Solar Powering Your Community

Addressing Soft Costs and Barriers

Powered by SunShot

U.S. Department of Energy

Powered by SunShot

U.S. Department of Energy

Ben Inskeep

Energy Policy Analyst

ben_inskeep@ncsu.edu

Kate Daniel

Energy Policy Analyst

kdaniel2@ncsu.edu

NC CLEAN ENERGY TECHNOLOGY CENTER

About the SunShot Solar Outreach Partnership

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

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.

About the SunShot Solar Outreach Partnership

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

Complimentary Services

Technical Resources

Regional Workshops

One to One Assistance

Strategy Session

Complimentary Services

Technical Resources

Helping Policymakers Understand Best Practices:

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

www.solaroutreach.org

One to One Assistance

Regional Workshops

Strategy Session

Powered by SunShot U.S. Department of Energy

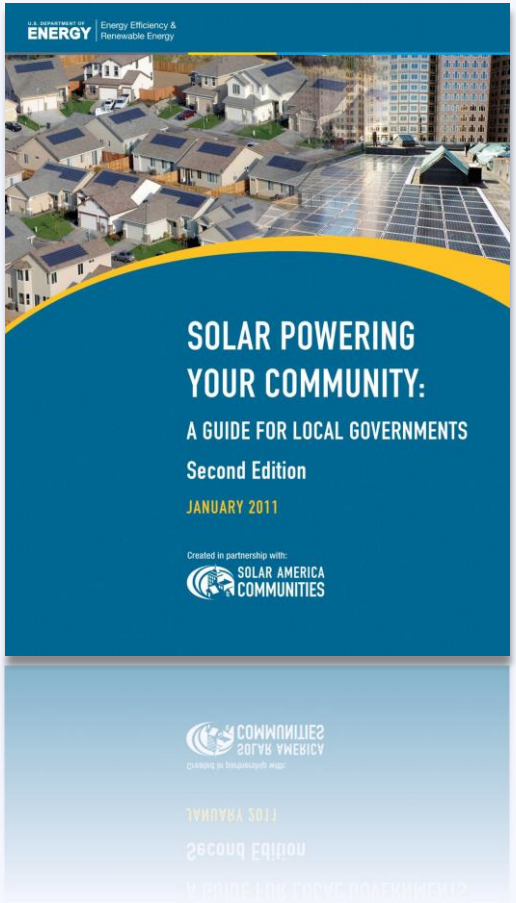
Email solar-usa@iclei.org to request a 20 minute consultation

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



Complimentary Services

Quickly get up to speed on key solar policy issues:

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

Regional Workshops

Strategy Session

Powered by SunShot U.S. Department of Energy

Email solar-usa@iclei.org to request a 20 minute consultation

Complimentary Services

Technical Resources

Regional Workshops

Develop an implementation strategy for smart solar policy

One to One Assistance

Strategy Session

Powered by SunShot U.S. Department of Energy

Email solar-usa@iclei.org to request a 20 minute consultation

Complimentary Services

Technical Resources

Regional Workshops

One to One Assistance

Receive customized technical support on implementation of smart solar policy

Powered by SunShot U.S. Department of Energy

Email solar-usa@iclei.org to request a 20 minute consultation

After This Session

Talk to Us!

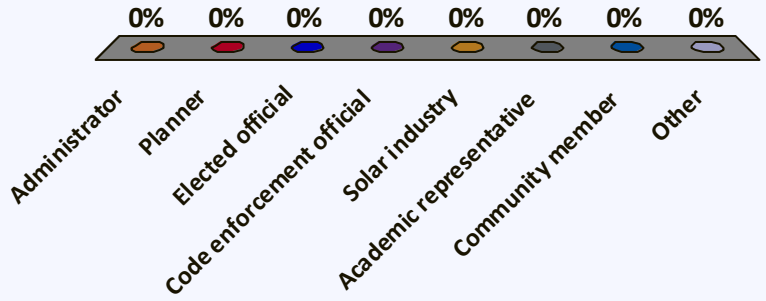
Sign up for a 20 minute consultation to learn more about our free services

See us to sign up.

We want to get to know you better

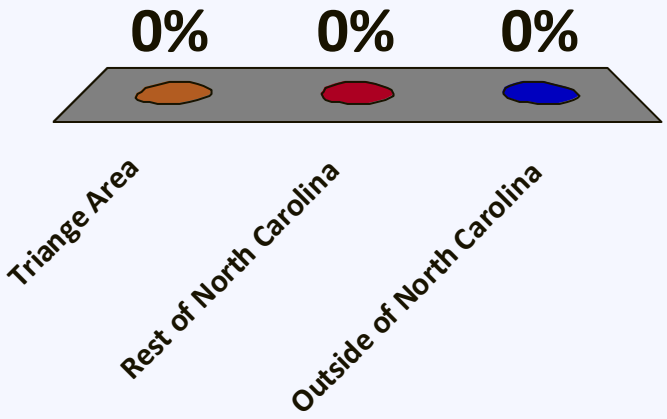
Who are you?

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



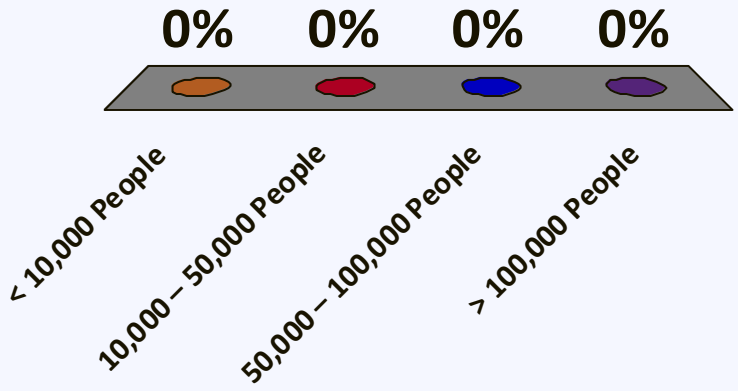
Where are you coming from?

A. Triangle Area
B. The rest of North Carolina
C. Outside of North Carolina



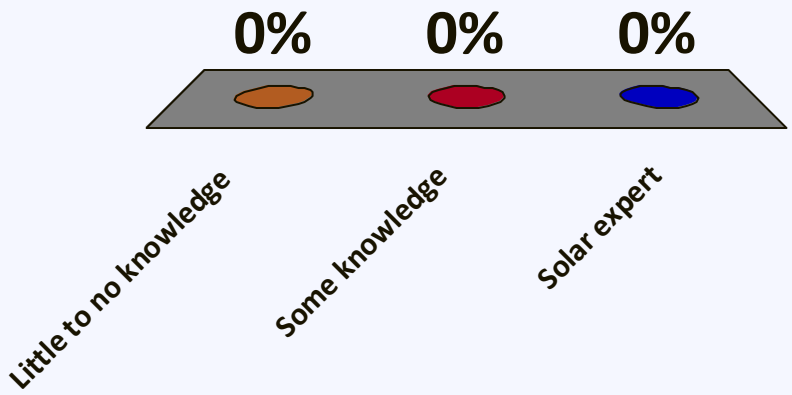
What size is your community?

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



How familiar are you with solar?

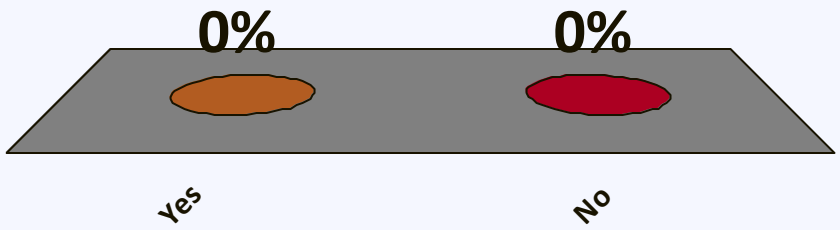
A. Little to no knowledge
B. Some knowledge
C. Solar expert



Do you have solar on your home?

A. Yes

B. No



Solar Development in the US

In 2014, the US solar industry installed

195,000 new solar installations

of which

95% were residential projects

If you do have solar on your home:

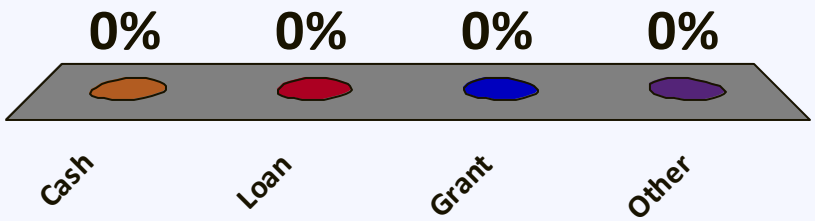
How did you finance it?

A. Cash

B. Loan

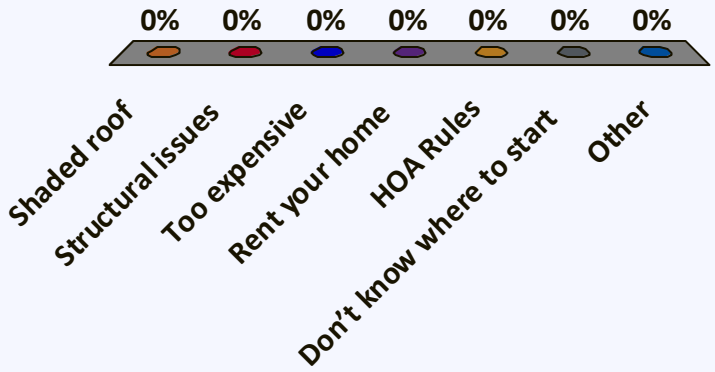
C. Grant

D. Other



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

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

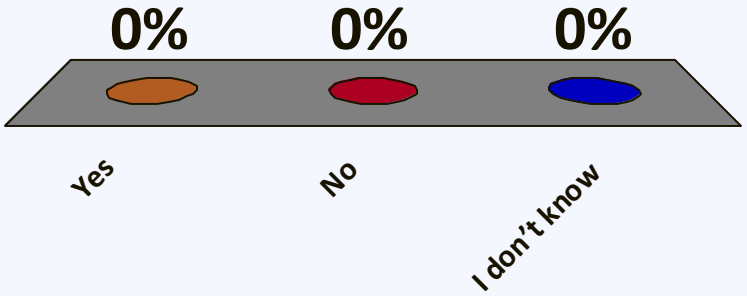


Does your local government have solar on public properties?

A. Yes

B. No

C. I don't know



Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

Solar Technologies

Solar Photovoltaic (PV)

Solar Hot Water

Concentrated Solar Power

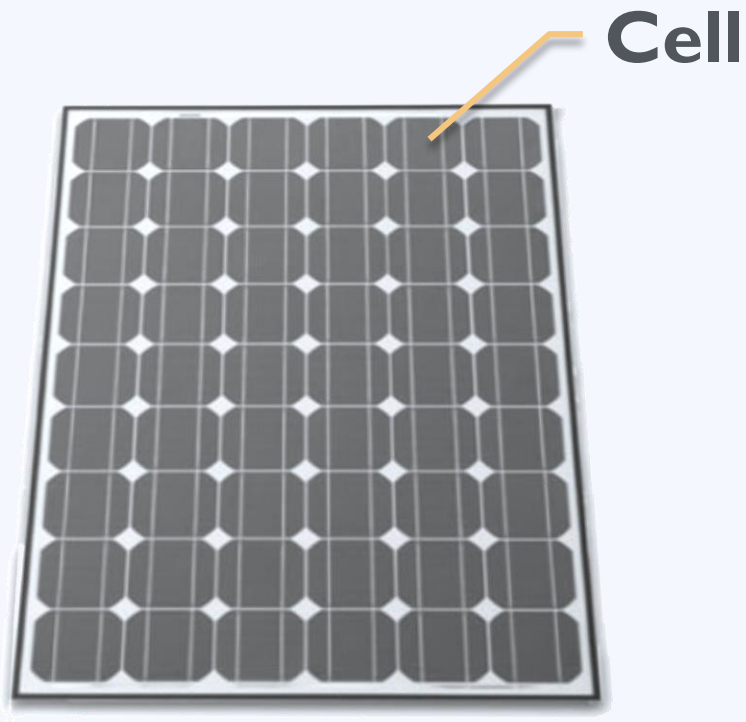
Solar Technologies

Solar Photovoltaic (PV)

