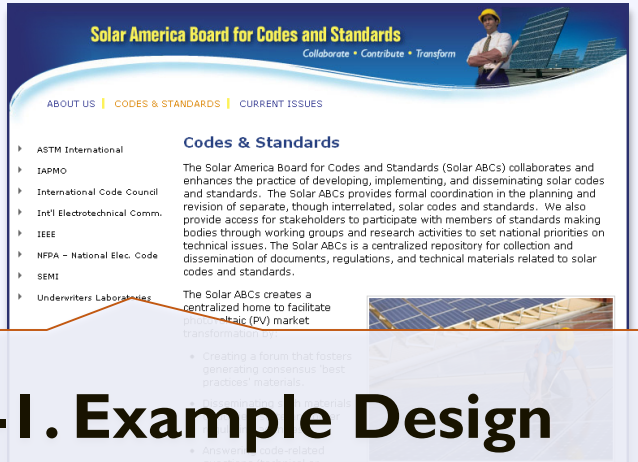
Source: IREC/ Vote Solar

Expedited Permitting Process

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

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



1-1. Example Design Criteria:

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

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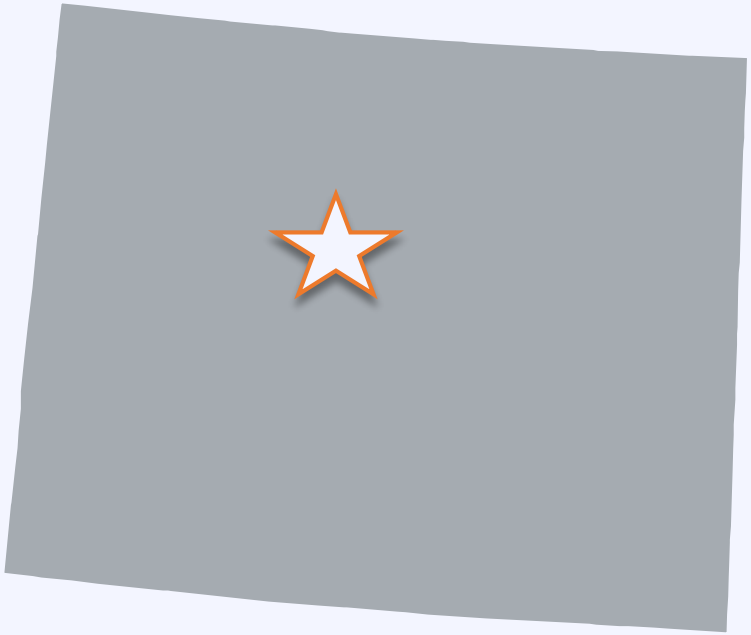
Solar Permitting Best Practices

- ✓ Collect Reasonable Permitting Fees
- ✓ No Community-Specific Licenses
- ✓ Narrow Inspection Appointment Windows
- ✓ Eliminate Excessive Inspections
- ✓ Train Permitting Staff in Solar

Source: IREC/Vote Solar

Expedited Permitting: Case Study



Variability in Colorado permitting processes

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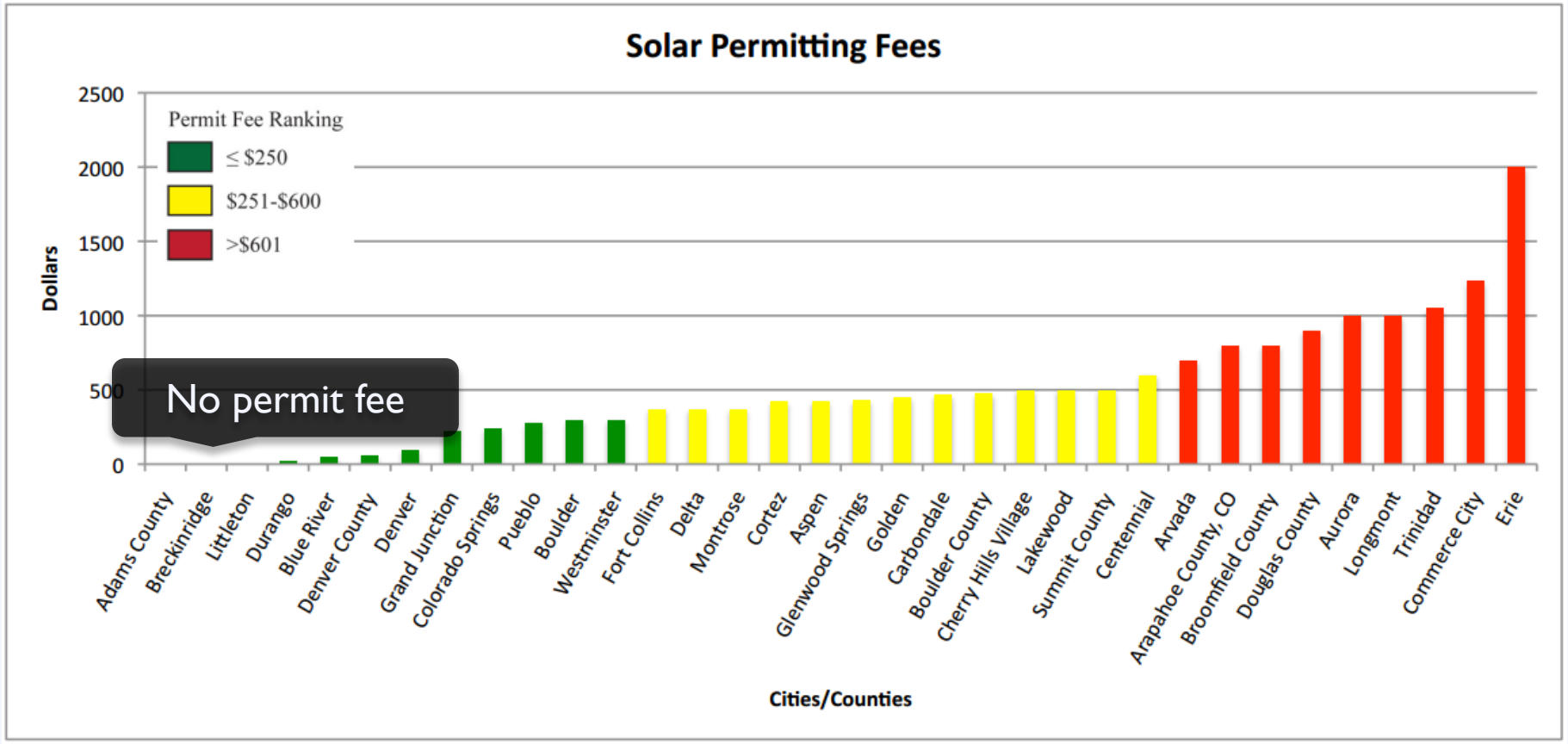
Source: Wikipedia

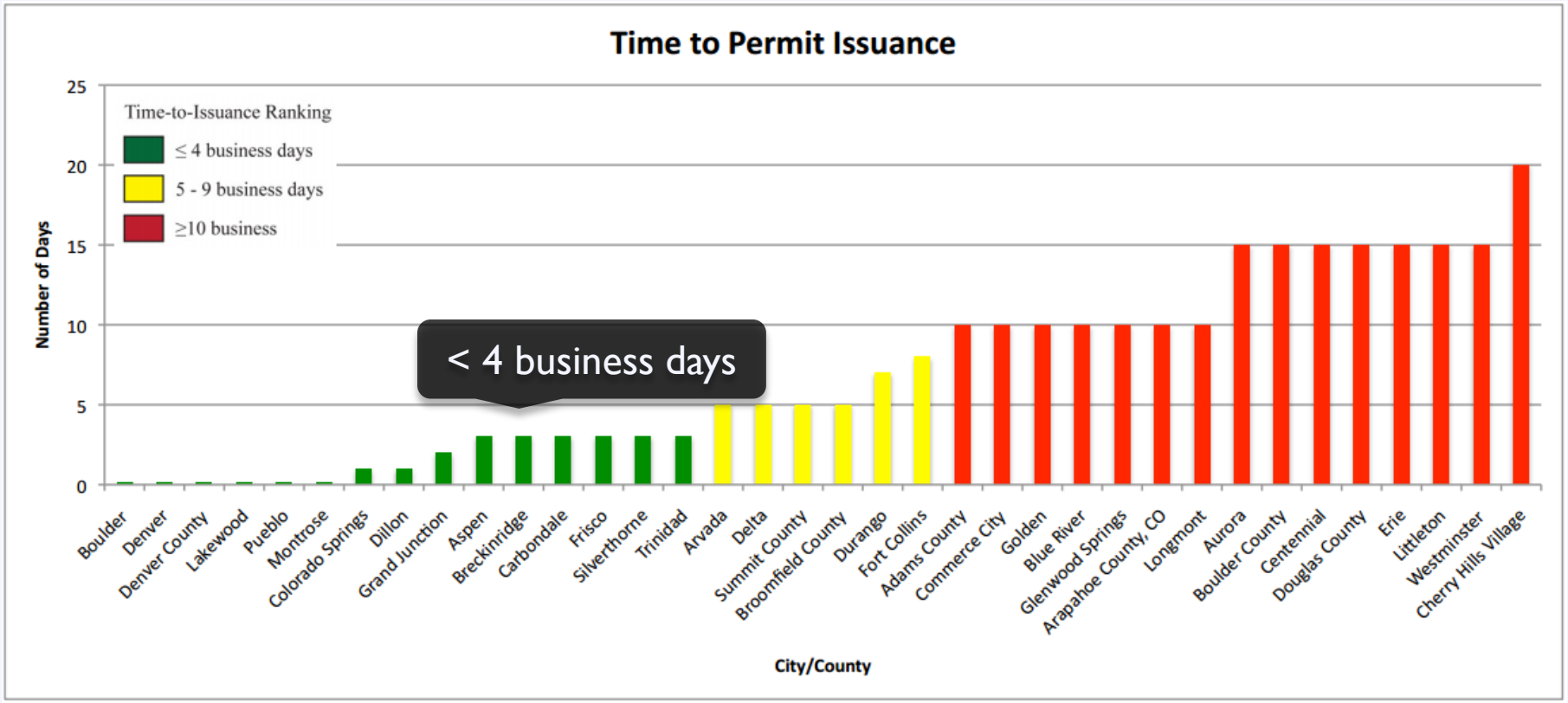
Expedited Permitting: Case Study

Breckenridge charges no fees to file for a solar permit



Expedited Permitting: Case Study

Breckenridge offers a short turn around time for solar permits

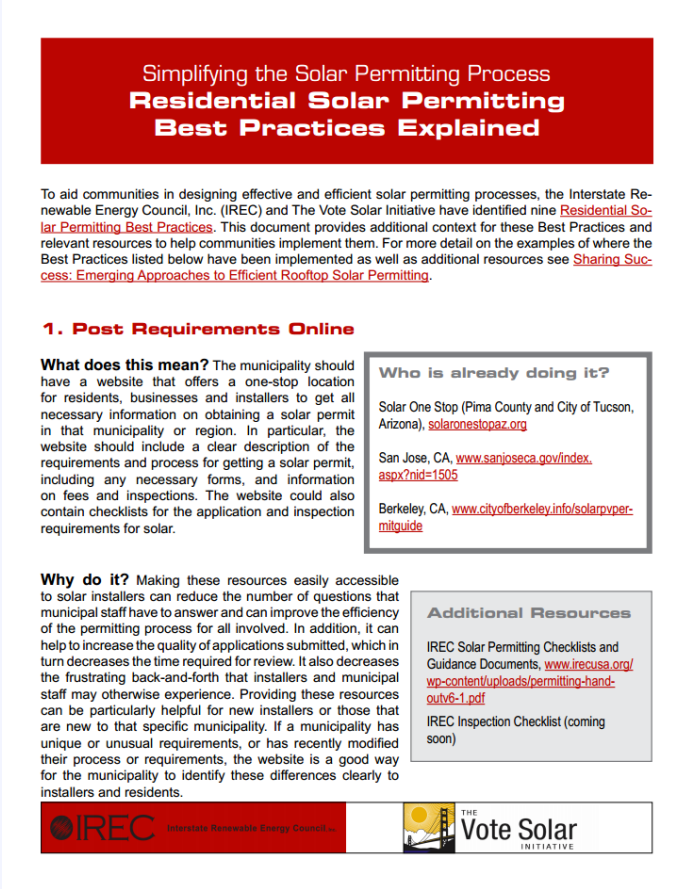


Source: Vote Solar (http://votesolar.org/wp-content/uploads/2011/03/COPermitReport.pdf)

Permitting: Best Practices

Resource **Interstate Renewable Energy Council**

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



Simplifying the Solar Permitting Process
Residential Solar Permitting Best Practices Explained

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

1. Post Requirements Online

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

Who is already doing it?

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

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

Berkeley, CA, www.cityofberkeley.info/solarpvpermitguide

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

Additional Resources

IREC Solar Permitting Checklists and Guidance Documents, www.irecusa.org/wp-content/uploads/permitting-hand-outv6-1.pdf

IREC Inspection Checklist (coming soon)

IREC Interstate Renewable Energy Council

THE Vote Solar INITIATIVE

http://projectpermit.org/wp-content/uploads/2013/04/Expanded-Best-Practices-7.23.13_VSI.pdf

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Effective Local Solar Policy

Local Solar Policy

Understanding solar financing

Expanding financing options

Addressing customer acquisition

Effective Solar Permitting Process

Solar Market Development Tools

The Solar Equation

Cost

+ Installed Cost

+ Maintenance

- Direct Incentive

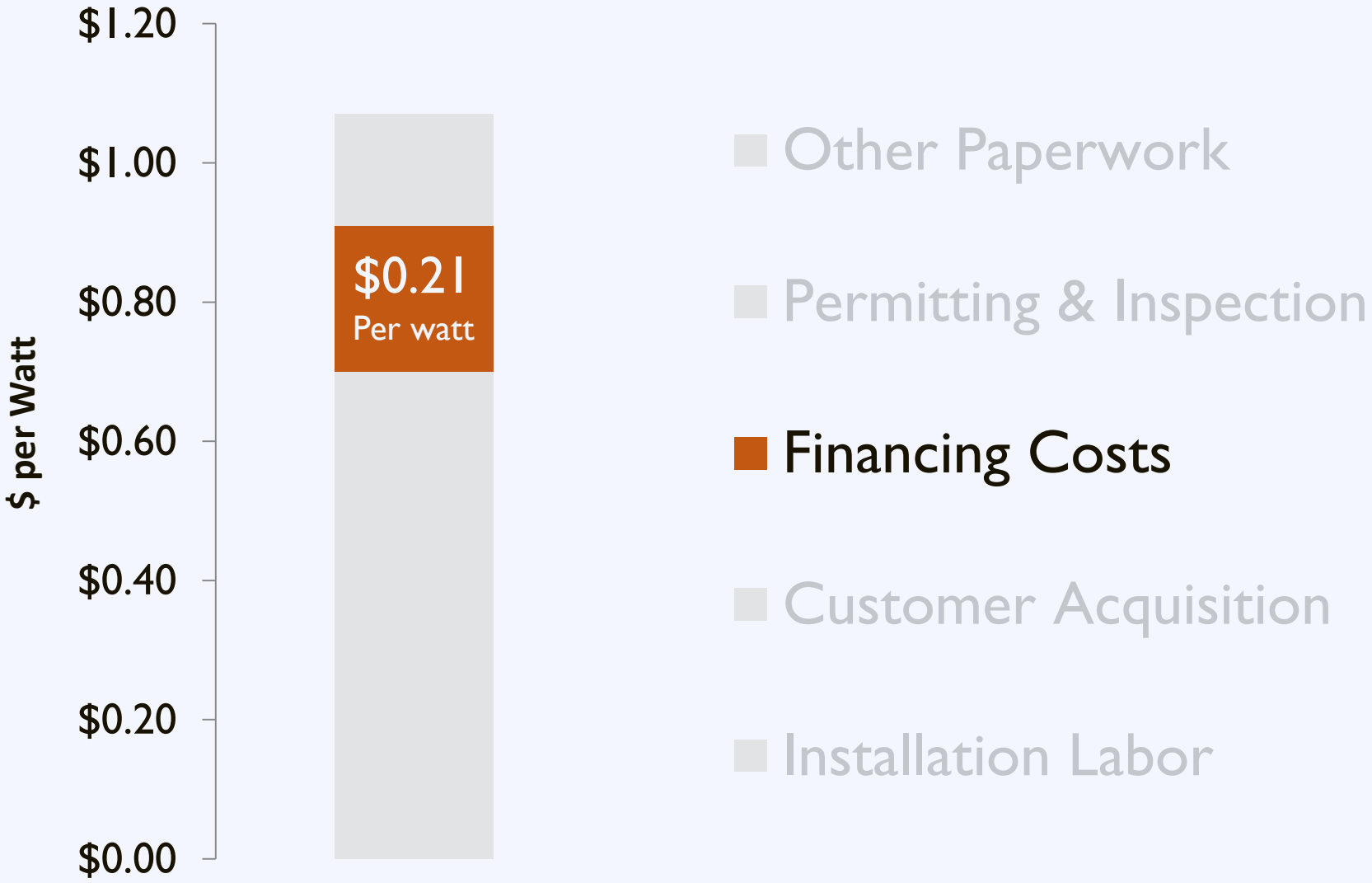
Benefit

+ Avoided Energy Cost

+ Excess Generation

+ Performance Incentive

Financing Costs



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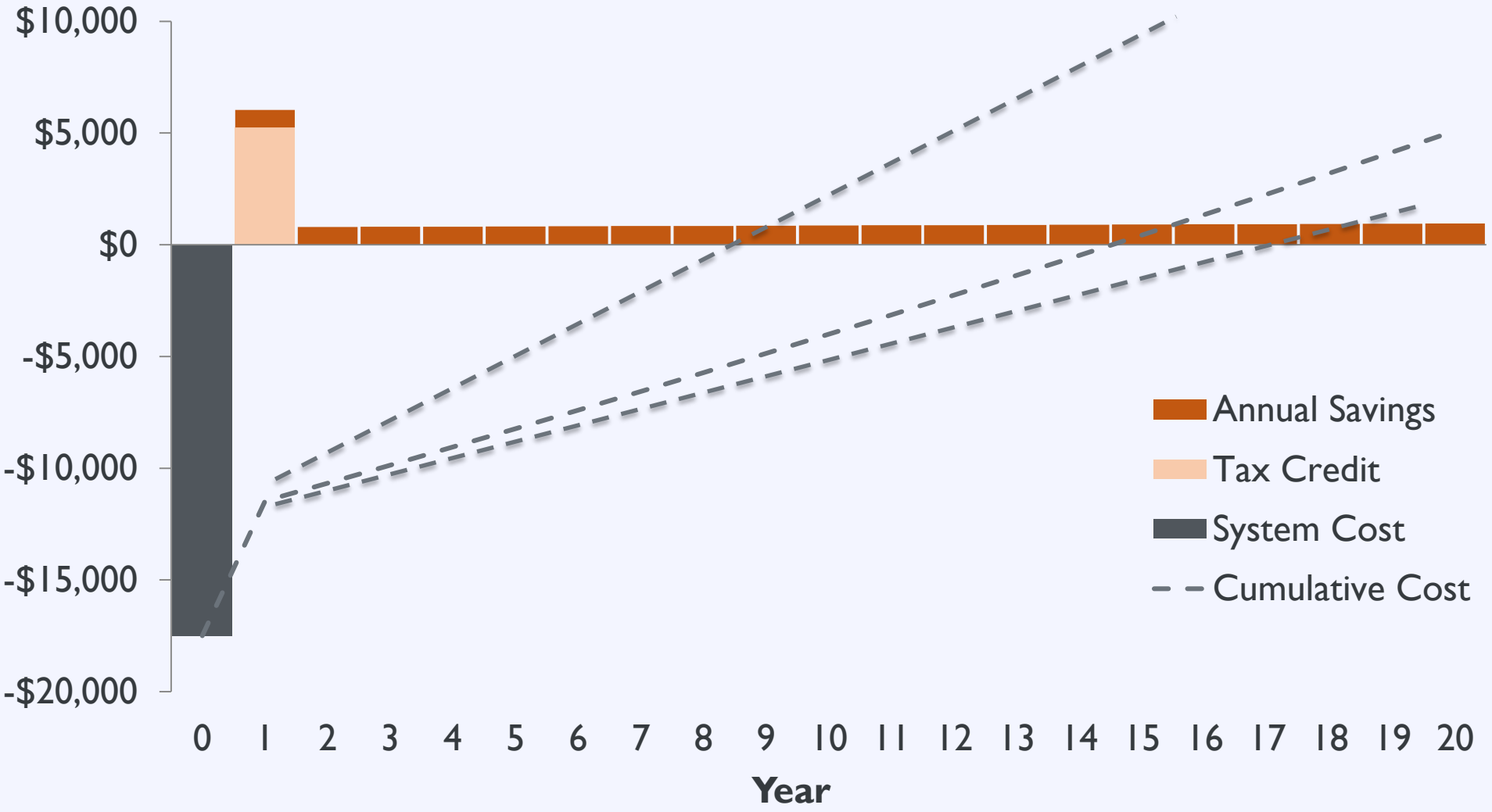
The Solar Finance Problem