Solar Hot Water

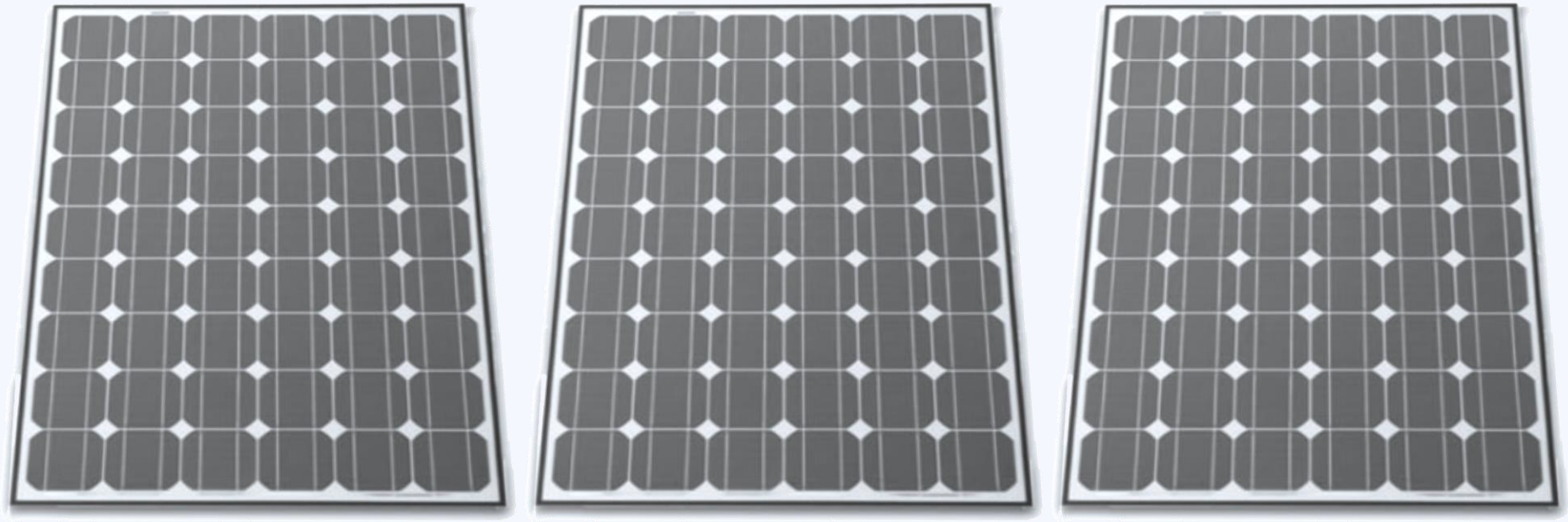
Concentrated Solar Power

Some Basic Terminology



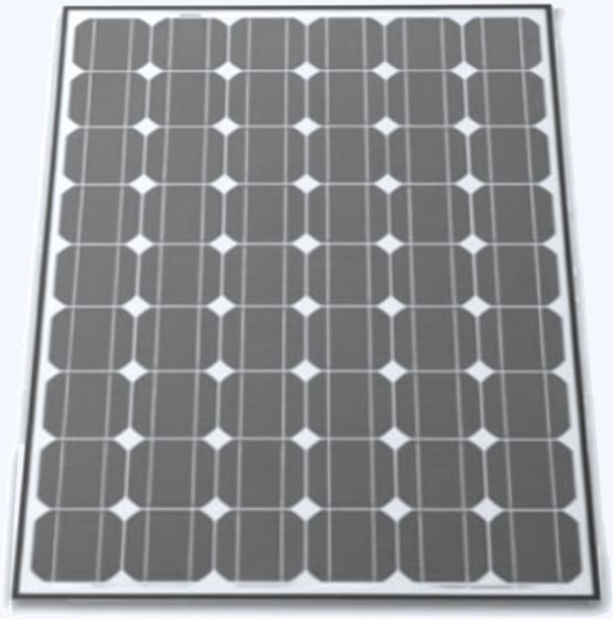
Panel / Module

Some Basic Terminology



Array

Some Basic Terminology



Capacity / Power

kilowatt (kW)

Production

Kilowatt-hour (kWh)

Some Basic Terminology

Residence
5 kW

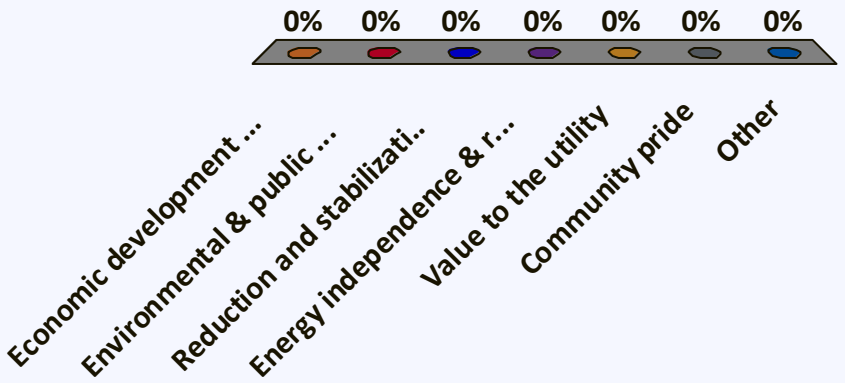
Factory
1 MW+

Office
50 – 500 kW

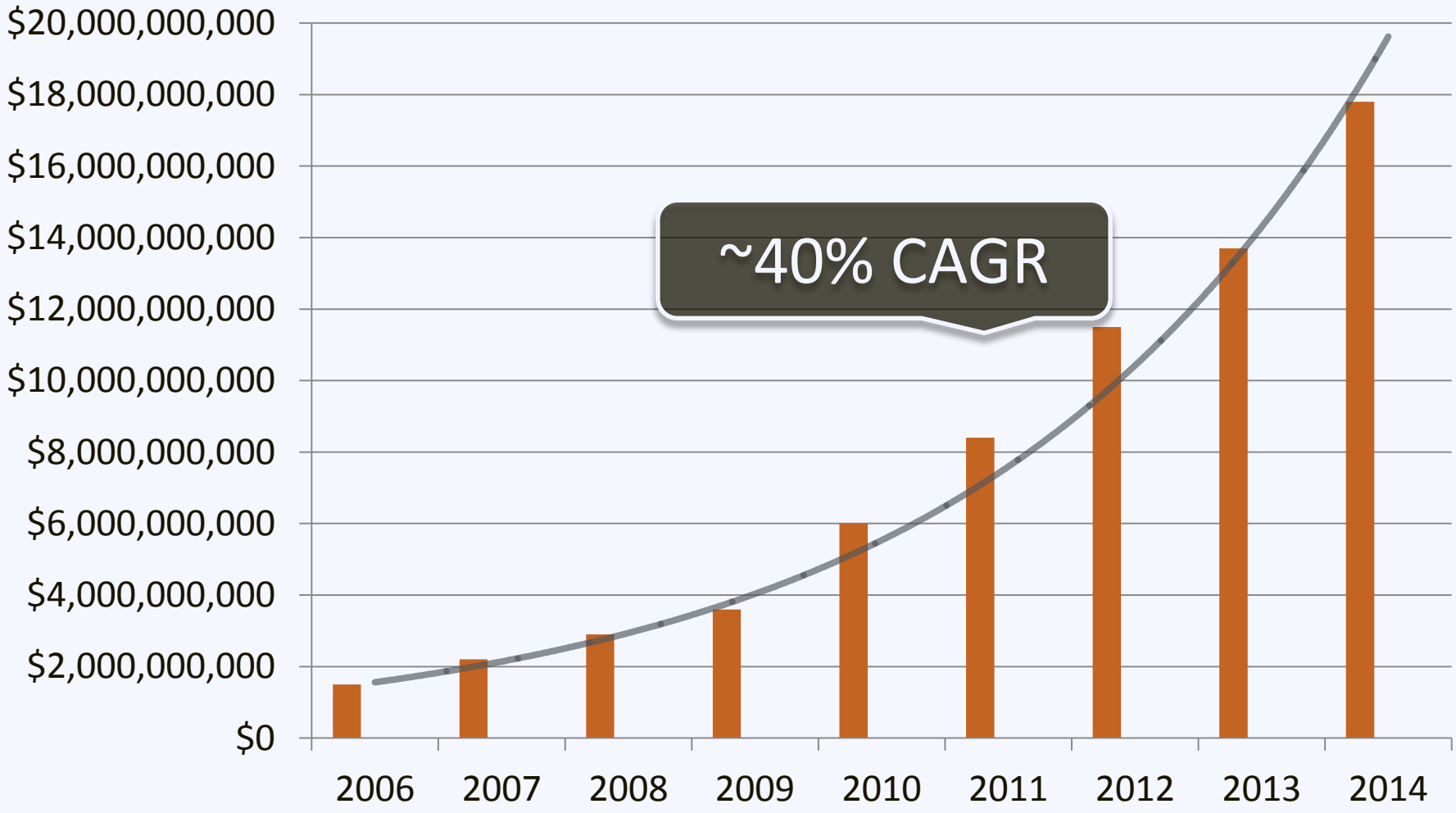
Utility
2 MW+

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

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



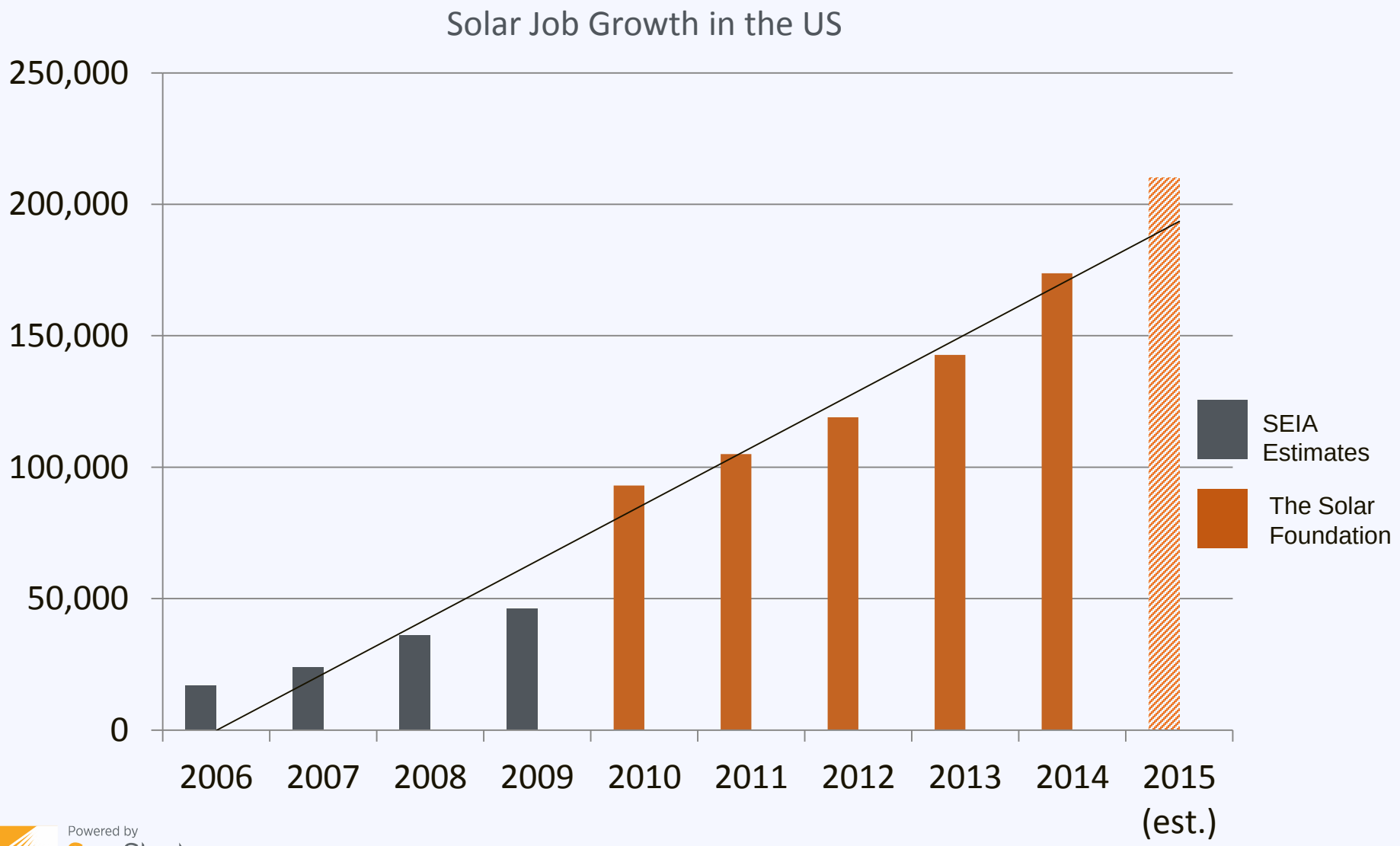
Benefits: Solar Economic Growth



Powered by SunShot U.S. Department of Energy

Source: SEIA/GTM Research – 2009/2010/2011/2012 /2014 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

The Local Economic Opportunity

1 Megawatt of Residential Solar Development in North Carolina:

35 Jobs *and* **$4.3 Million**

In economic output

Powered by SunShot U.S. Department of Energy

Source: JEDI Model, NREL. US$2015. Assumes $4/W system cost.