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Solar Financing Options

Third Party Ownership

Traditional Lending

Utility-Owned Solar

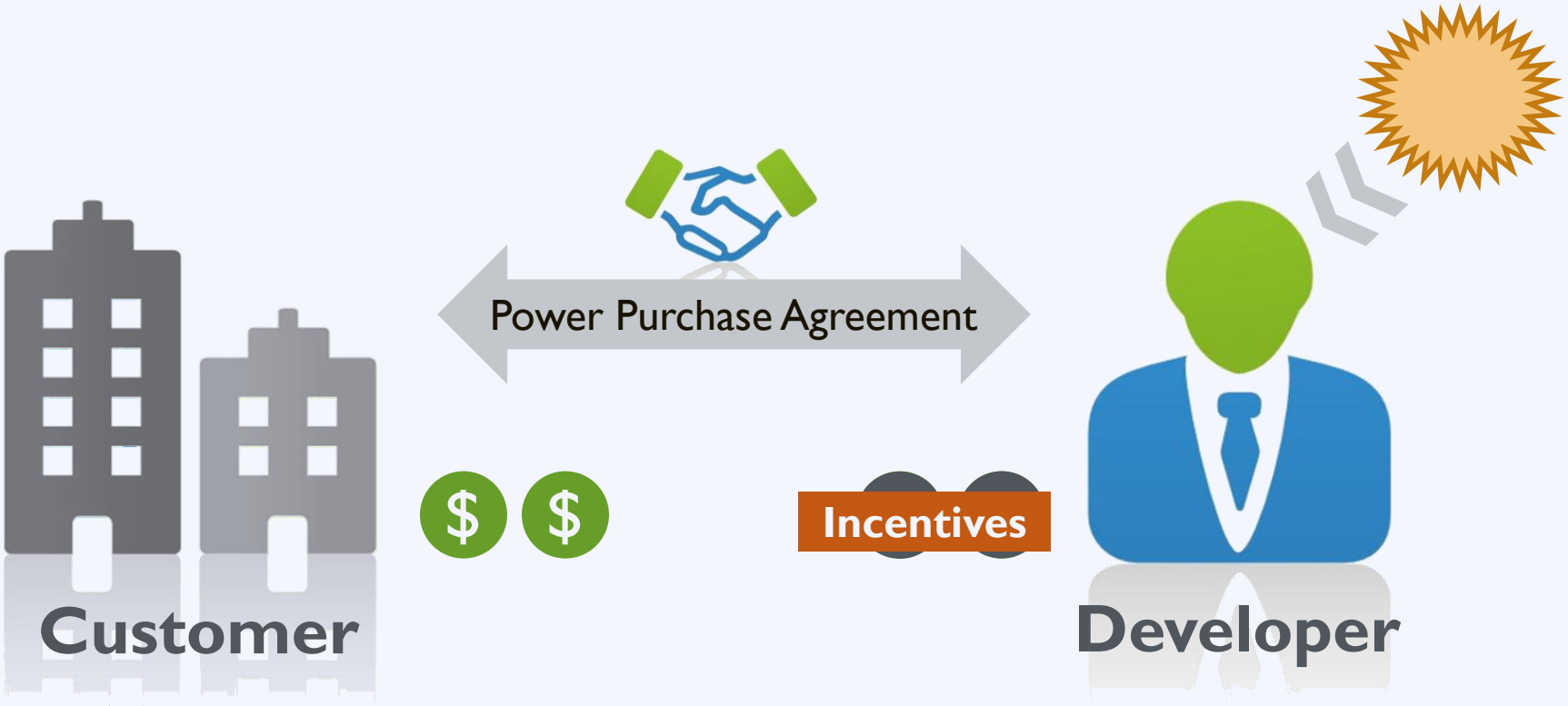
Solar Financing Options

Third Party Ownership

Traditional Lending

Utility-Owned Solar

Third Party Ownership



Third Party Ownership

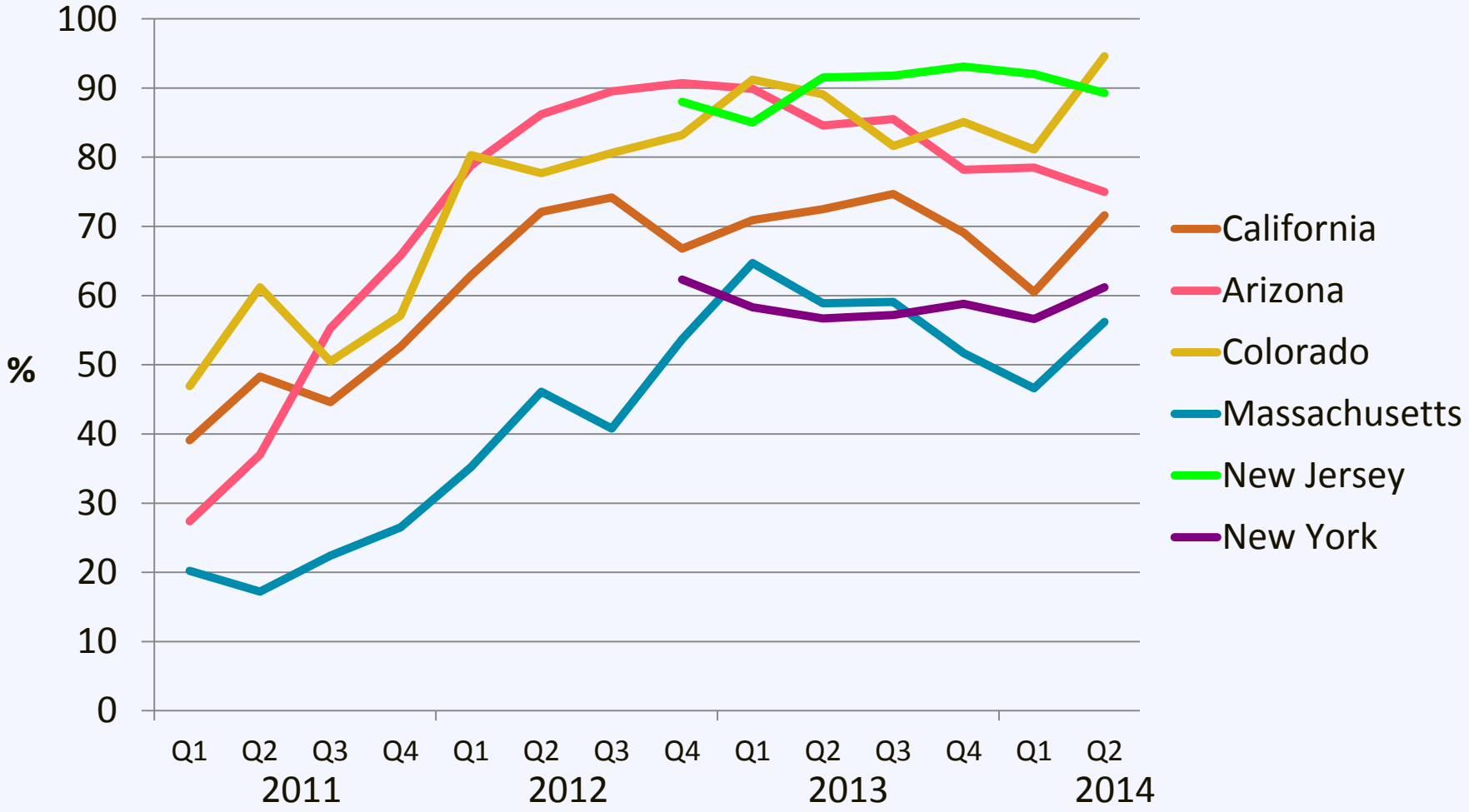
Benefits

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

Drawbacks

- Investor needs higher ROI
- PPAs not available in every state

Third Party Ownership



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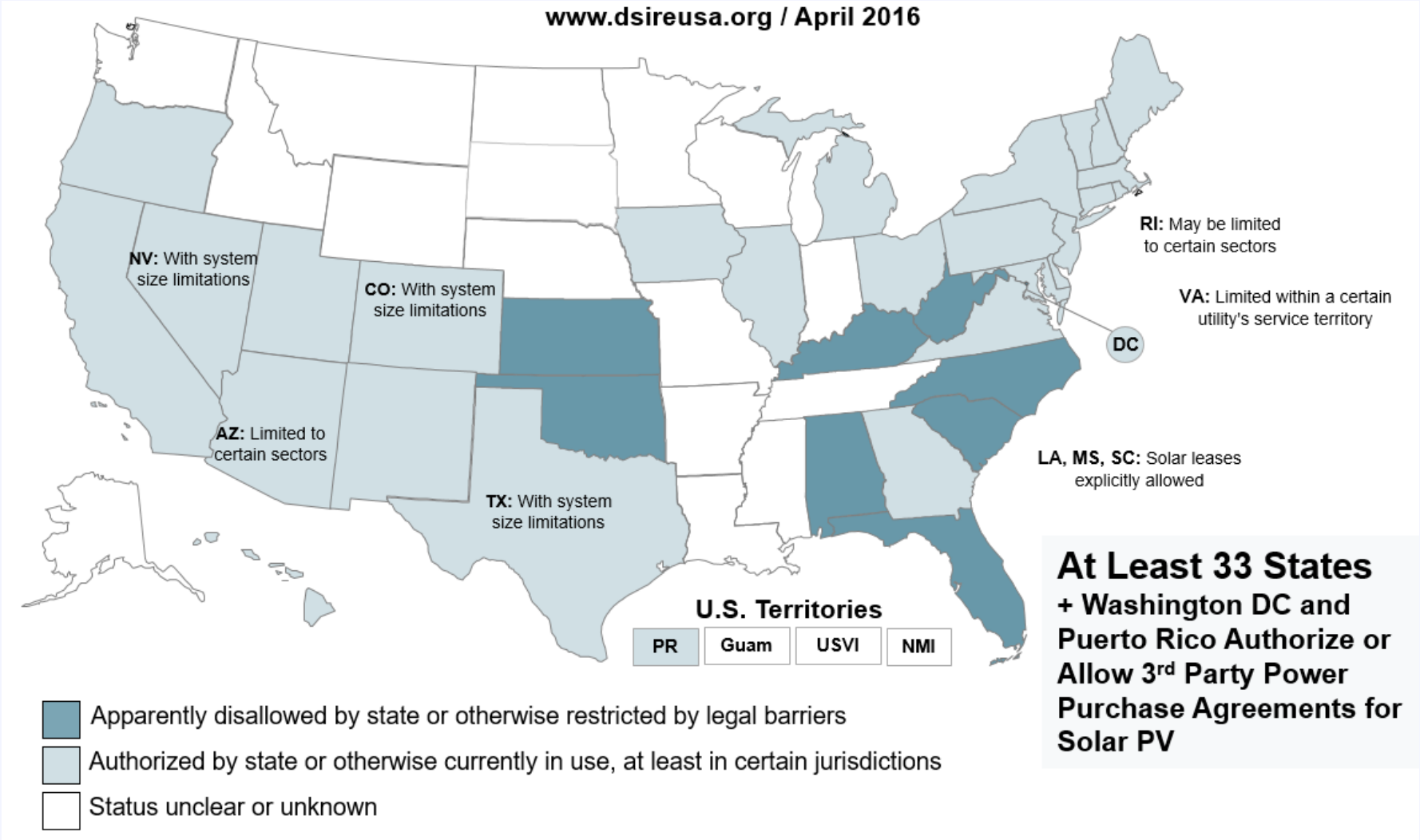
Source: GTM Research/ Solar Energy Industries Association, *U.S. Solar Market Insight 2012 Year-in-Review & U.S. Solar Market Insight Q2 2014*

Third Party Ownership: State Policy

Third Party Ownership is not always available



At Least 33 States
+ Washington DC and Puerto Rico Authorize or Allow 3rd Party Power Purchase Agreements for Solar PV

Solar Financing Options

Third Party Ownership

Traditional Lending

Utility-Owned Solar

Engage Local Lenders

Fewer than **5%**

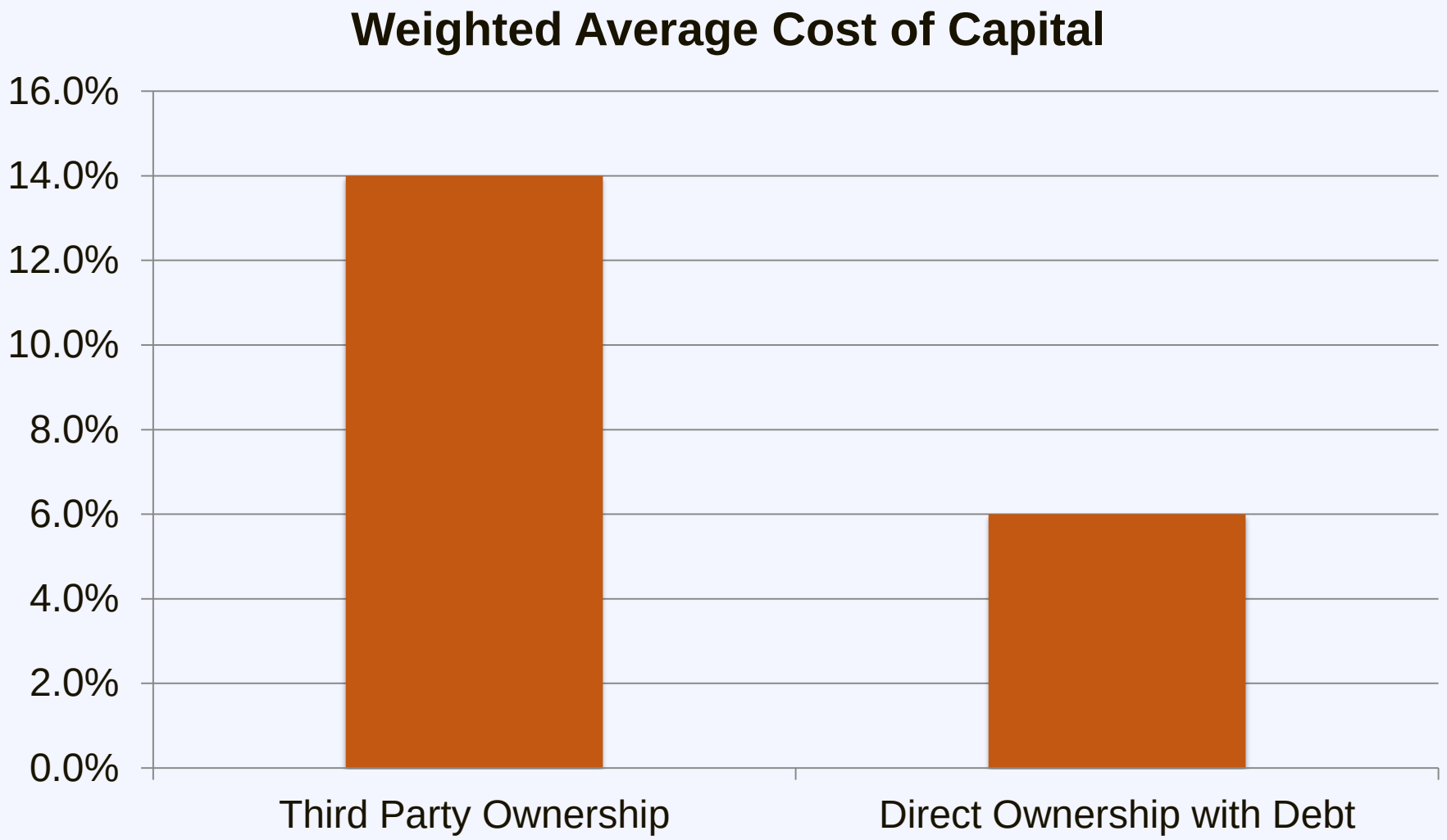
of the

6,500 banks in the US

are

actively financing solar PV projects

Third Party Ownership: Cost



Financing Options

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

Municipal – Lender Partnership

Milwaukee SHINES

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

Austin Energy Power Saver Loans

- Partnership with Velocity Credit Union
- Market-variable rate

Municipal partnerships can beat existing options

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

Engage Local Lenders: Resources

Resource **Local Lending for Solar PV**

A guide for local governments seeking to engage financial institutions

www.solaroutreach.org

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Solar Financing Options

Third Party Ownership

Traditional Lending

Utility-Owned Solar

Utility-Enabled Solar

Utility Options for Distributed Solar

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

Utility On-Bill Financing

Utility pays for customer-owned rooftop system

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

Examples:

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

Roanoke Electric Cooperative
Your Touchstone Energy® Partner

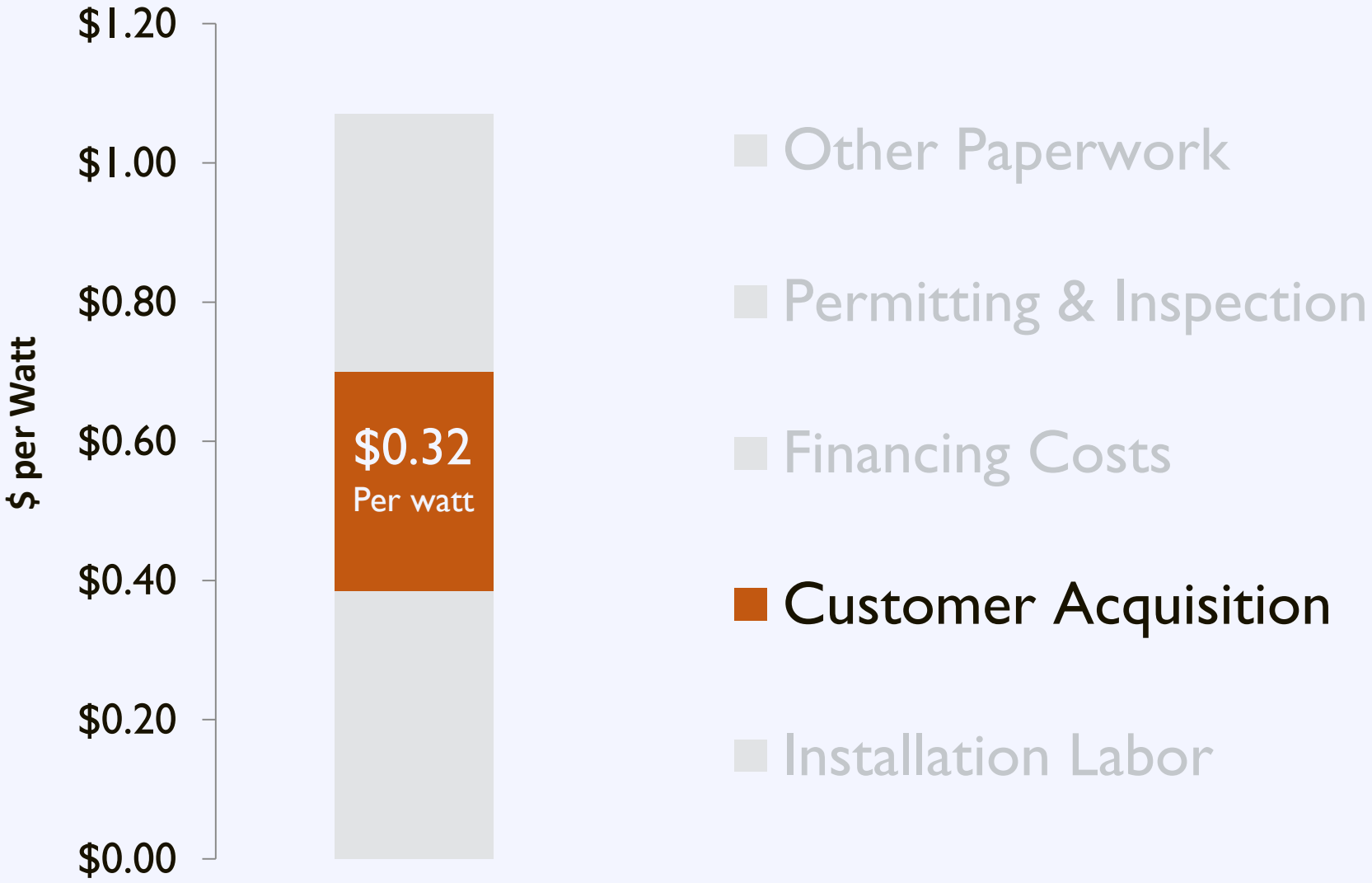
How$martKY™

Utility-Run Community Solar

Utility lends money to solar developer

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

Customer Acquisition



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Source: National Renewable Energy Laboratory

Customer Acquisition

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

Customer Acquisition

Barriers

High upfront cost

Complexity

Customer inertia

The Solarize Program

Group purchasing for residential solar PV

SOLARIZE MASS

SOLARIZE ROANOKE

solarize ASHEVILLE

solarize washington
a program of northwest seed

SOLARIZEtybee

SanCap SOLAR CONNECT

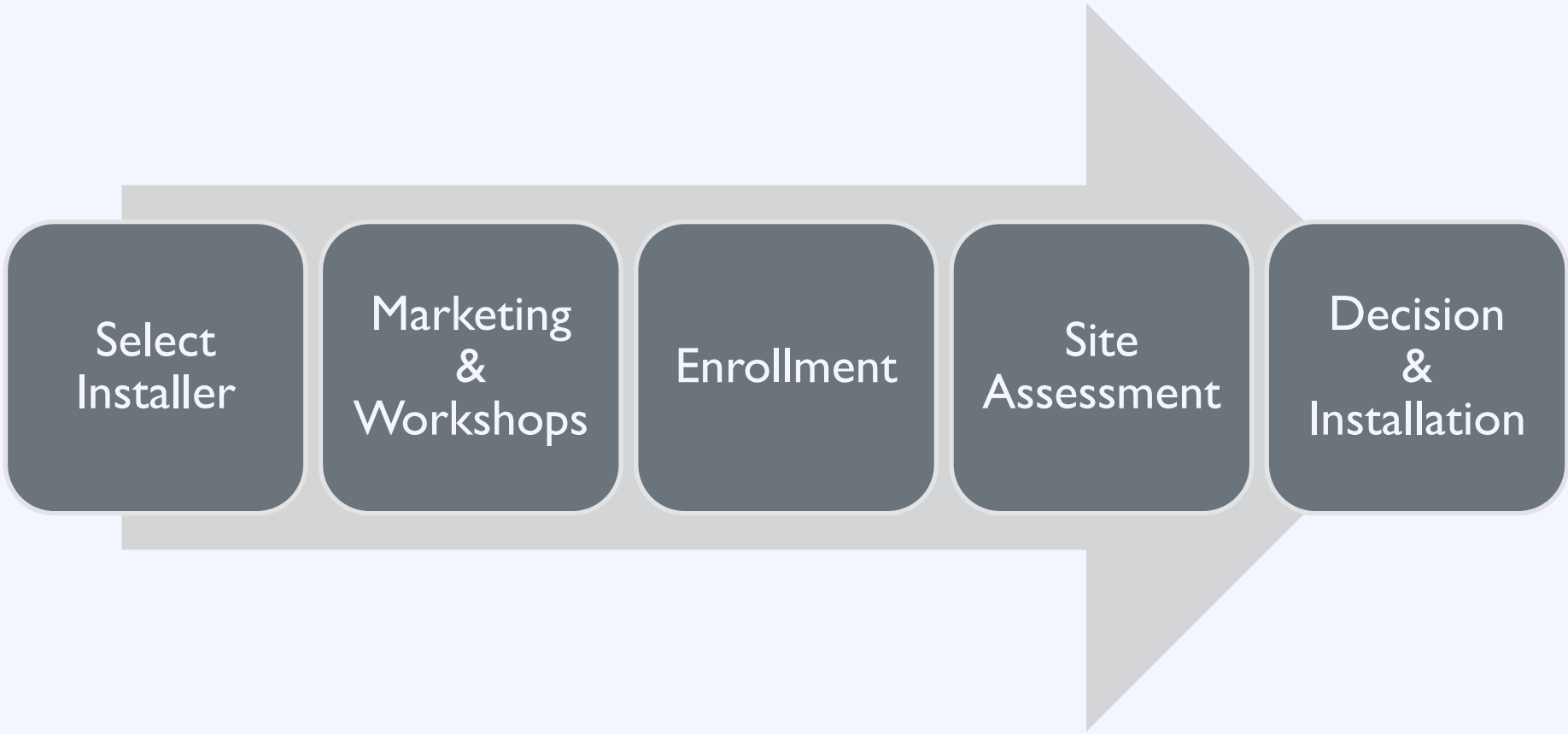
The Solarize Program

Barriers		Solutions
High upfront cost	→	Group purchase
Complexity	→	Vetted offer
Customer inertia	→	Limited-time offer