Economic Development in North Carolina

There are currently

177 solar companies

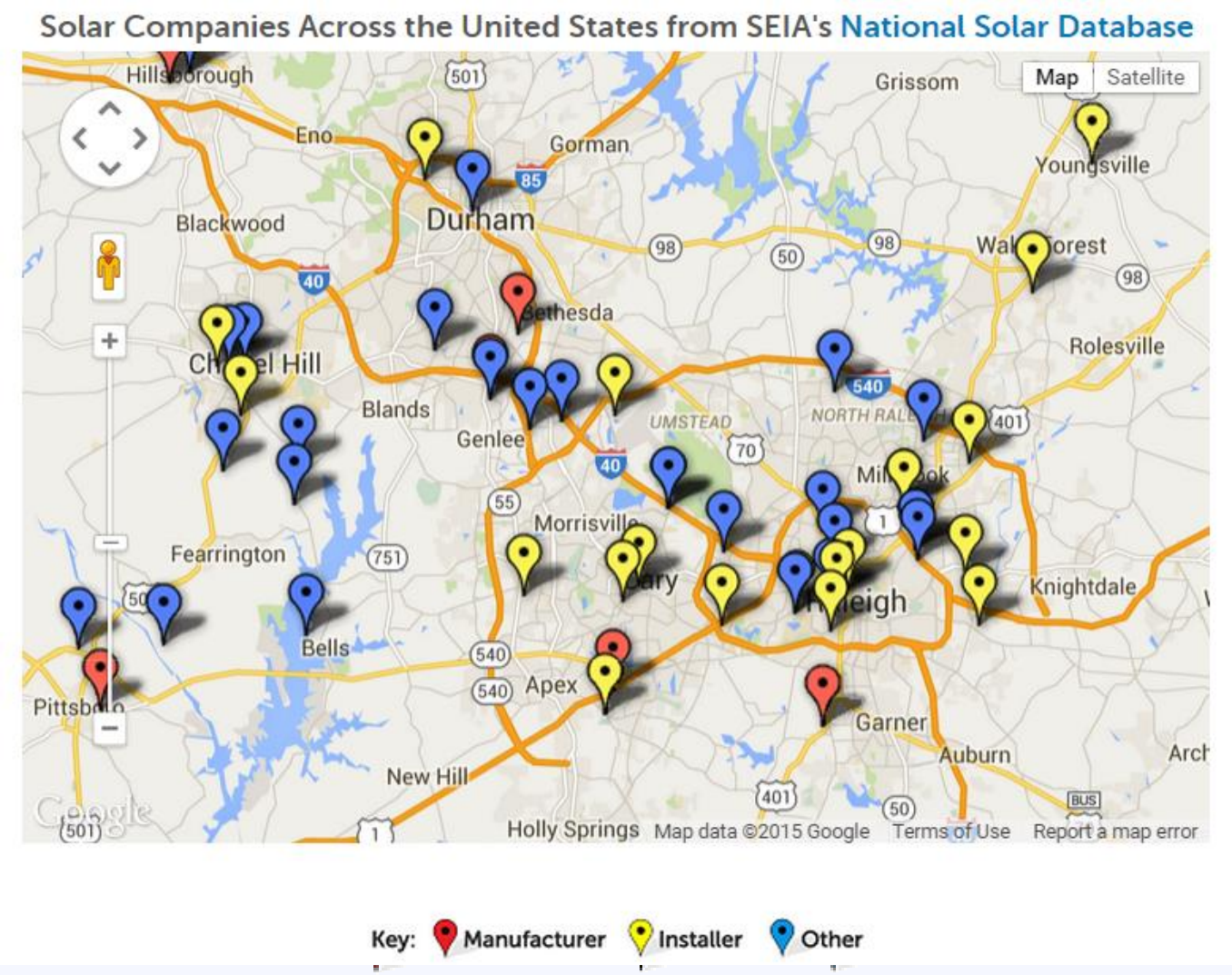
that employ

5,600 people

Powered by SunShot U.S. Department of Energy

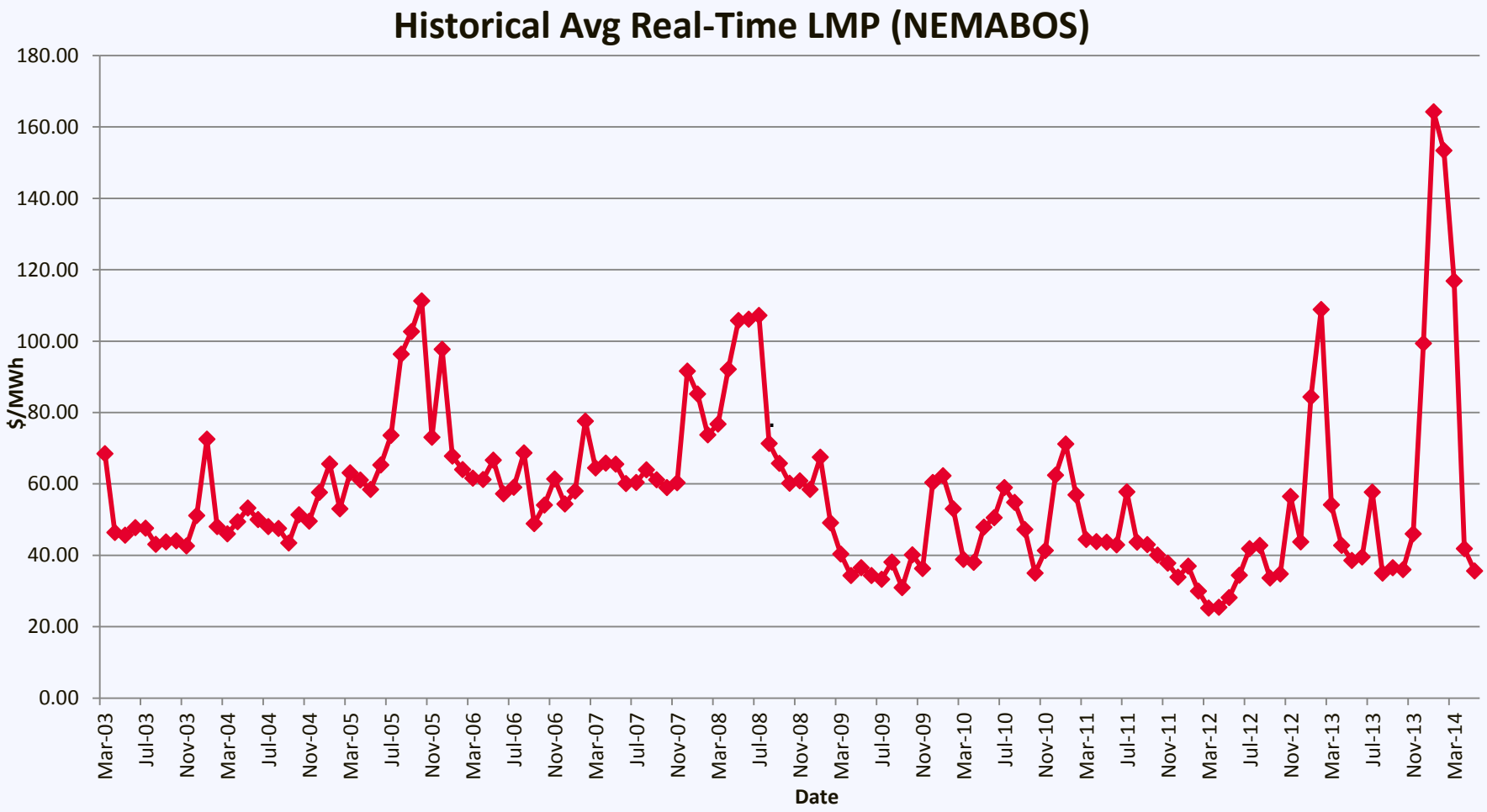
Source: SEIA, The Solar Foundation

Economic Development in North Carolina



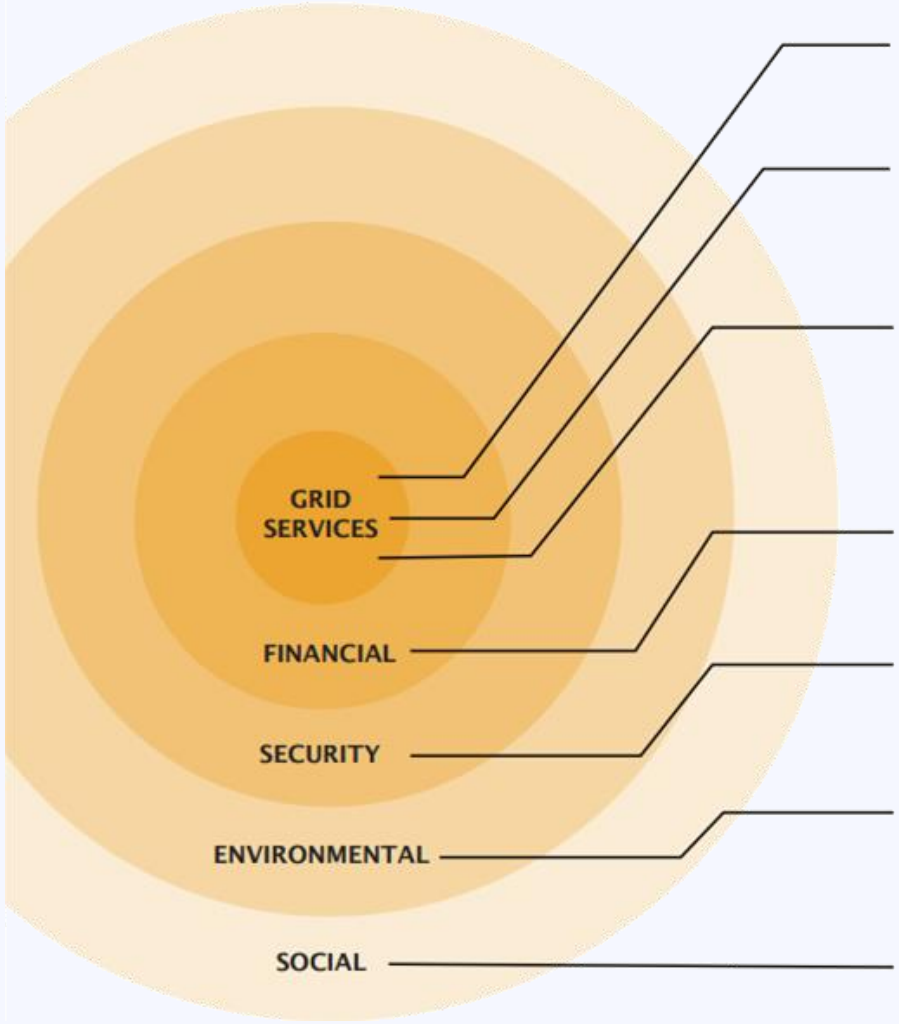
Source: SEIA

Benefit: Stabilize Energy Prices



Source: NEPOOL

Valuable to Community & Utilities



ENERGY
- energy
- energy losses

CAPACITY
- generation capacity
- transmission & distribution capacity
- DPV installed capacity

GRID SUPPORT SERVICES
- reactive supply & voltage control
- regulation & frequency response
- energy & generator imbalance
- synchronized & supplemental operating reserves
- scheduling, forecasting, and system control & dispatch

FINANCIAL RISK
- fuel price hedge
- market price response

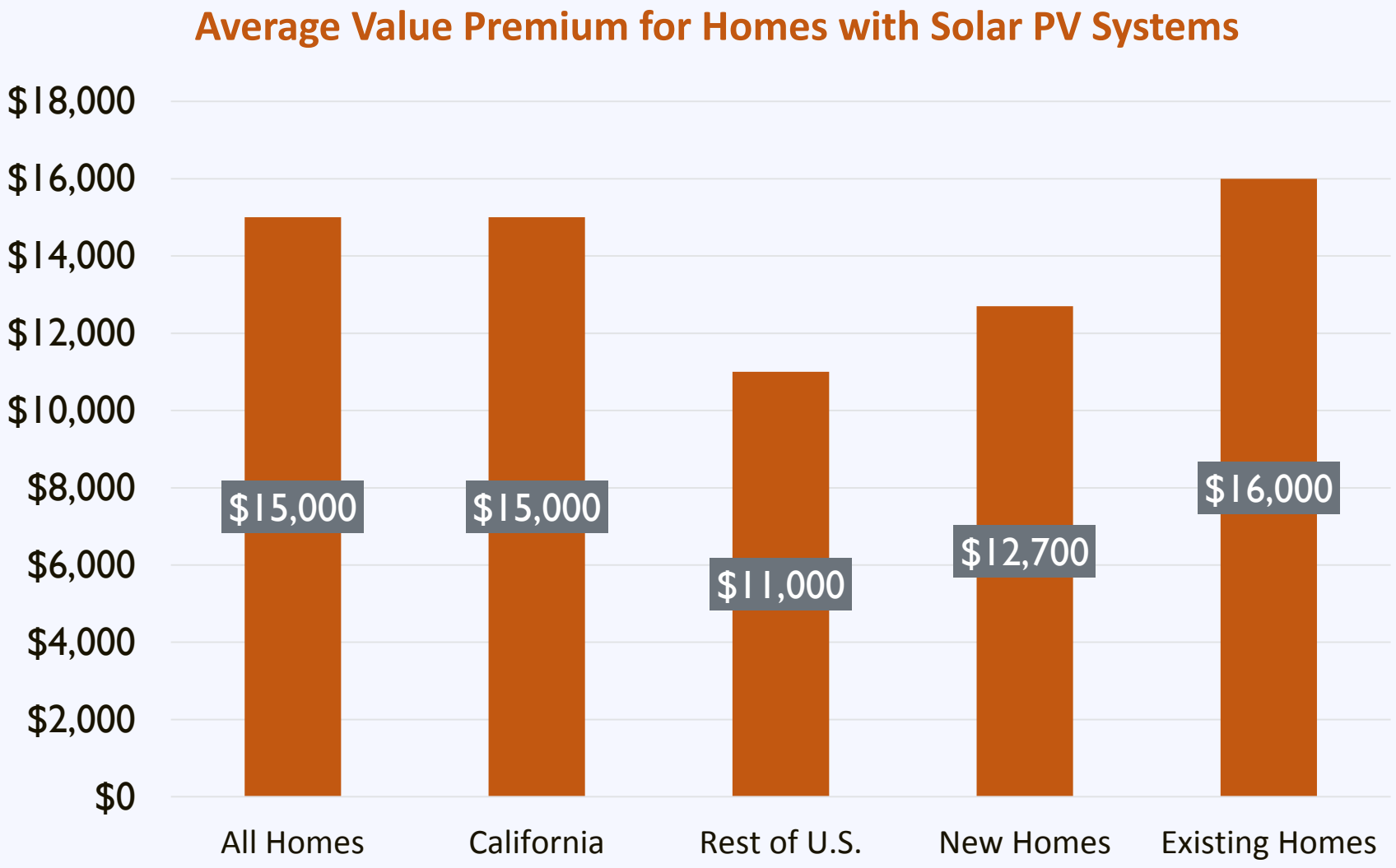
SECURITY RISK
- reliability & resilience

ENVIRONMENTAL
- carbon emissions
- criteria air pollutants (SOx, NOx, PM10)
- water
- land

SOCIAL
- Economic development (jobs and tax revenues)