Solarize: Partnership

Program Sponsor	Community ties Technical knowledge
Solar Contractor	Solar installations Volume discounts
Citizen Volunteers	Campaign support Neighborhood outreach
Community Residents	Program participation Word of mouth

Solarize: Process

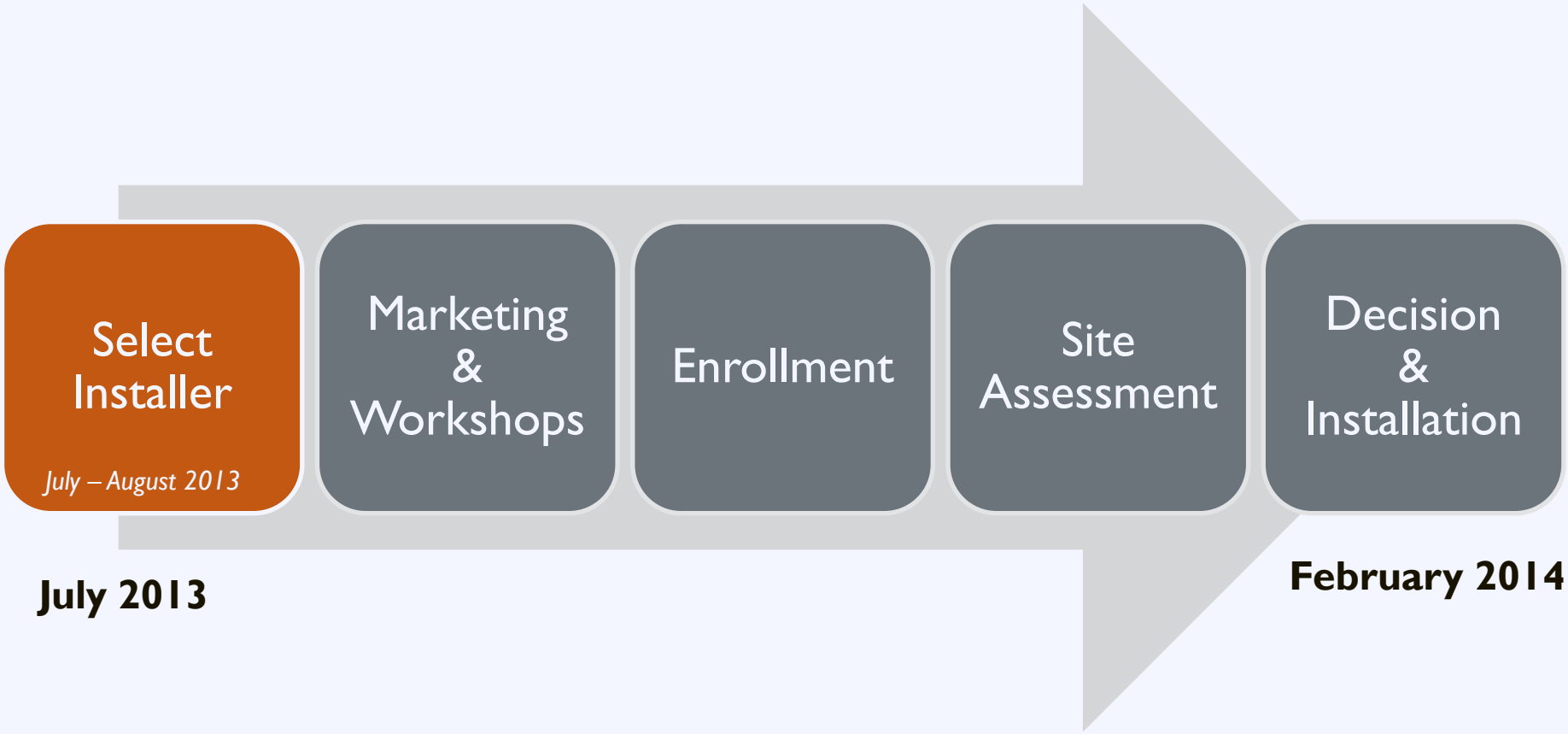


Solarize Plano: Case Study

Plano, Texas

Population: 272,000

Solarize Plano: Case Study



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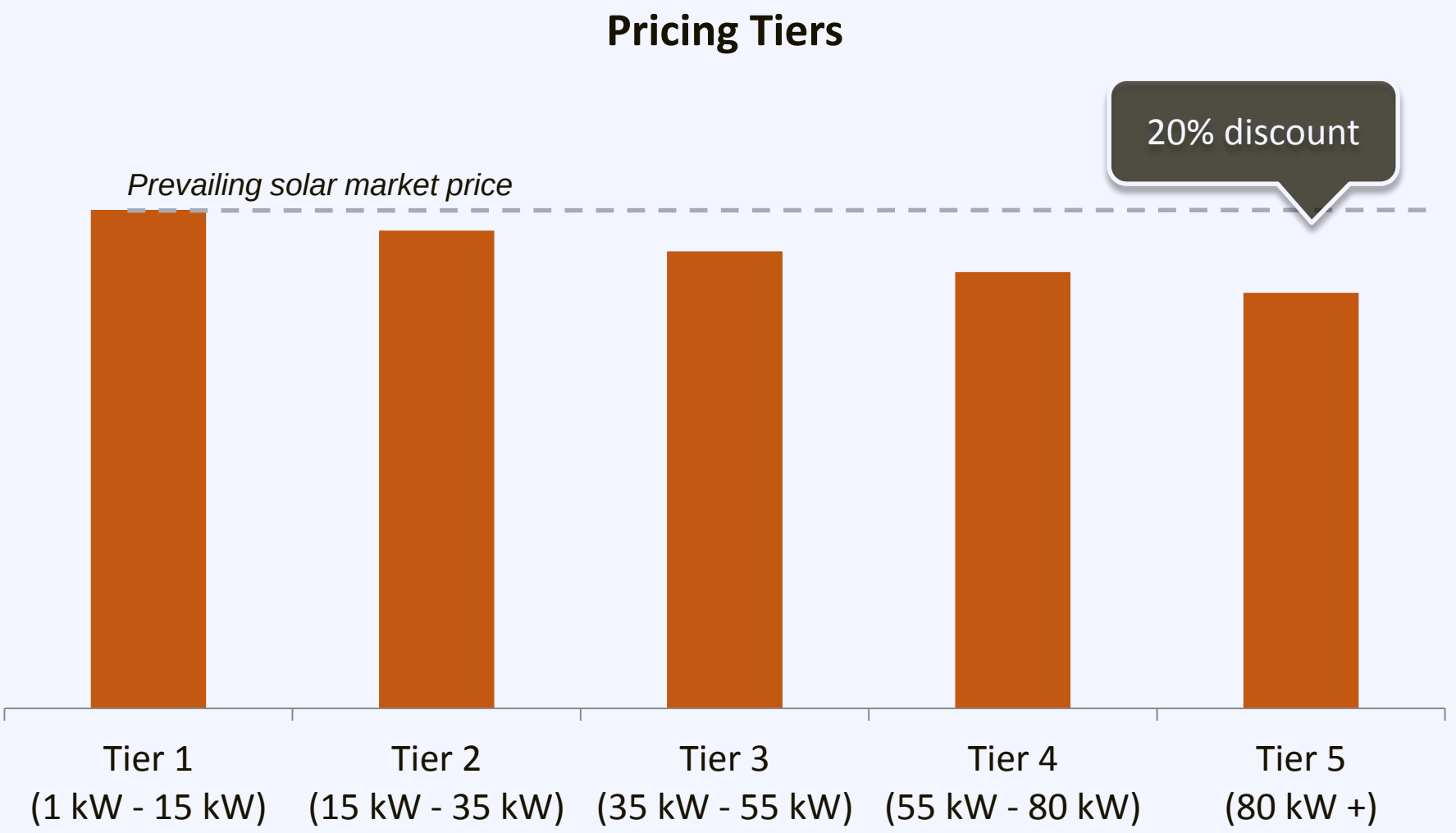

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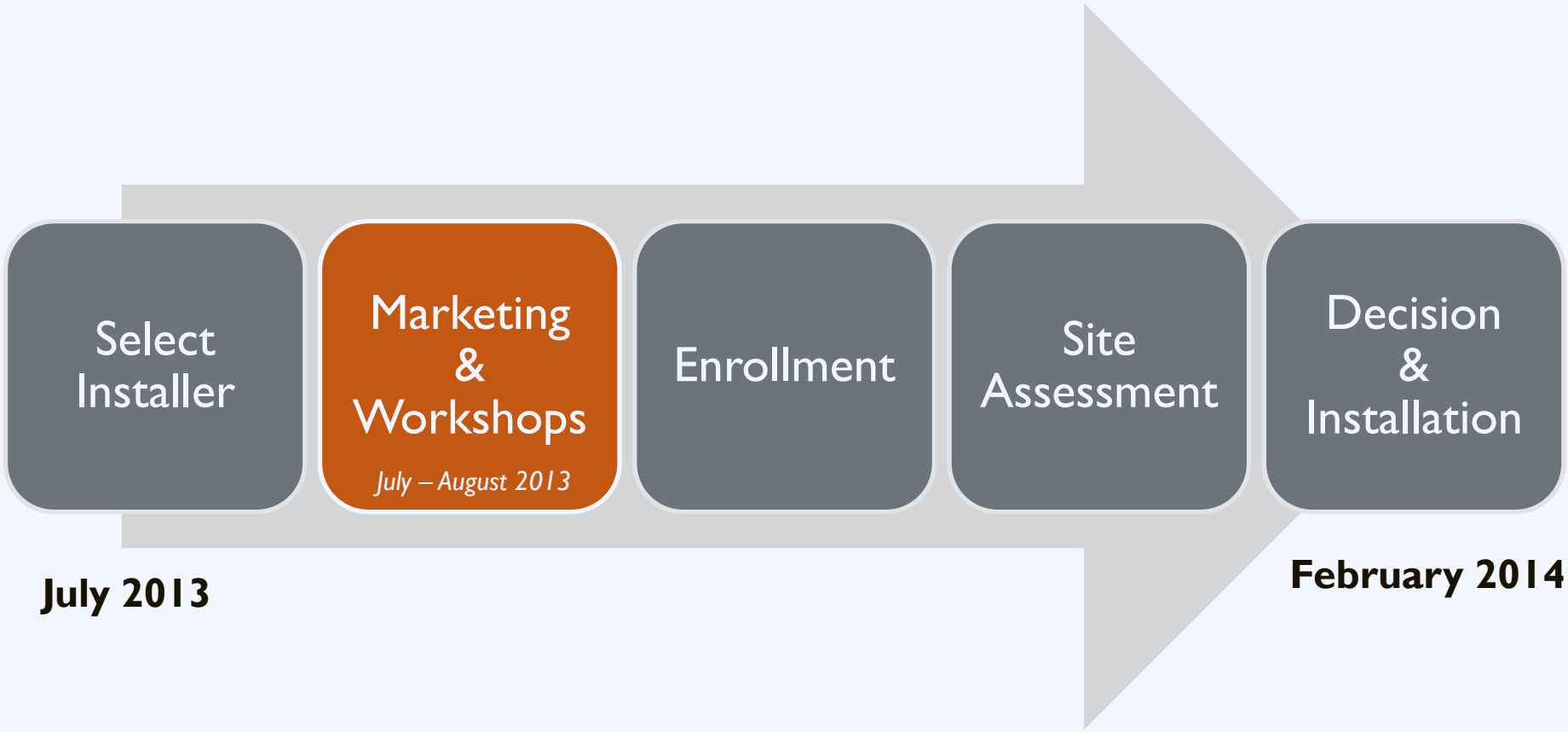
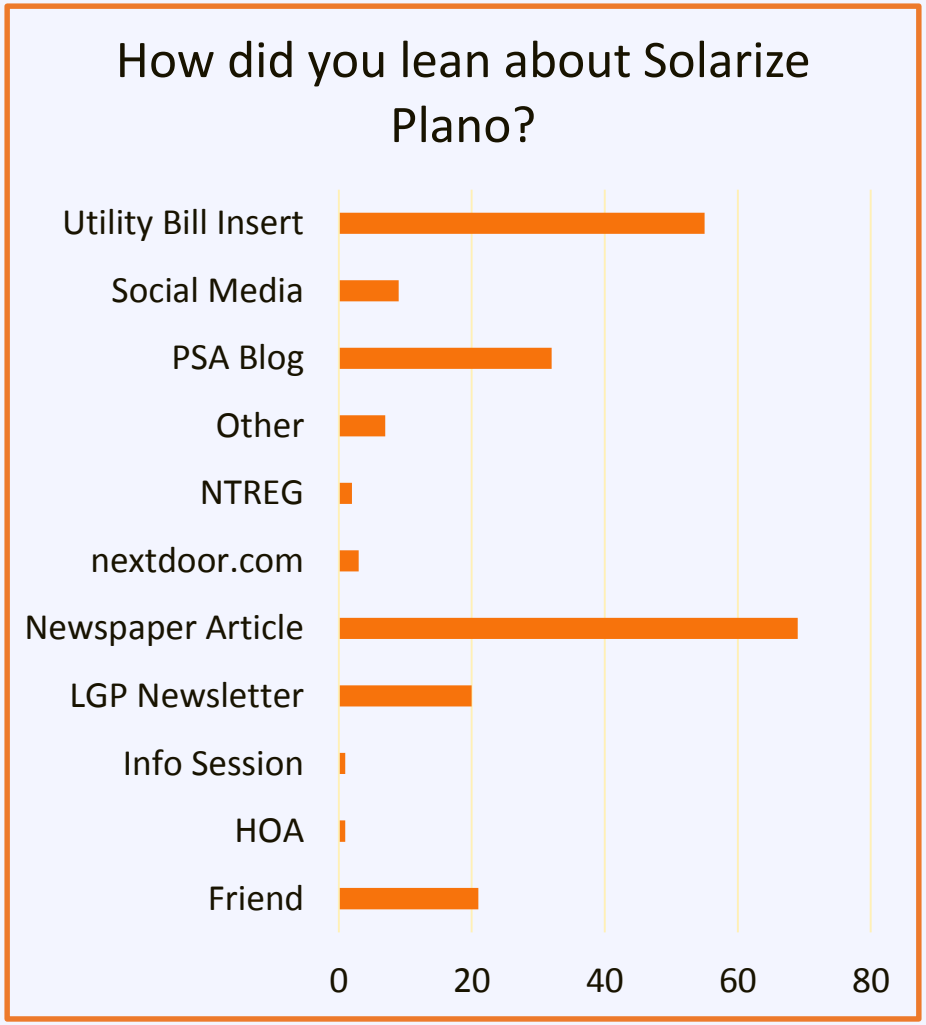


Solarize Plano: Case Study

Marketing Strategy:

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



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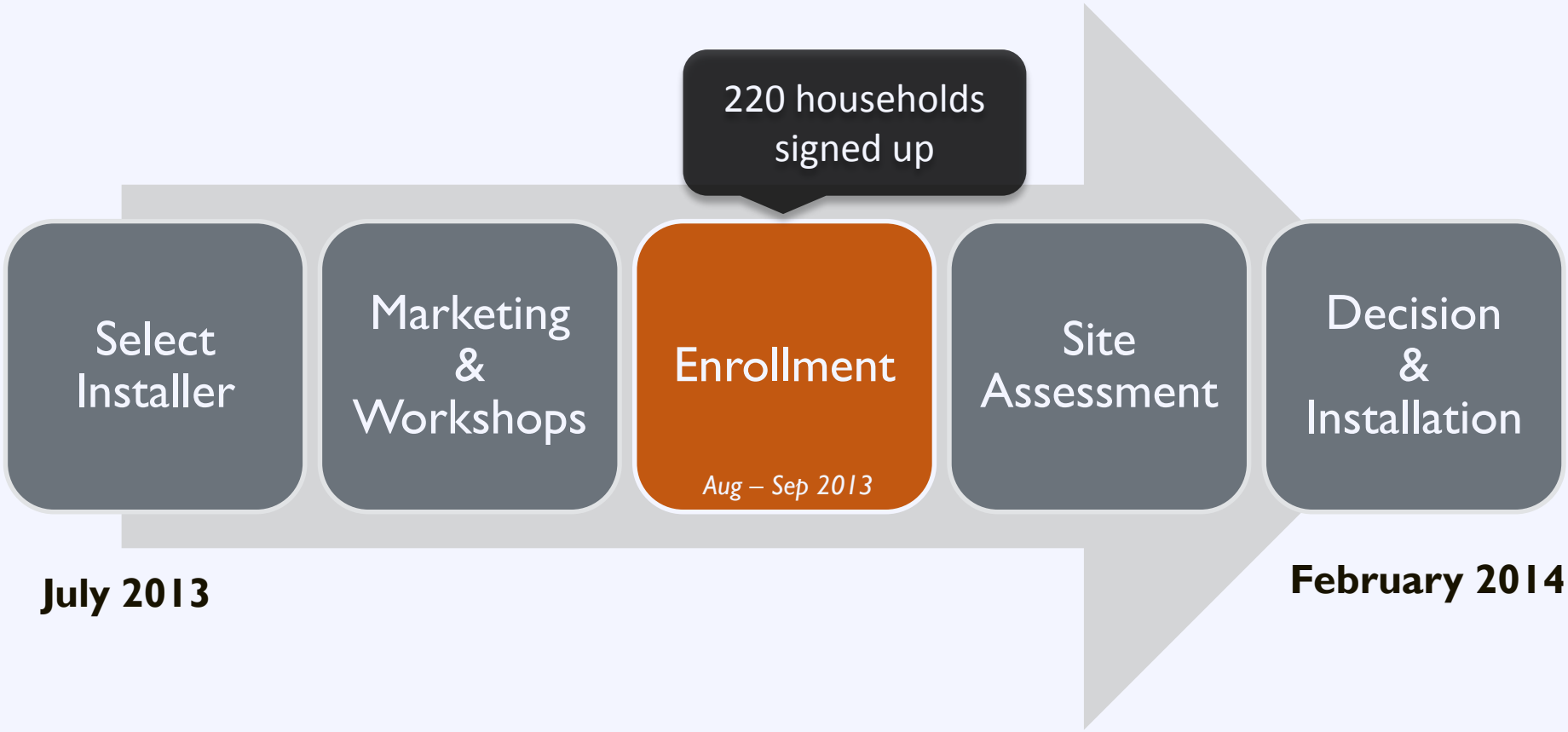
Source: Solarize Plano & NCTCOG

Solarize Plano: Case Study



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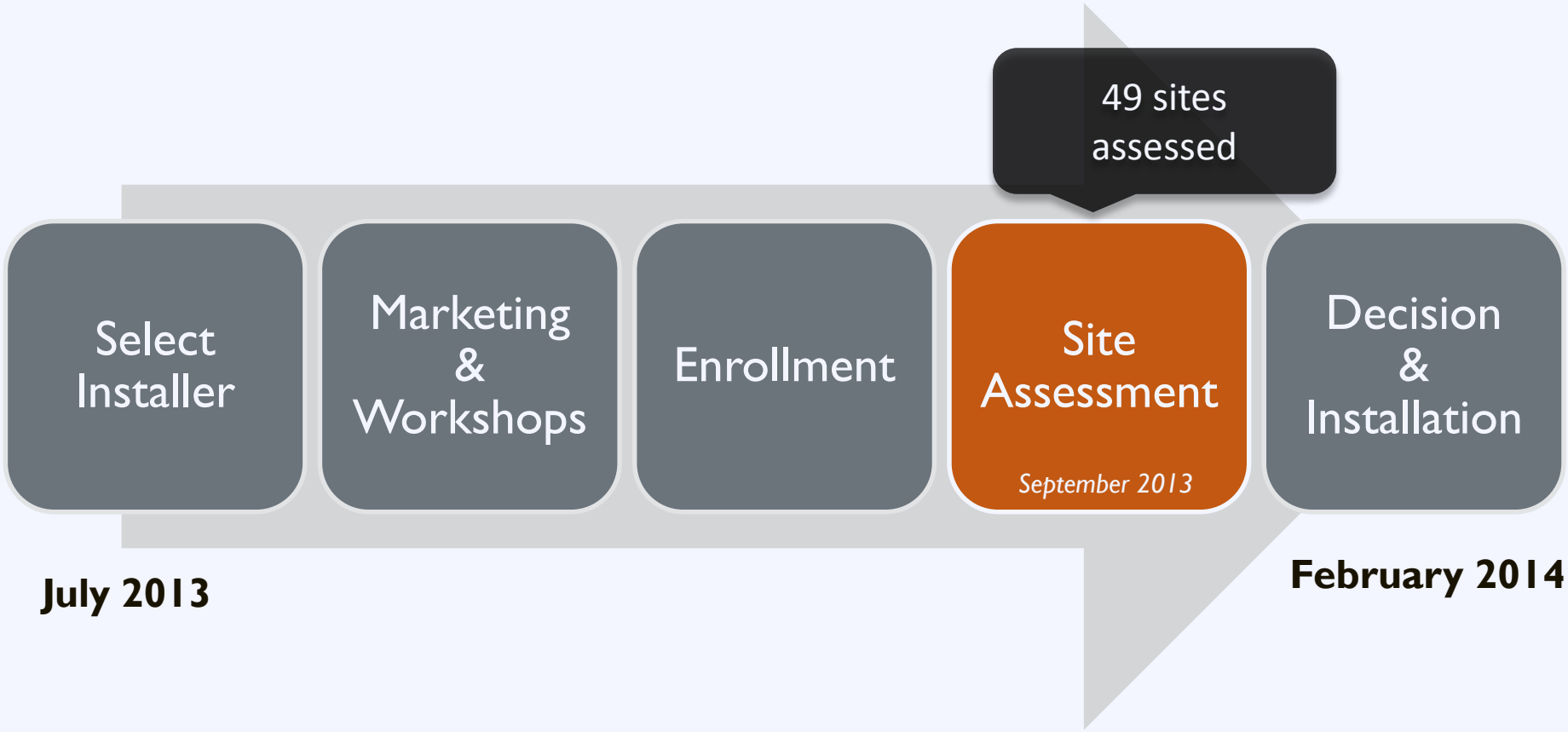