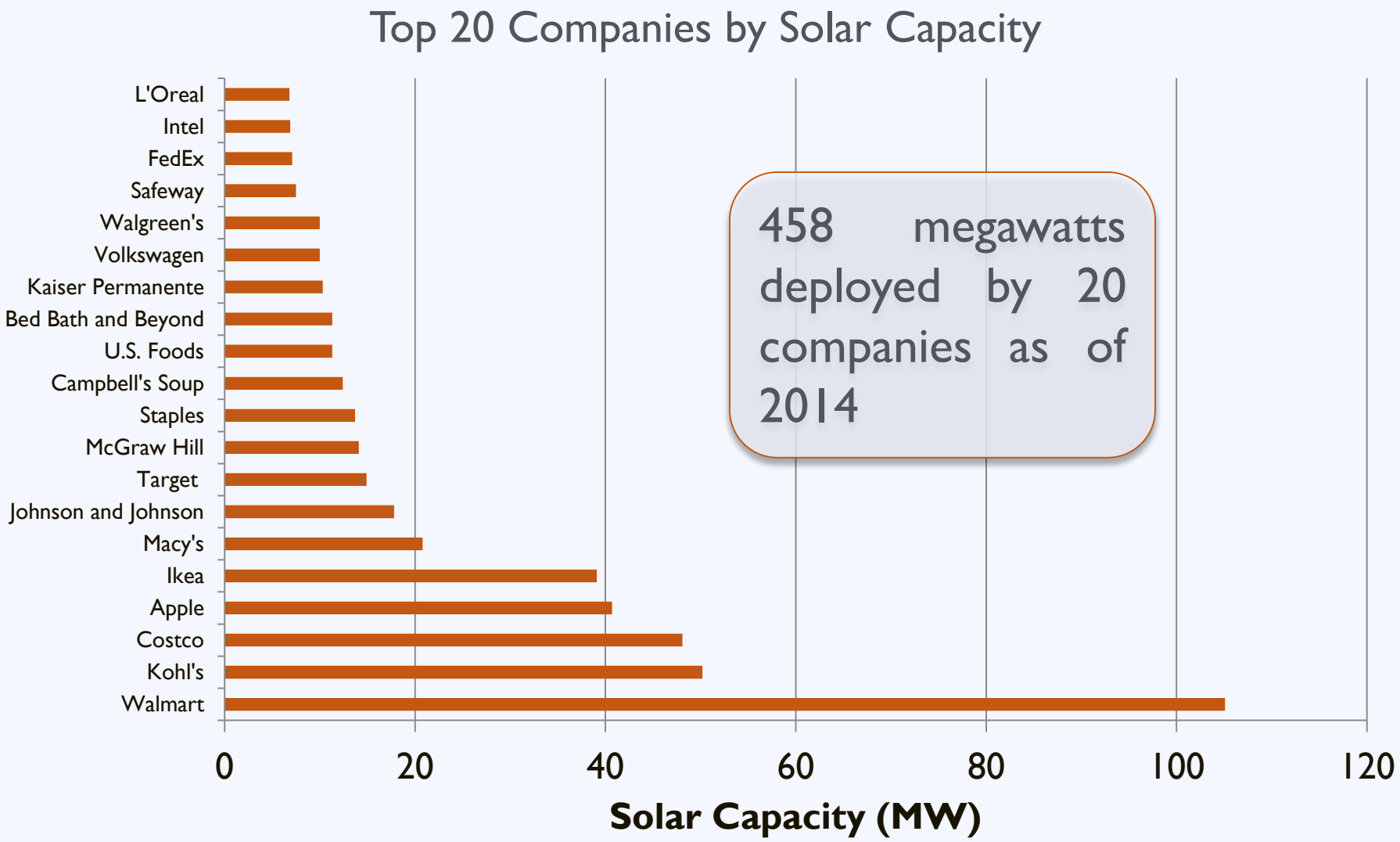
Source: Rocky Mountain Institute
(http://www.rmi.org/Content/Files/eLab-DER_cost_value_Deck_130722.pdf)

Smart Investment for Homeowners



Source: LBNL, *Selling Into the Sun* (2015)

Smart Investment for Businesses



Powered by SunShot U.S. Department of Energy

Source: Solar Energy Industries Association

Smart Investment for Governments

Source: Borrego Solar

Solar on Schools

Current:

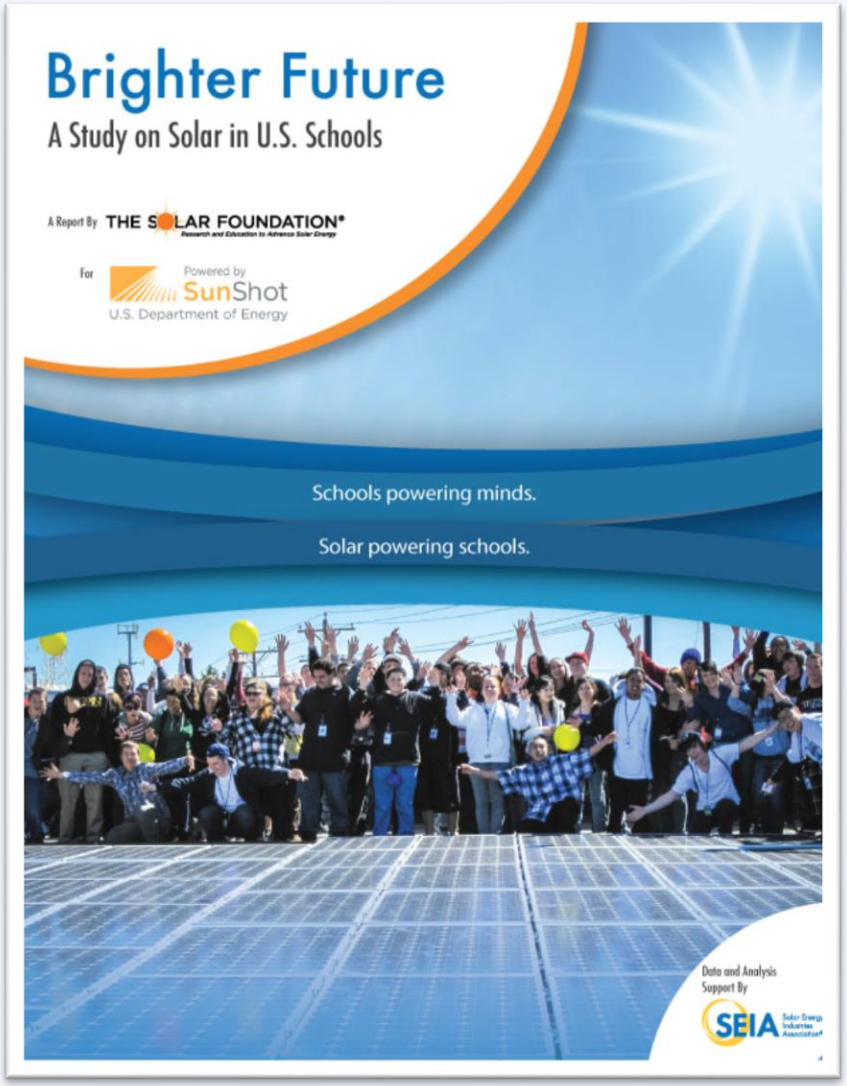
× 3,752

= $77.8m

Potential:

× 40,000 – 72,000

= $800m



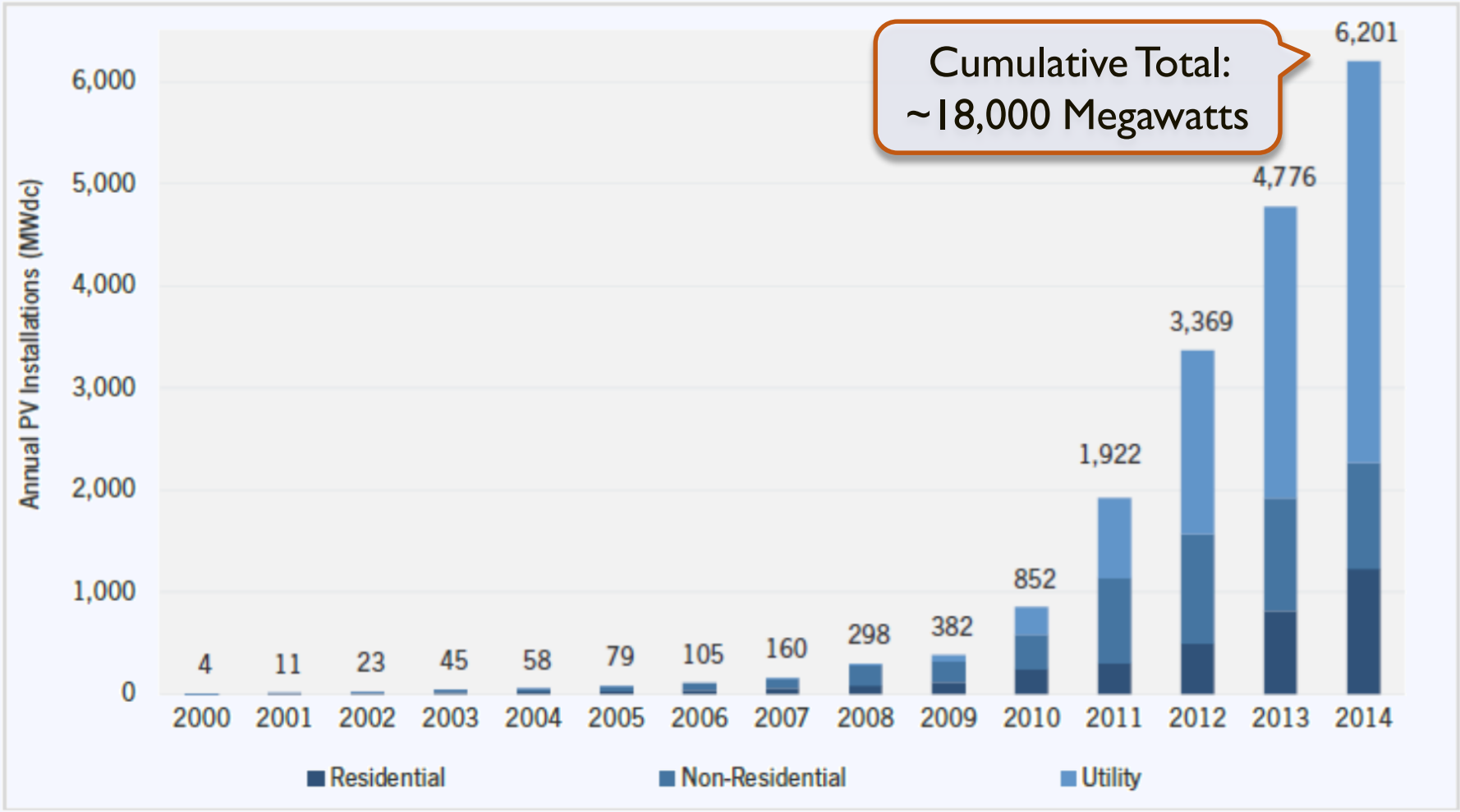
Powered by SunShot U.S. Department of Energy

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

Agenda

10:20 – 10:50	Putting Solar Energy on the Local Policy Agenda
10:50 – 11:20	State of the Local Solar Market
11:20 – 11:50	Federal, State, and Utility Policy Drivers
11:50 – 12:15	*Break and Grab Lunch*
12:15 – 12:50	Planning for Solar: Getting Solar Ready
12:50 – 1:25	Solar Market Development Tools
1:25 – 1:35	*Break*
1:35 – 2:20	Local Speakers
2:20 – 3:00	Developing and Solar Policy Implementation Plan for Your Community and Next Steps

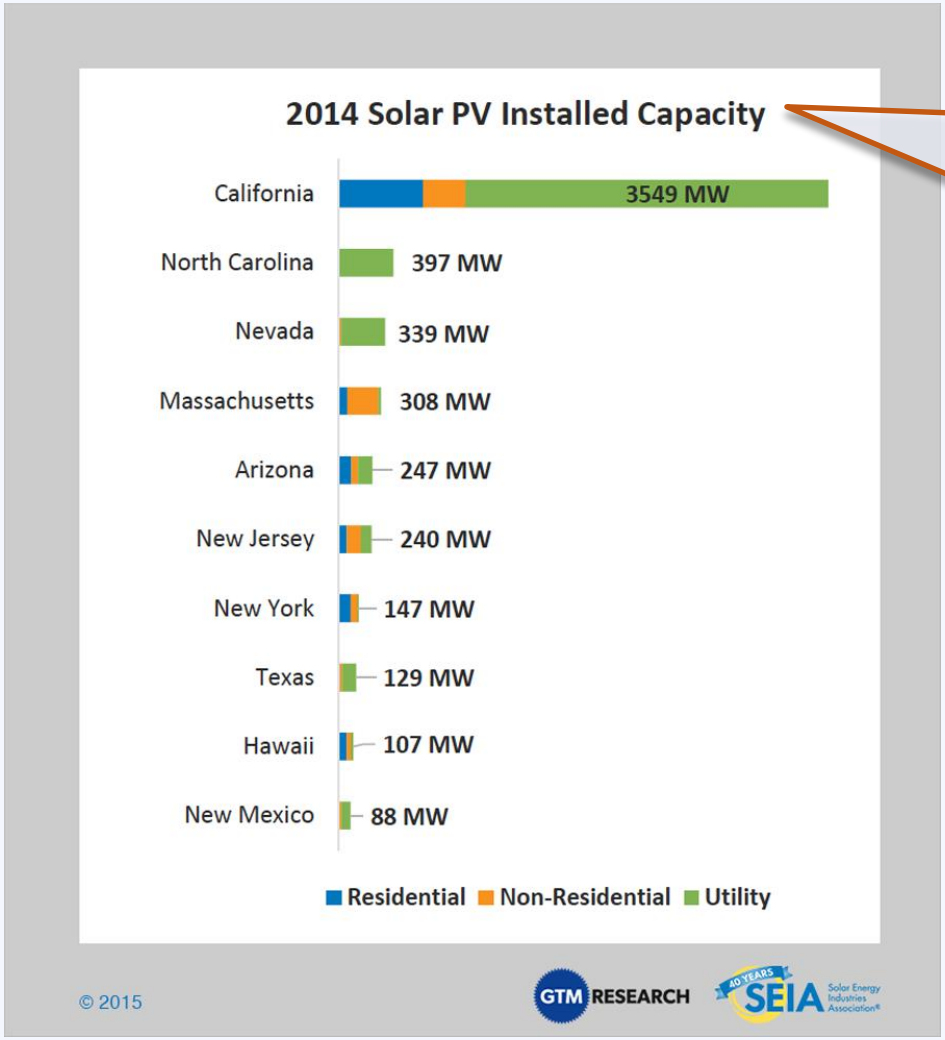
US Solar Market



Powered by SunShot U.S. Department of Energy

Source: Solar Energy Industries Association/ GTM Research, *Solar Market Insight: 2014 Year-in-Review*