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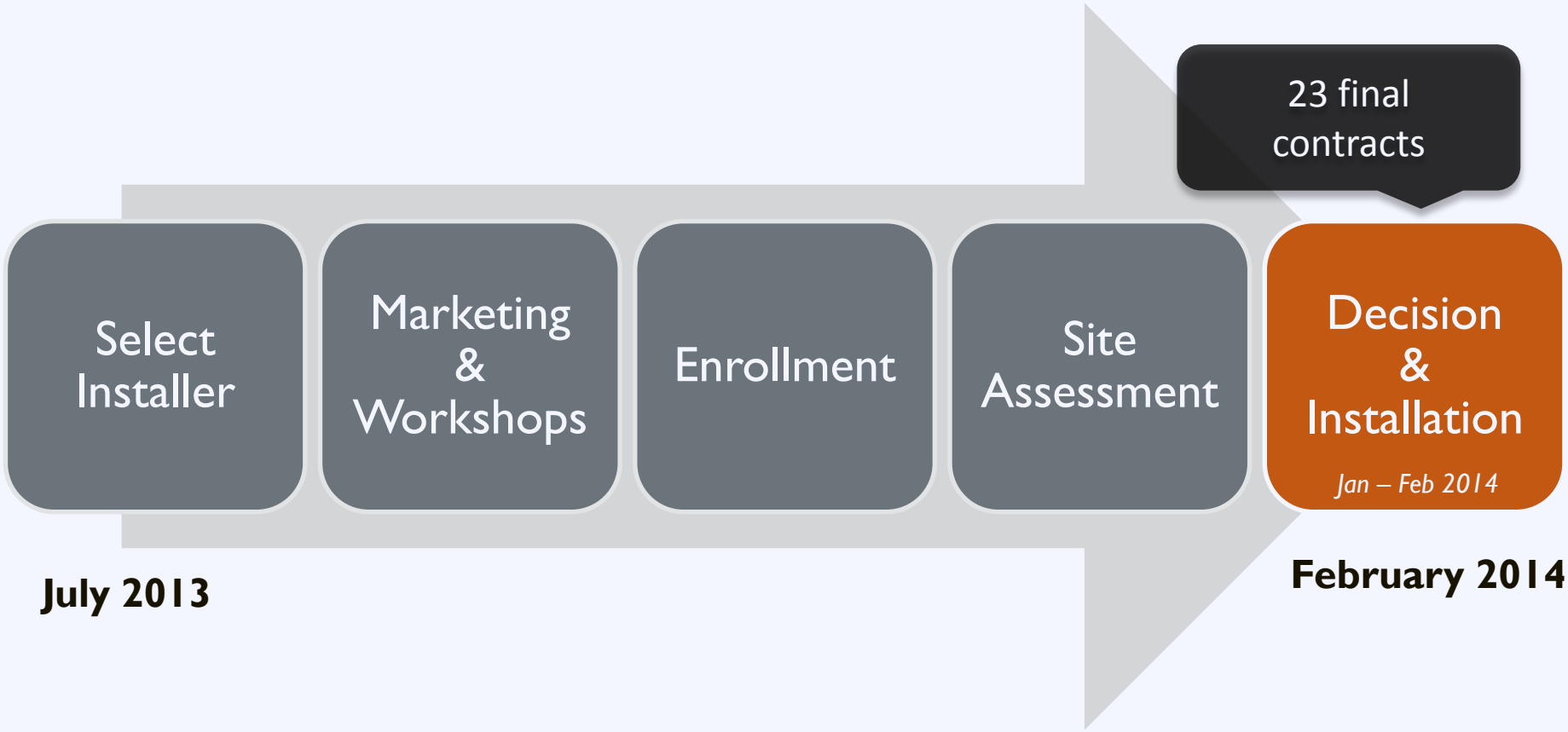

Solarize Plano: Case Study

Results:

23 new installations totaling 112 kW

45% of assessed sites signed contracts

20% reduction in solar price

Round 2 of Solarize Plano in 2014

5 new Solarize communities in Texas

Solarize: Lasting Impact

Studies have shown households are

significantly more likely to adopt solar

the more installations in their zip code.

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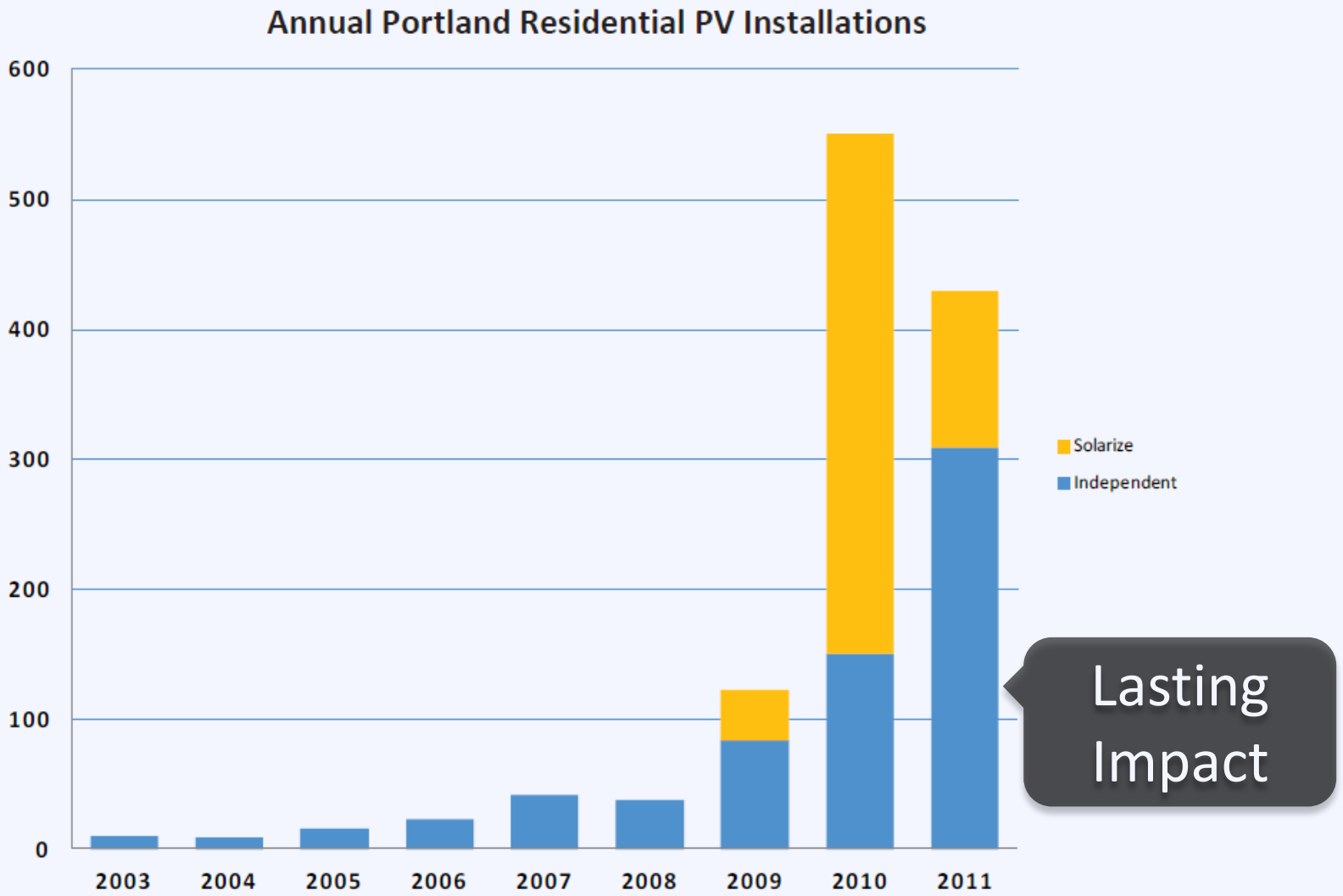
Source: NYU Stern and Yale School of Forestry – Peer Effects in the Diffusion of Solar Panels

Solarize: Lasting Impact



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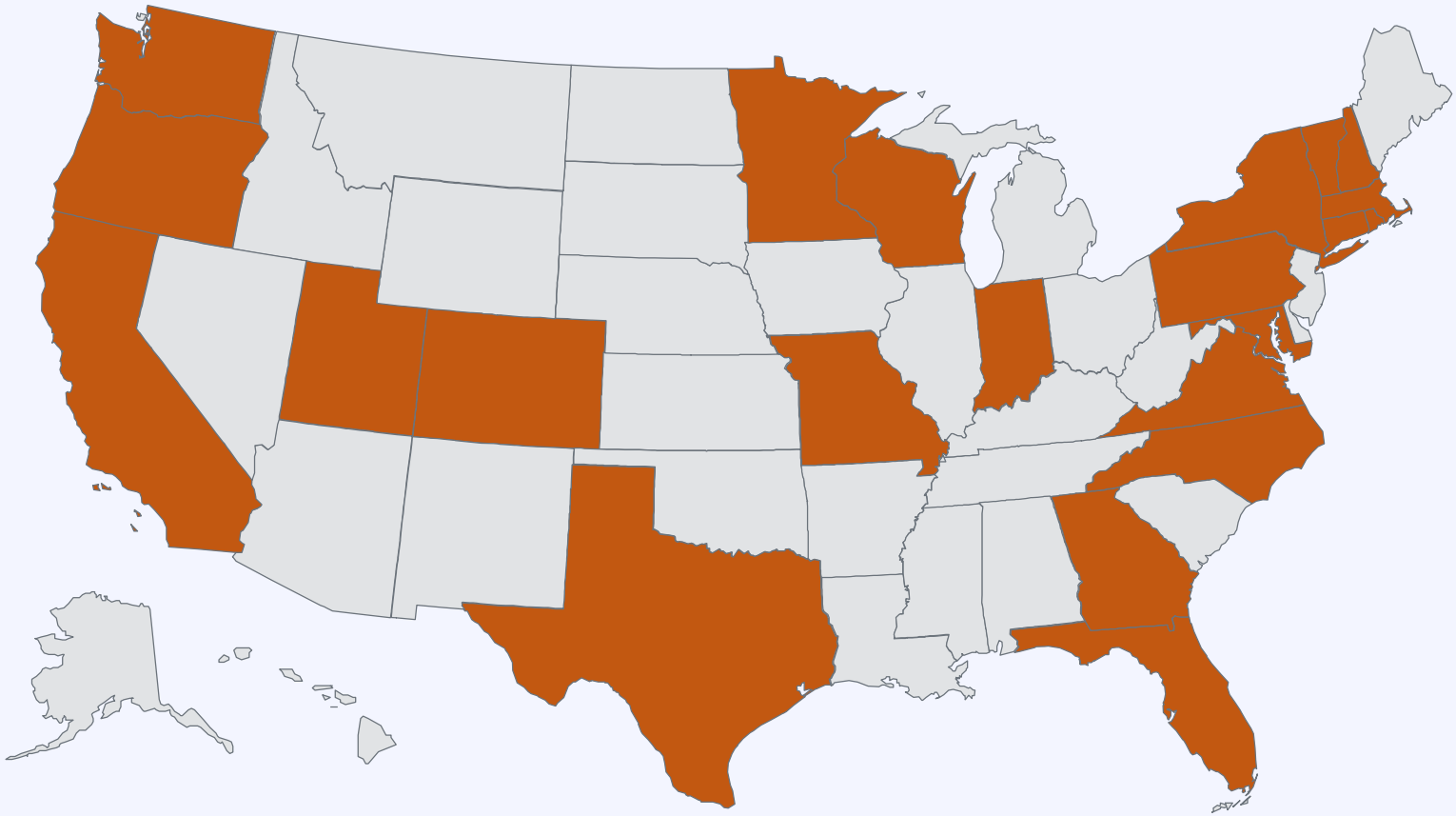
Solarize: National Growth

Over 200 Campaigns in 22 States



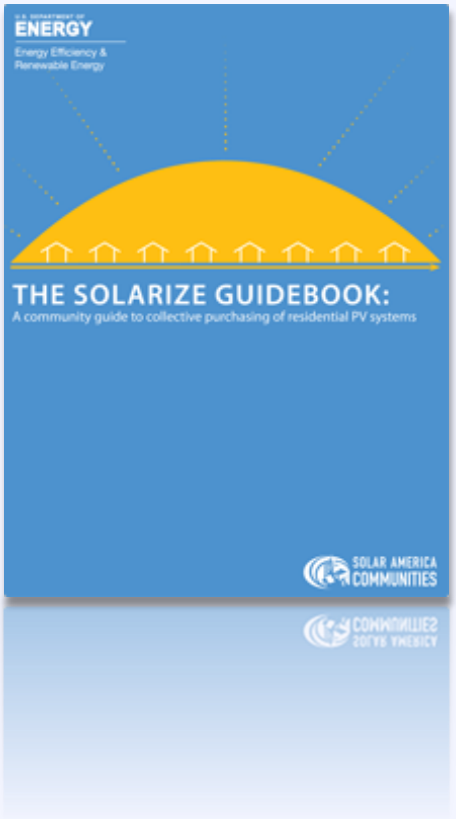
Thousands of homes Solarized!

Solarize: Resources

Resource **The Solarize Guidebook**

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

www.nrel.gov



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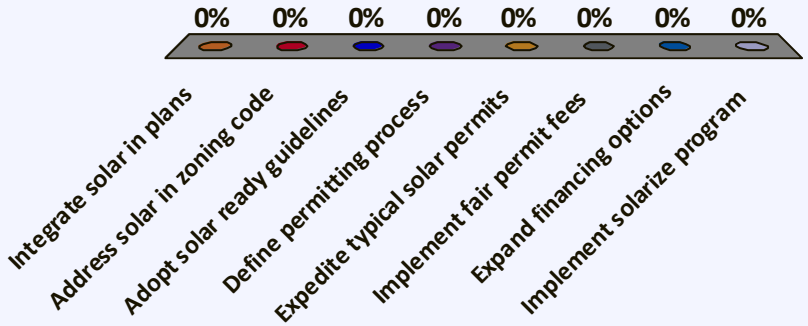
Activity: Solar in Your Community

1. Understand the federal, state, & utility policy landscape
2. Think about your community's solar goals
3. Recognize local successes and review current local policies/procedures
4. Identify opportunities and barriers to implementation
5. Outline implementation plan

Where to begin?

- Integrate solar in plans
- Address solar in zoning code
- Adopt solar ready guidelines
- Define permitting process
- Expedite typical solar permits
- Implement fair permit fees
- Expand financing options
- Implement solarize program



Technical Assistance

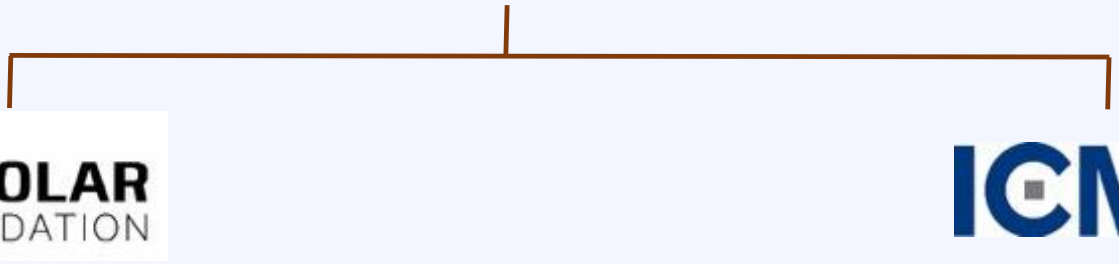
- Available to local governments
  - Can request through a non-profit or regional organization (RPC)
  - Previously available through SolarOPs
  - **Now will be available through SPARC SolSmart Designation at GOSPARC.org**

The Next Solution

Solar Powering America by Recognizing Communities (SolSmart)

Community recognition program for 300 communities taking steps to reduce soft costs and promote solar locally

SPARC Program Structure



TA Delivery

Designation Program Expertise

TA Pipeline

Solar Outreach Experience

Designation Program Development

- **Tiered designation program** with different levels of achievement (Bronze, Silver, and Gold)
- **Ongoing competitions** to reward success in real-time
- **Annual awards** recognizing outstanding achievement in soft cost, market growth, community engagement, other categories

FINAL CRITERIA AND STRUCTURE AVAILABLE:
April 28th, 2016

SolSmart Bronze Designation

60 Points Needed

Public statement of solar goals via commitment letter and tracking of key metrics

Planning and Zoning

1 Pre-requisite

Must achieve 20 points

- Inspection
- Building Codes
- Solar Rights

Permitting

1 Pre-Requisite

Must achieve 20 points

- Utility Engagement
- Community Engagement
- Market Development

Each has 1 pre-requisite and menu of options for additional points

No-Cost Technical Assistance

- Communities pursuing SPARC designation will be **eligible for no-cost technical assistance** from national solar experts.

- Technical assistance will be designed to **help a community achieve the basic requirements for designation**. Depending on demand, some TA may also be available to help more advanced communities achieve higher levels of designation.

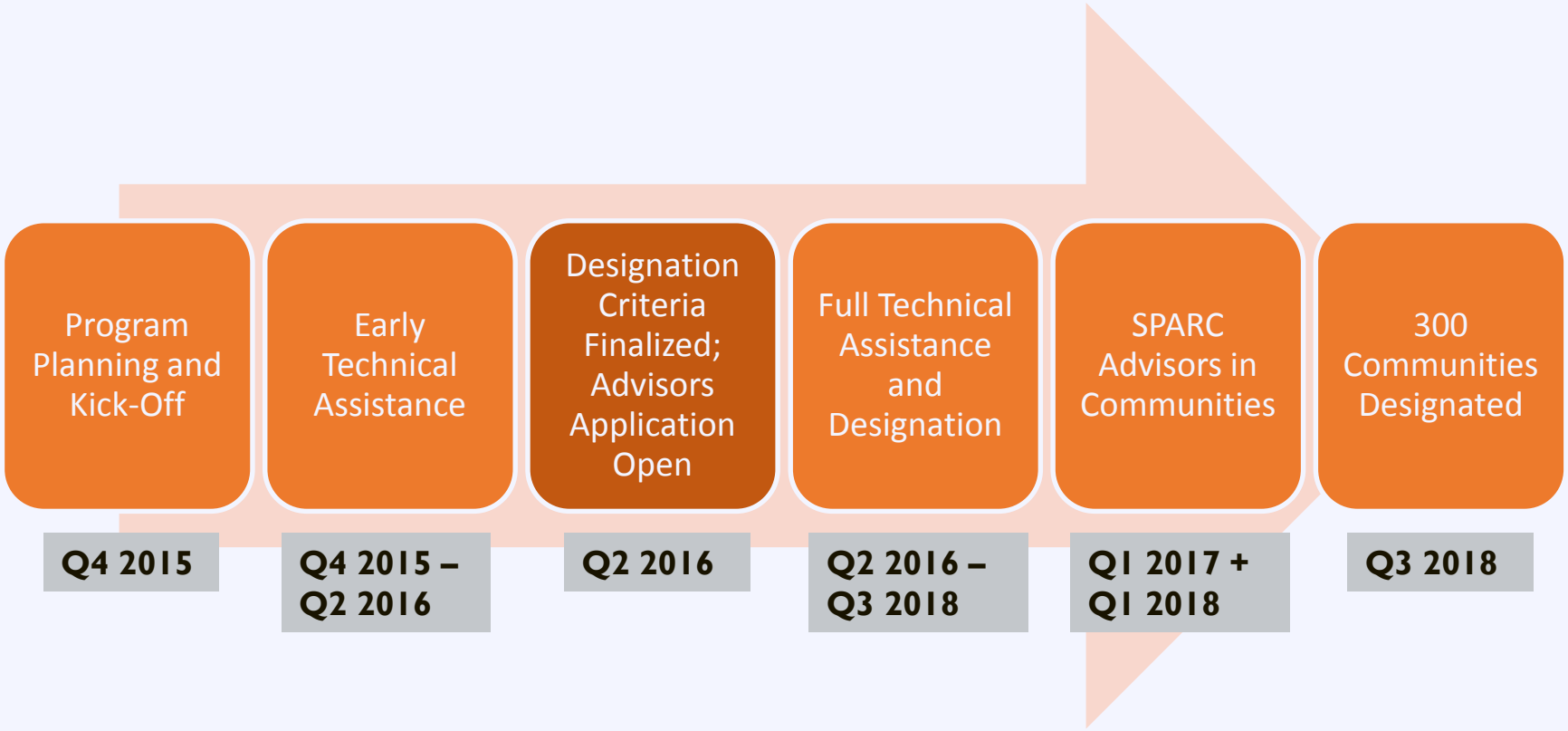
- **Topic areas** for TA include: streamlining permitting and inspection processes for solar, planning and zoning for solar, solar financing options, codes and standards, community and utility engagement, market development programs, and others.

SPARC Advisors

- **Funded temporary staff** to help communities achieve designation. Communities must apply to participate in SPARC to host an Advisor.
- Advisors will **evaluate existing local government policies/processes** and **apply industry leading best practices** that will move a community toward designation.
- SPARC Advisors will assist communities through **engagements lasting up to six months.**
- There will be **two opportunities** for a community to be chosen as a SPARC Advisor host, and these will occur through a highly competitive process.

FIRST ROUND OF COMMUNITY SELECTION BEGINS: April 28, 2016

SPARC Timeline



What do municipalities ask for?

- Review solar zoning ordinance, or HOA language – is it solar friendly?
- Review permitting processes
- Help with solarize program
- Review RFP
- Review responses to RFP
- Feasibility analysis for solar PV
- Myth busting

Agenda

10:20 – 10:50	Putting Solar Energy on the Local Policy Agenda
10:50 – 11:20	State of the Local Solar Market
11:20 – 11:50	Federal, State, and Utility Policy Drivers
11:50 – 12:15	*Break and Lunch*
12:15 – 12:45	Planning for Solar: Getting Your Community Solar Ready
12:45 – 1:20	Solar Market Development Tools
1:20 – 1:30	*Break*
1:30 – 2:15	Local Speakers
2:15 – 3:00	Developing a Solar Policy Implementation Plan
3:00 – 3:30	Networking Opportunity

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ICMA
Leaders at the Core of Better Communities

APA
American Planning Association
Making Great Communities Happen

NARC
Building Regional Communities
National Association of Regional Councils

ICLEI
Local Governments for Sustainability USA

IREC
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MEISTER
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The SOLAR FOUNDATION

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