US Solar Market

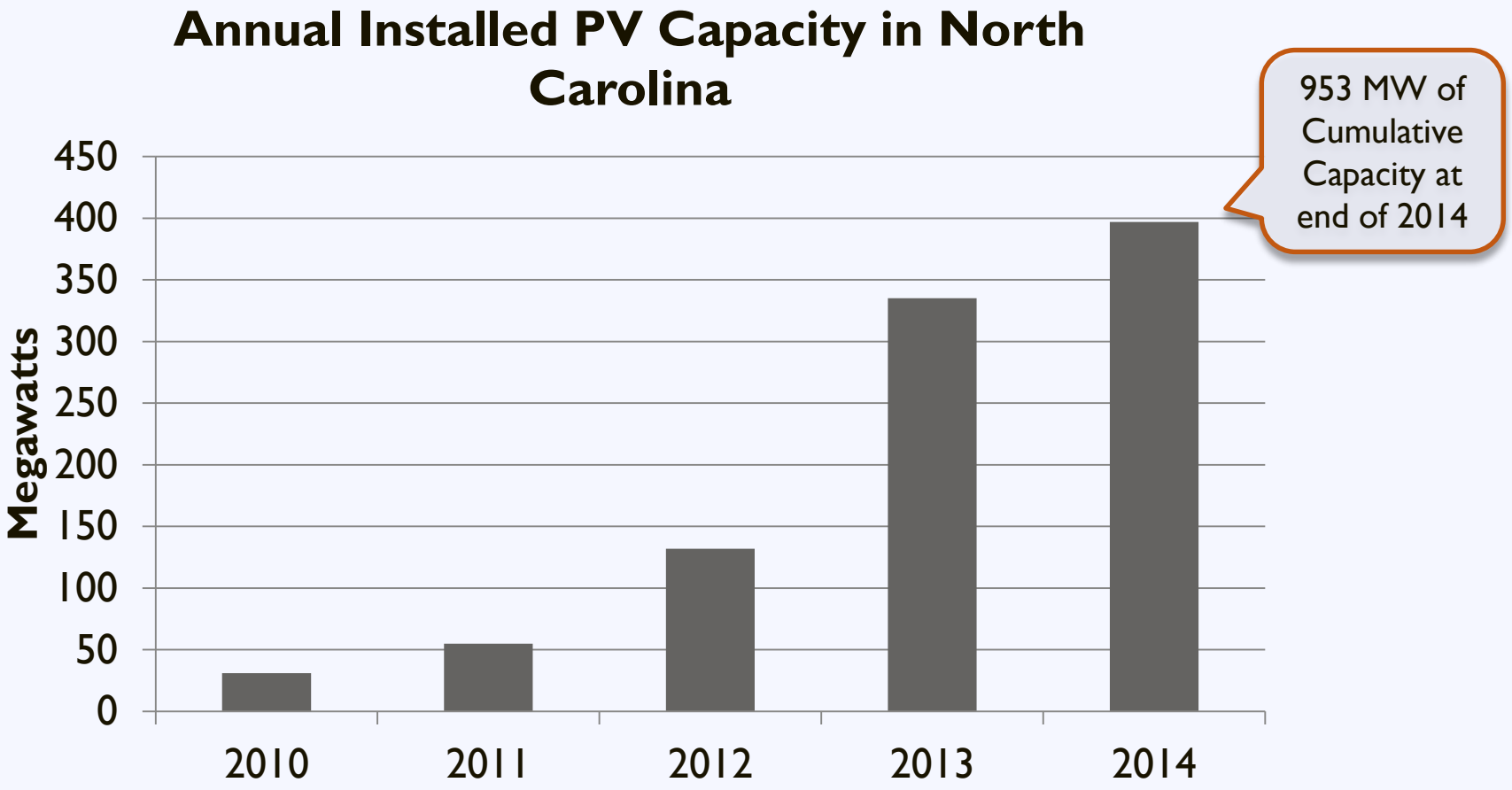


Total U.S. Installations in 2014: ~7,000 Megawatts

Powered by SunShot U.S. Department of Energy

Source: Solar Energy Industries Association/ GTM Research, *Solar Market Insight: 2014 Year-in-Review*

North Carolina Solar Market

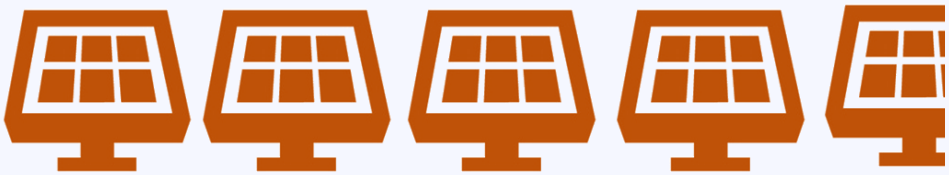


Source: Solar Energy Industries Association/ GTM Research, *Solar Market Insight*

North Carolina Solar Market

As of 2013…

North Carolina



47.6

watts per person

US

39

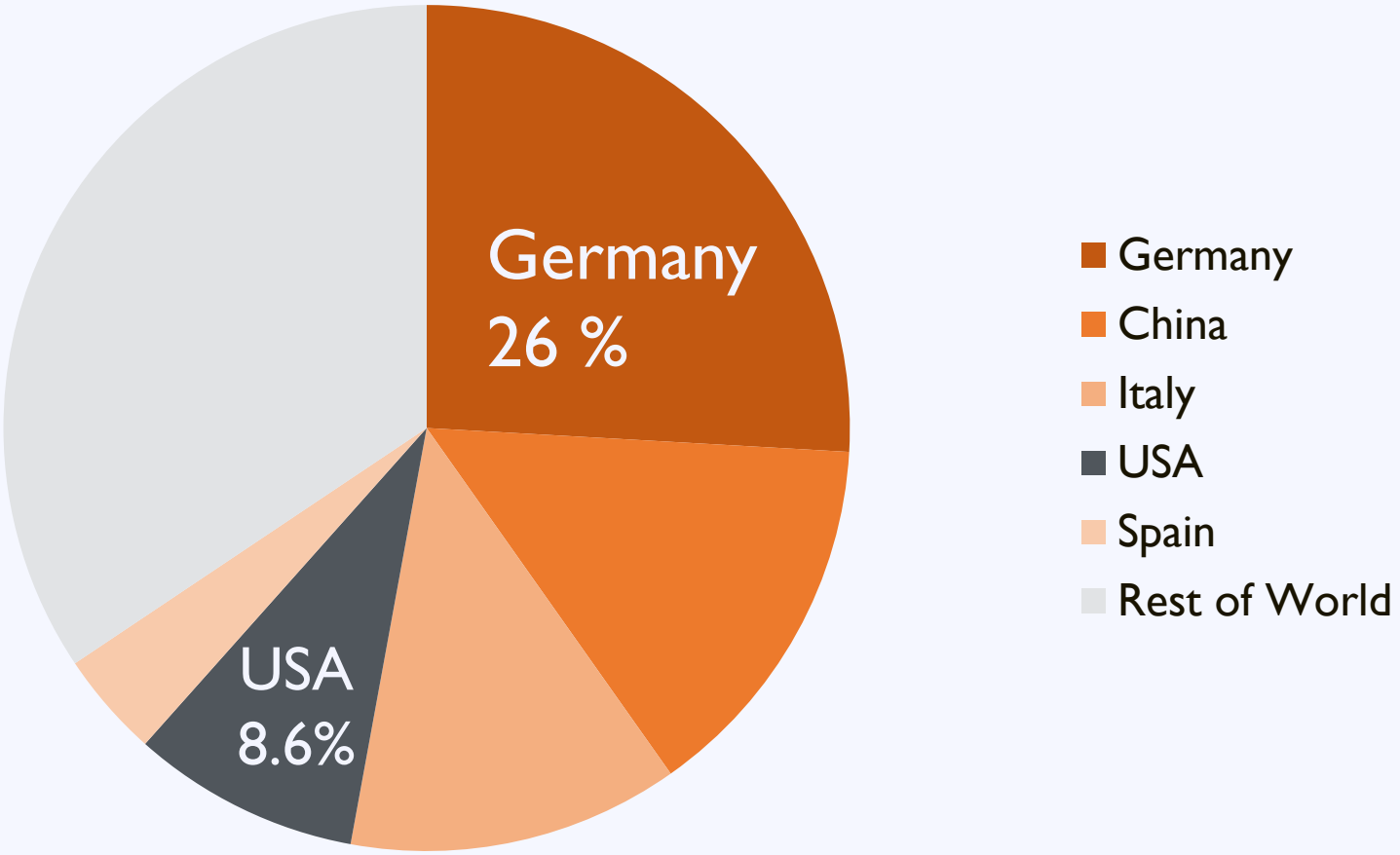
watts per person

Powered by SunShot U.S. Department of Energy

Source: IREC Solar Market Trends 2013

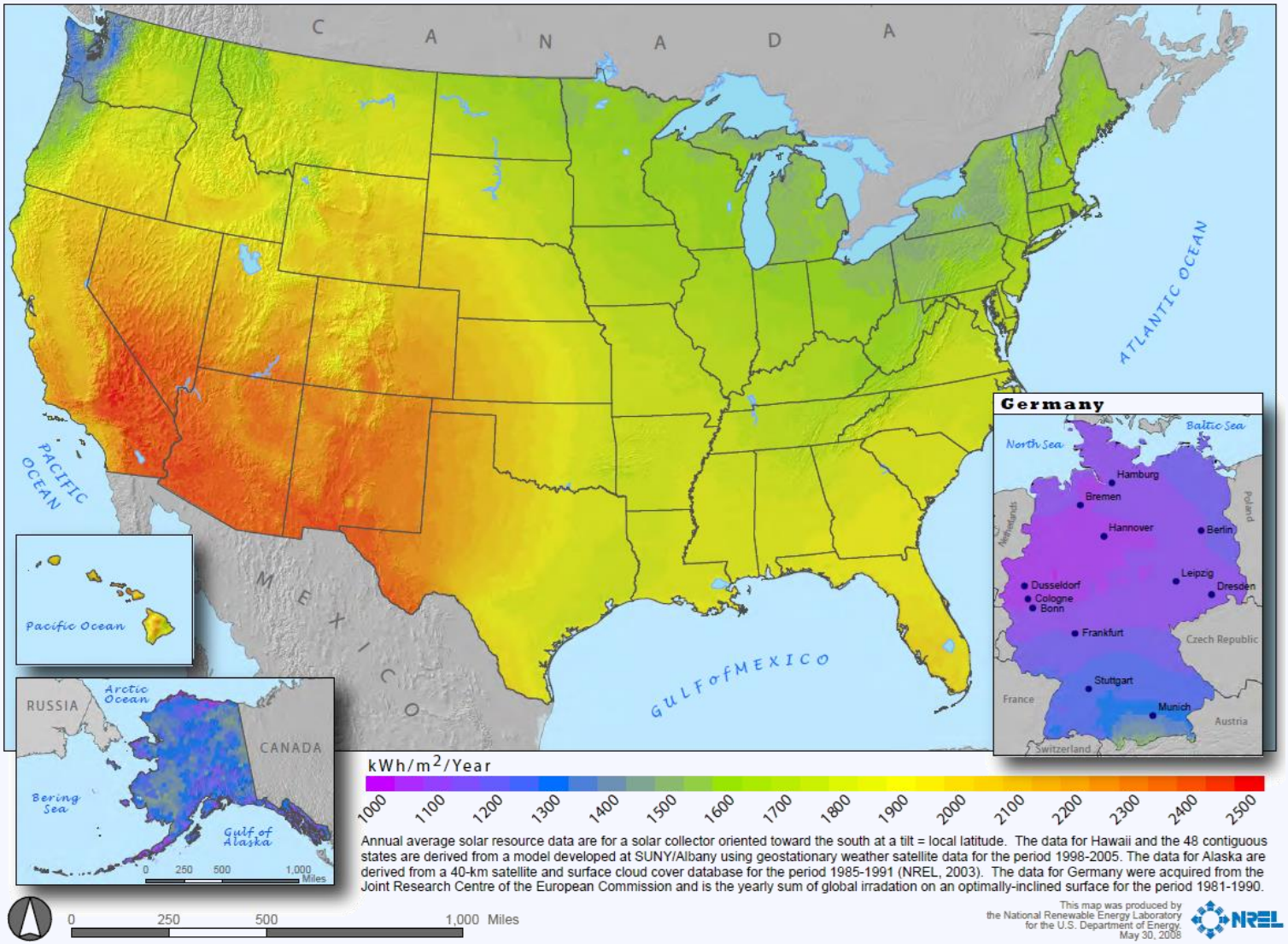
World Solar Market

Top 5 Countries Solar Operating Capacity (2013)



Source: REN 21

US Solar Resource

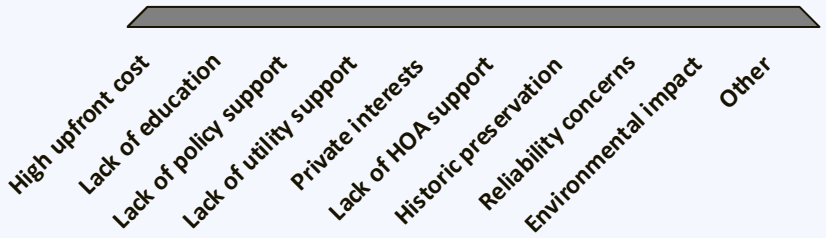


Powered by SunShot U.S. Department of Energy

Source: National Renewable Energy Laboratory

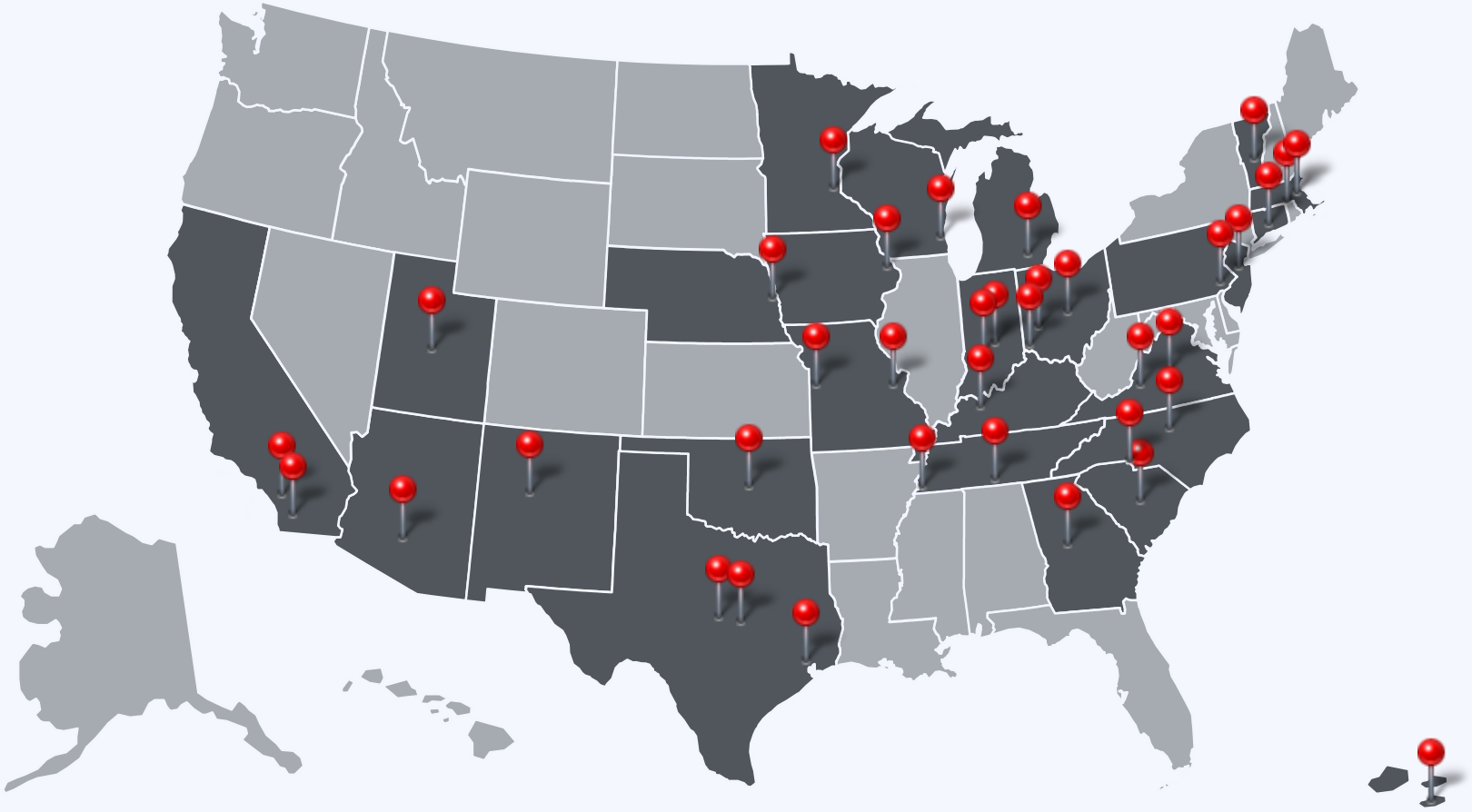
What are the top 3 barriers to solar adoption in your community?

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



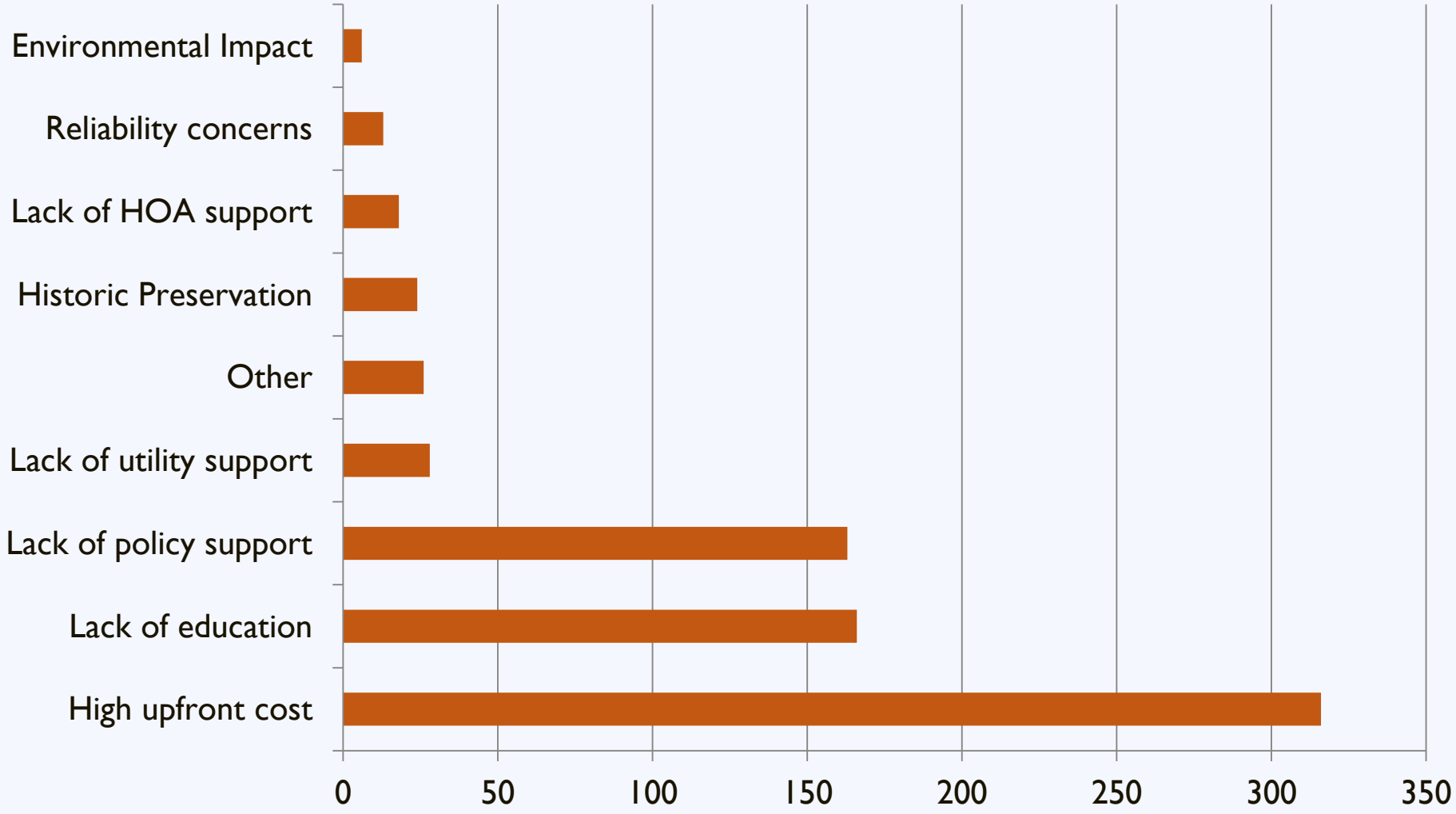
Regional Workshop Surveys

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

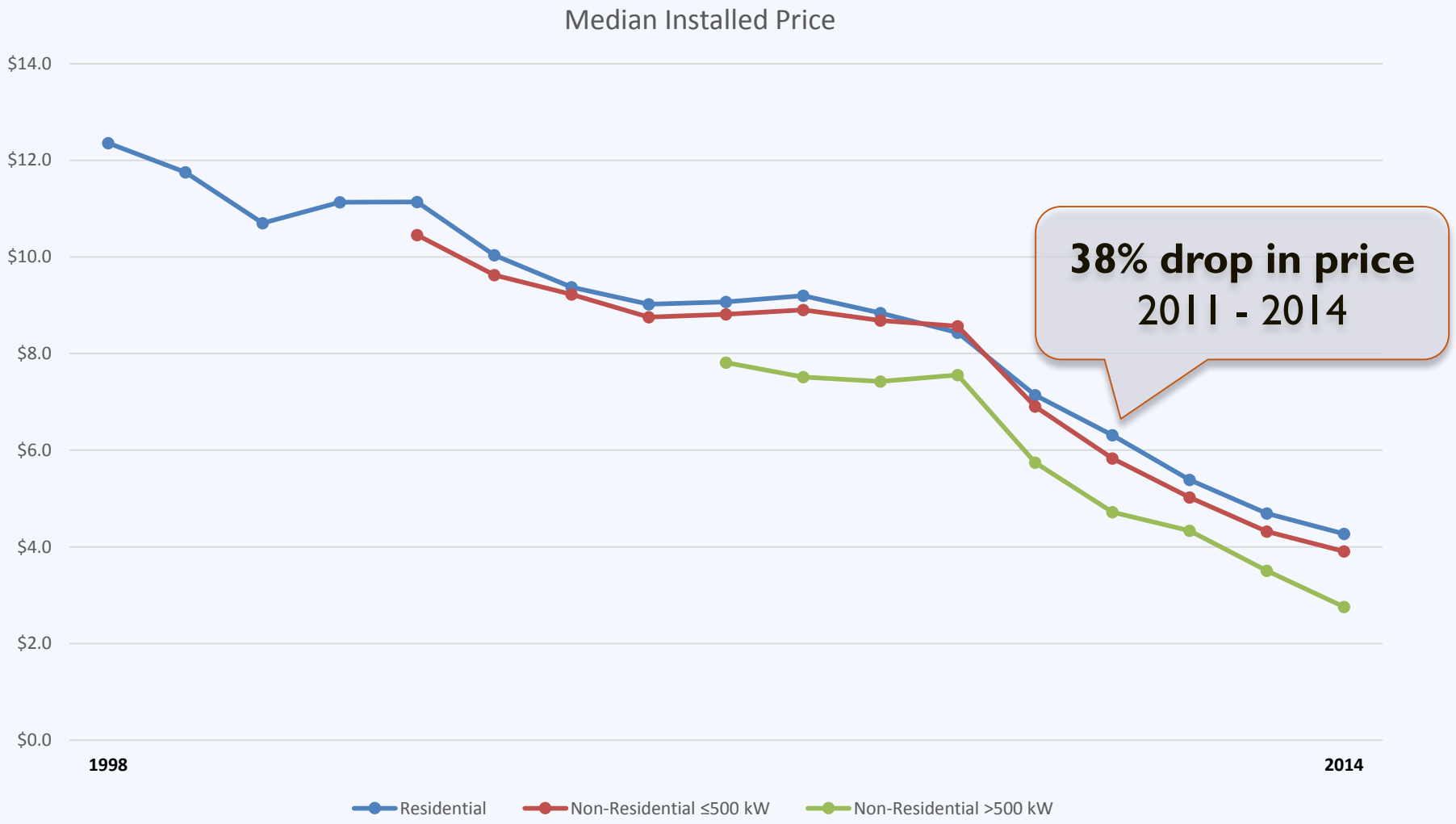


Powered by SunShot
U.S. Department of Energy

Activity: Addressing Barriers



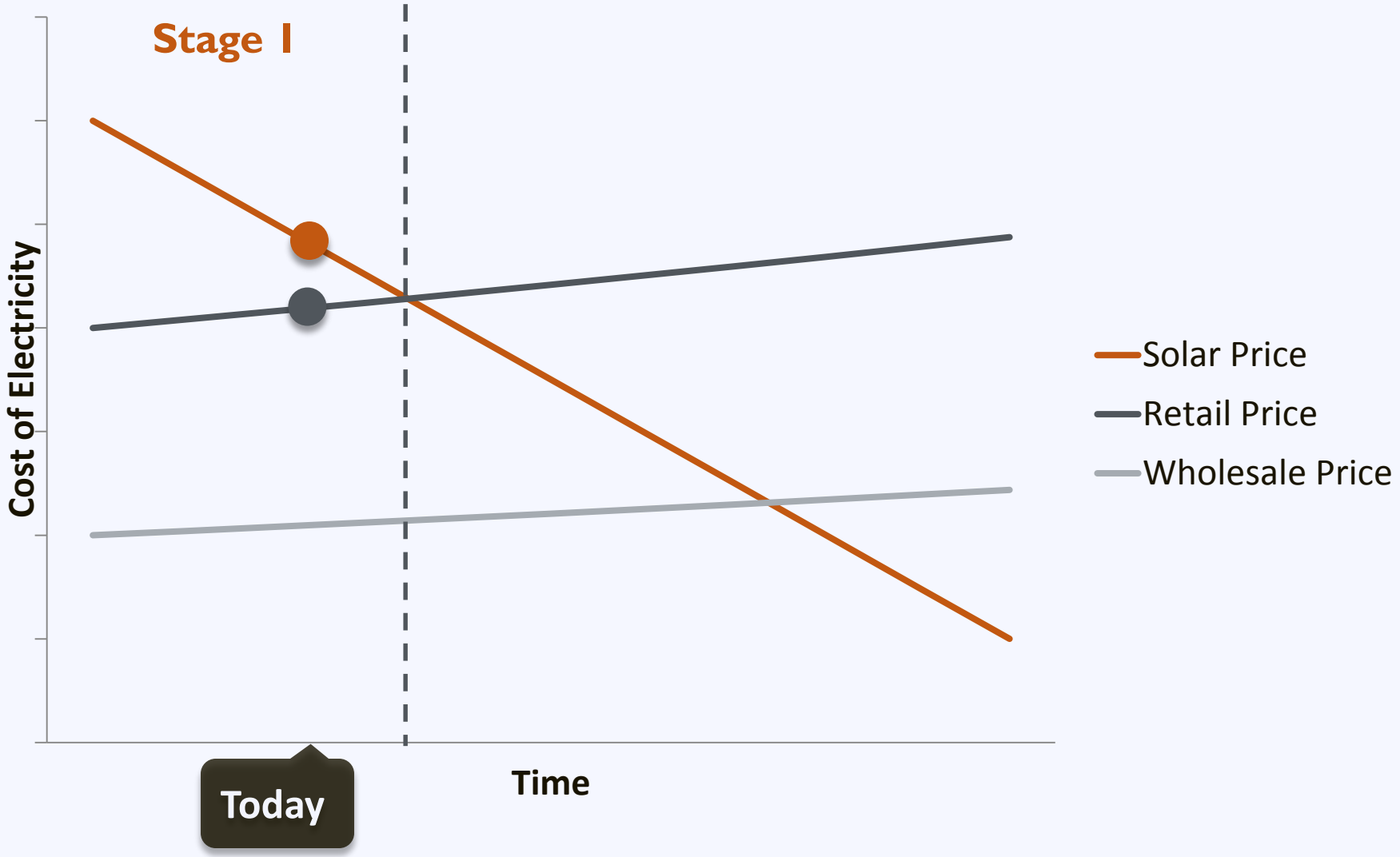
The Cost of Solar PV



Powered by SunShot U.S. Department of Energy

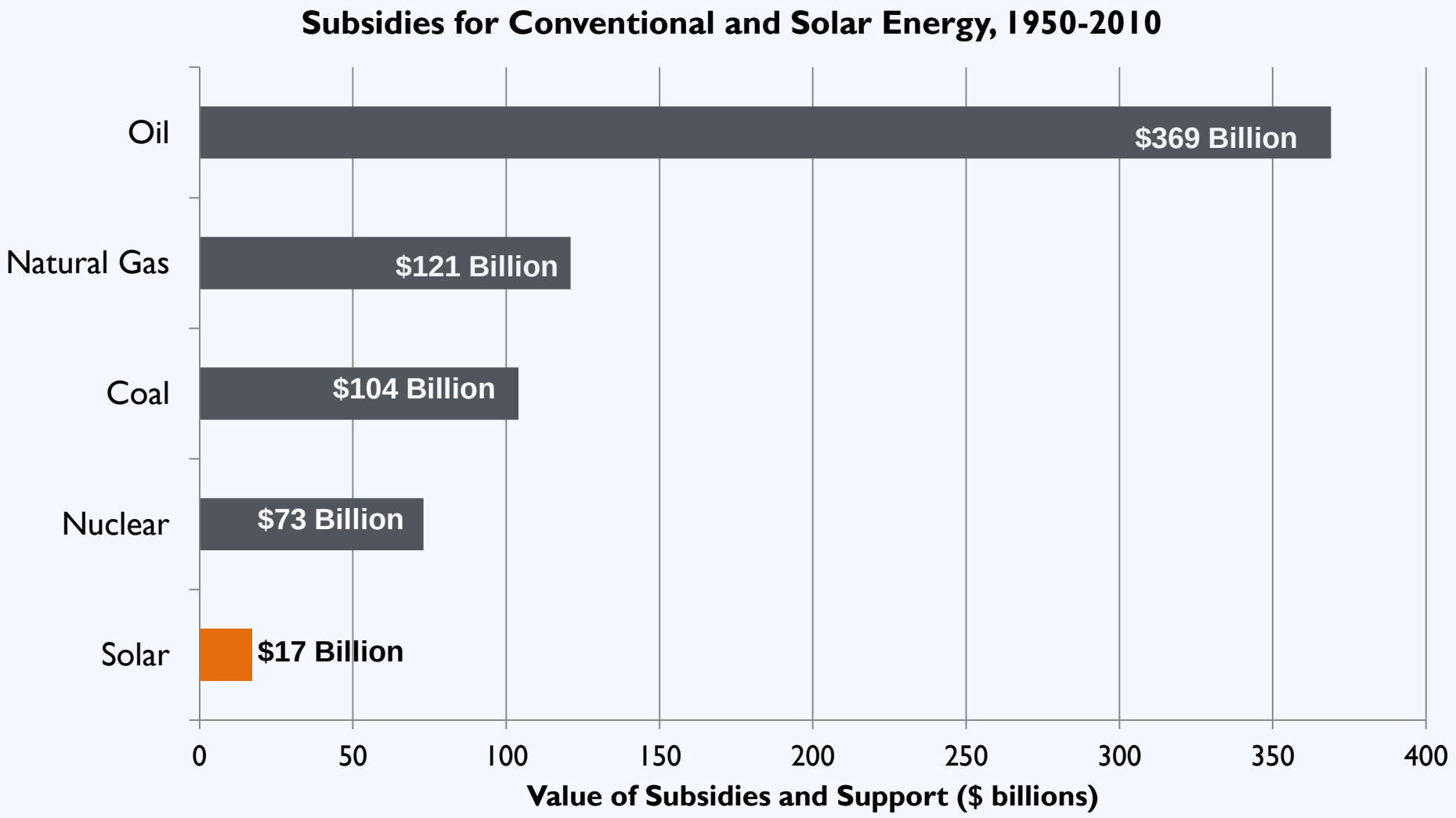
Tracking the Sun VIII: The Installed Cost of Photovoltaics in the US from 1998-2014 (LBNL)

The Cost of Solar PV



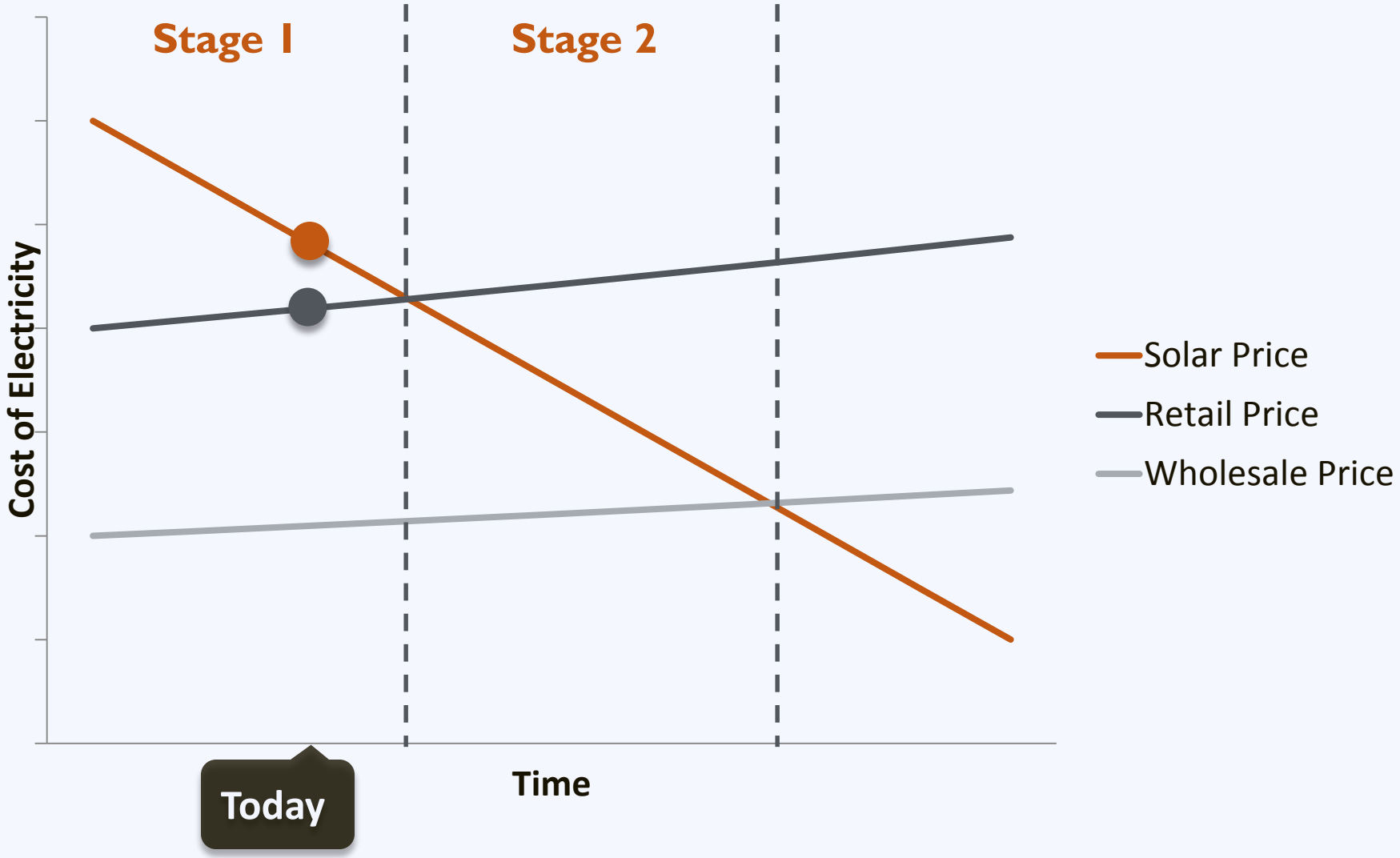
Source: Solar Electric Power Association

Subsidies and Support



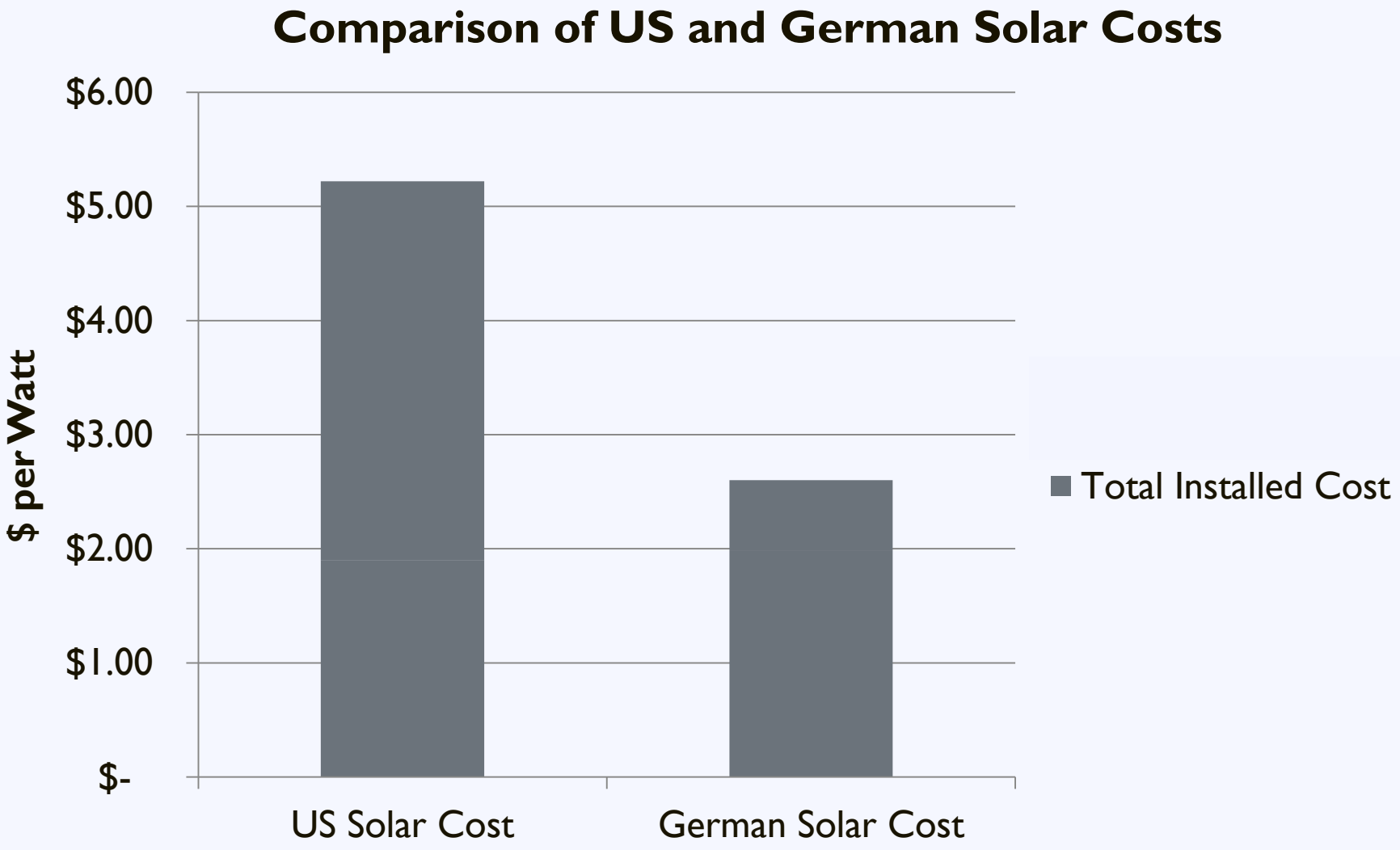
Source: Management Information Services, Inc. October 2011. *60 Years of Energy Incentives: Analysis of Federal Expenditures for Energy Development*; SEIA, May 1, 2012. *Federal Energy Incentives Report.*

The Cost of Solar PV



Source: Solar Electric Power Association

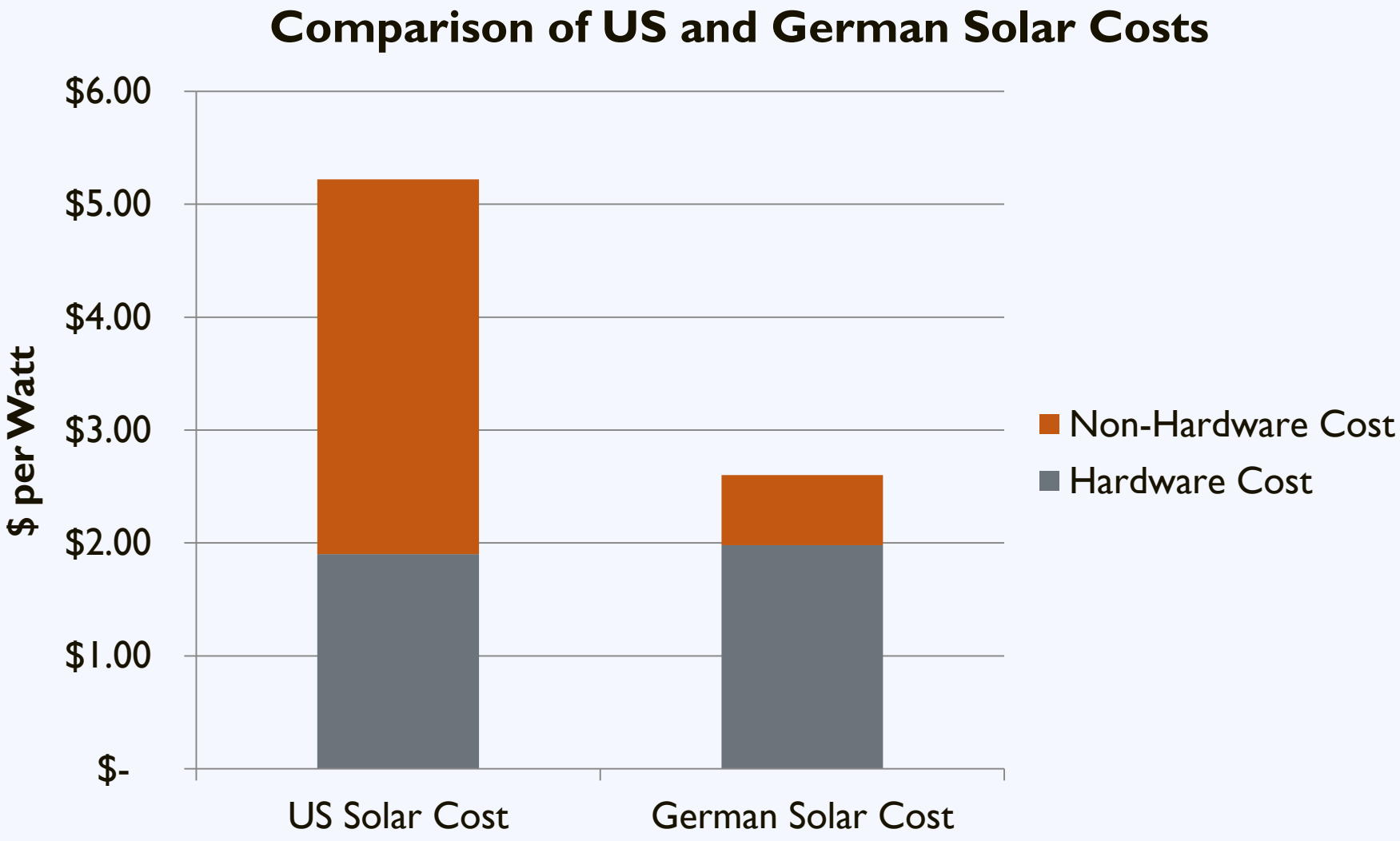
The Cost of Solar in the US



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)

Powered by SunShot U.S. Department of Energy

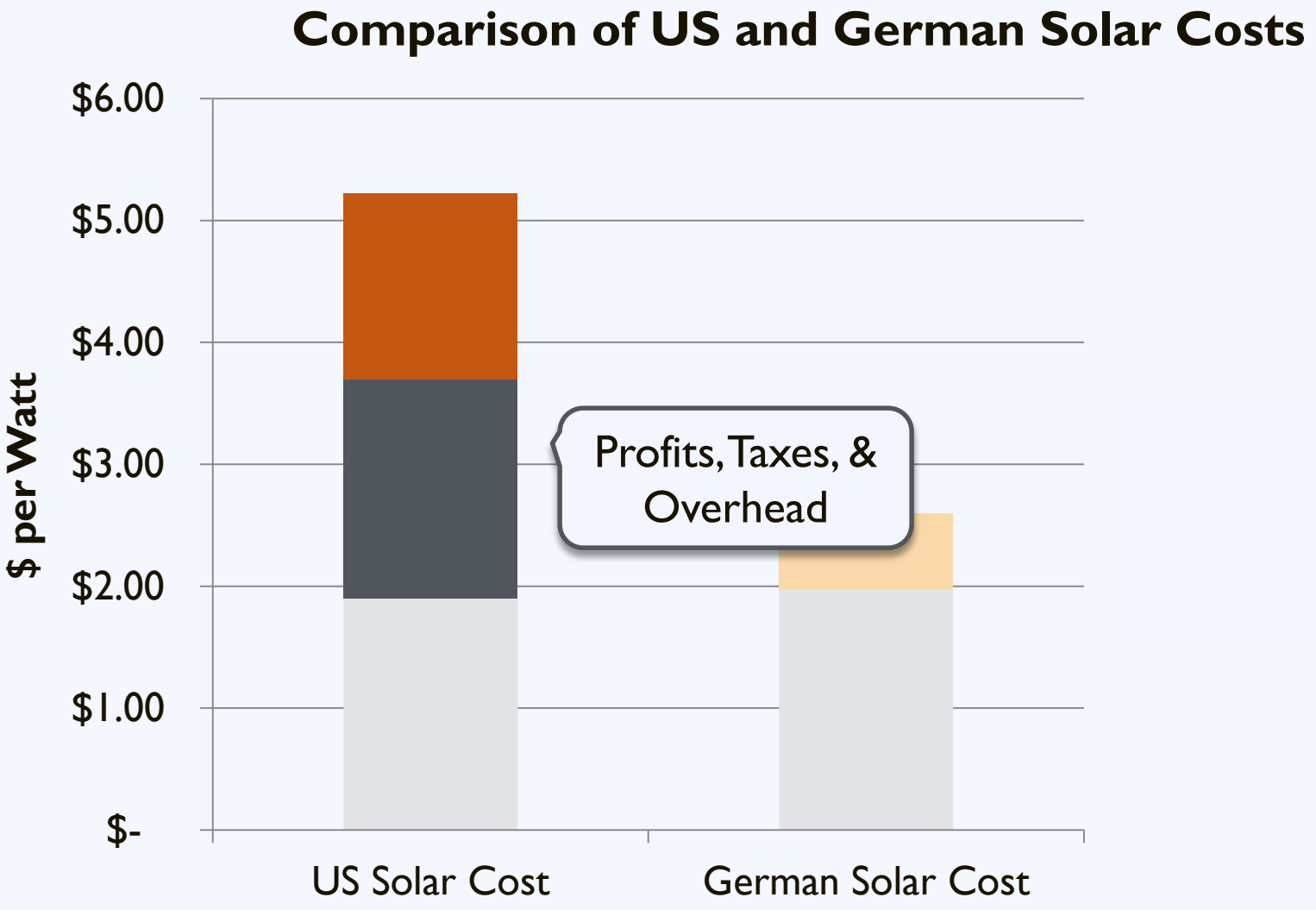
The Cost of Solar in the US



Powered by SunShot U.S. Department of Energy

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)

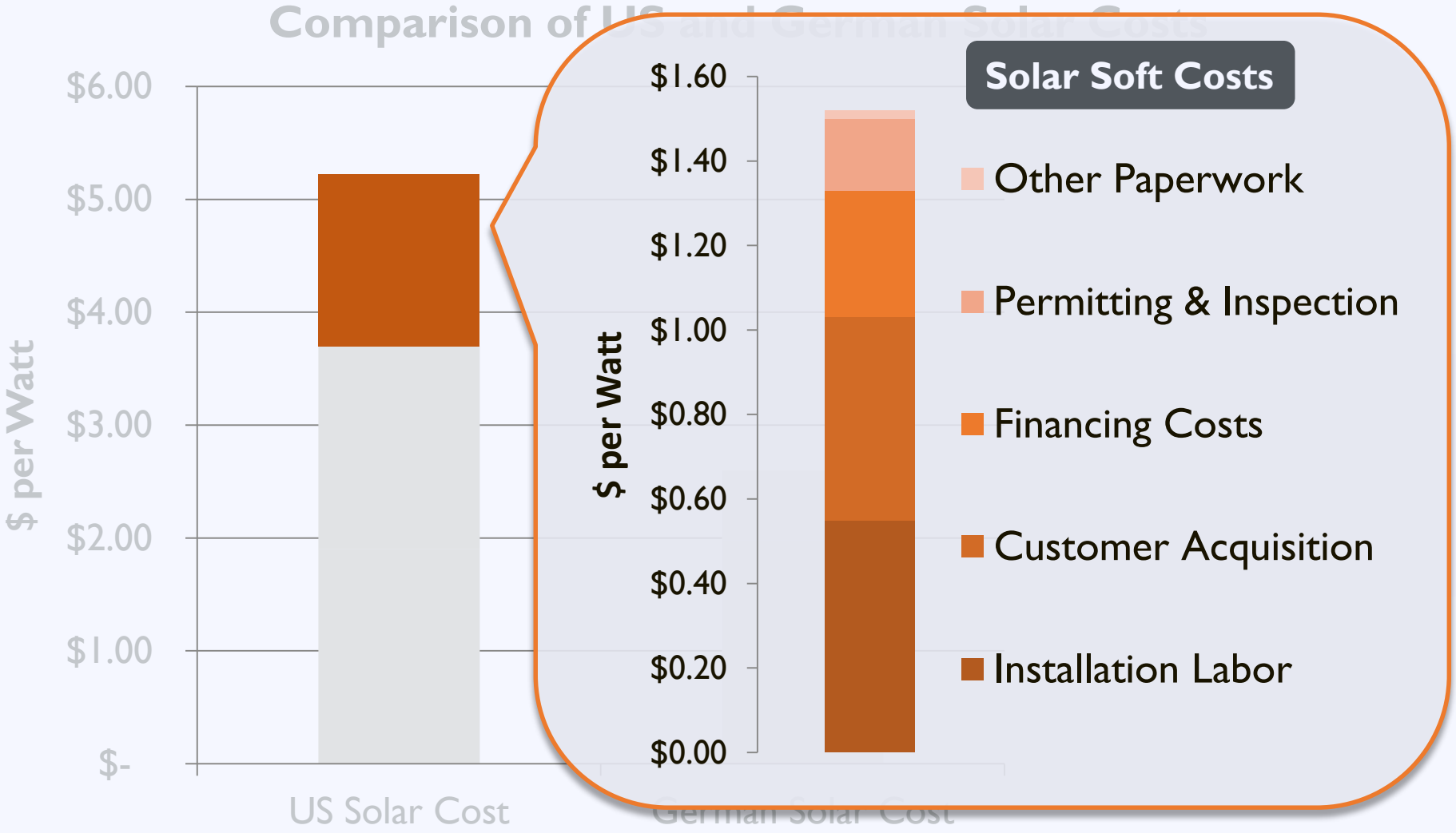
The Cost of Solar in the US



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)

Powered by SunShot U.S. Department of Energy

The Cost of Solar in the US



Powered by SunShot U.S. Department of Energy

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

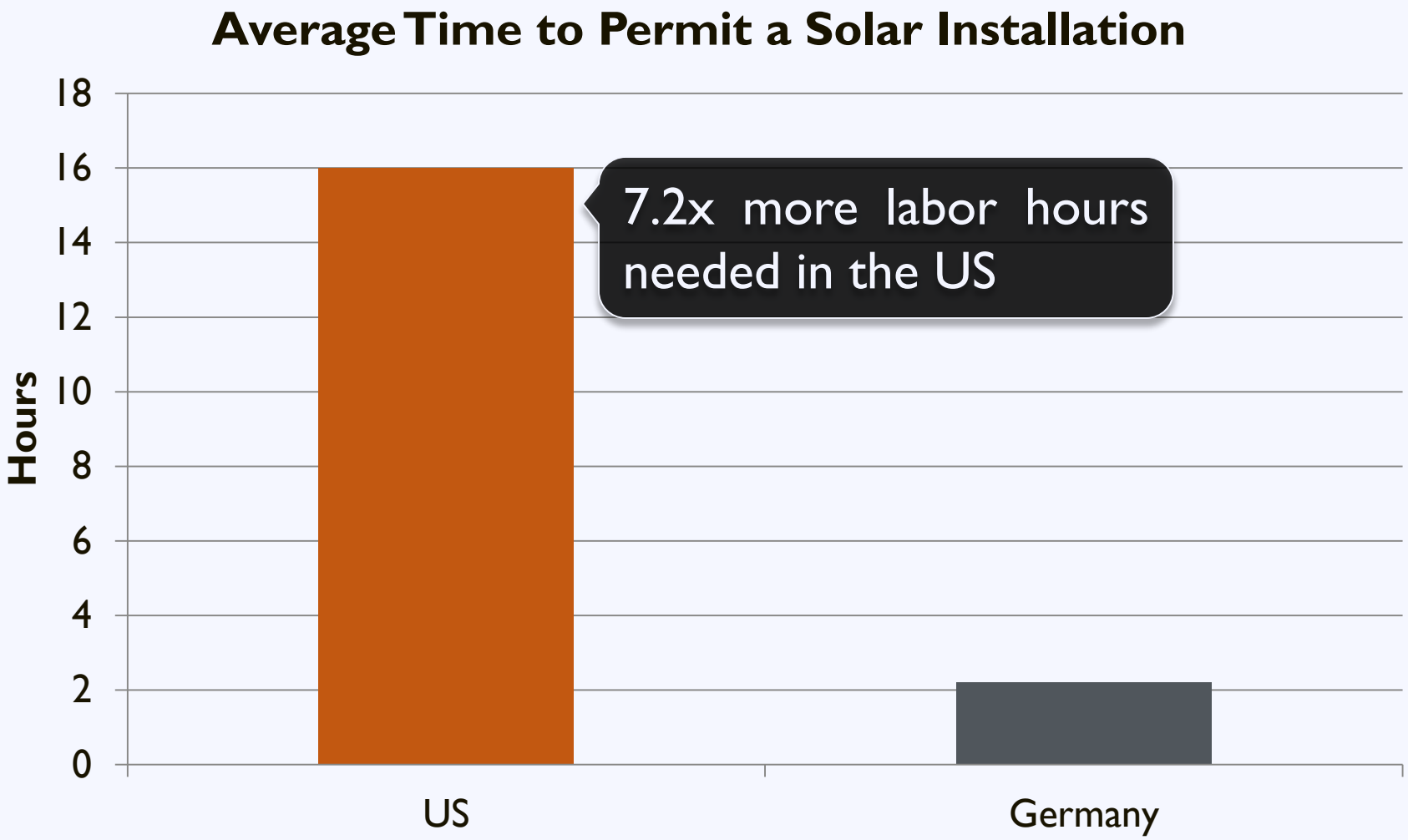
Germany Today

8 days

from inception to completion

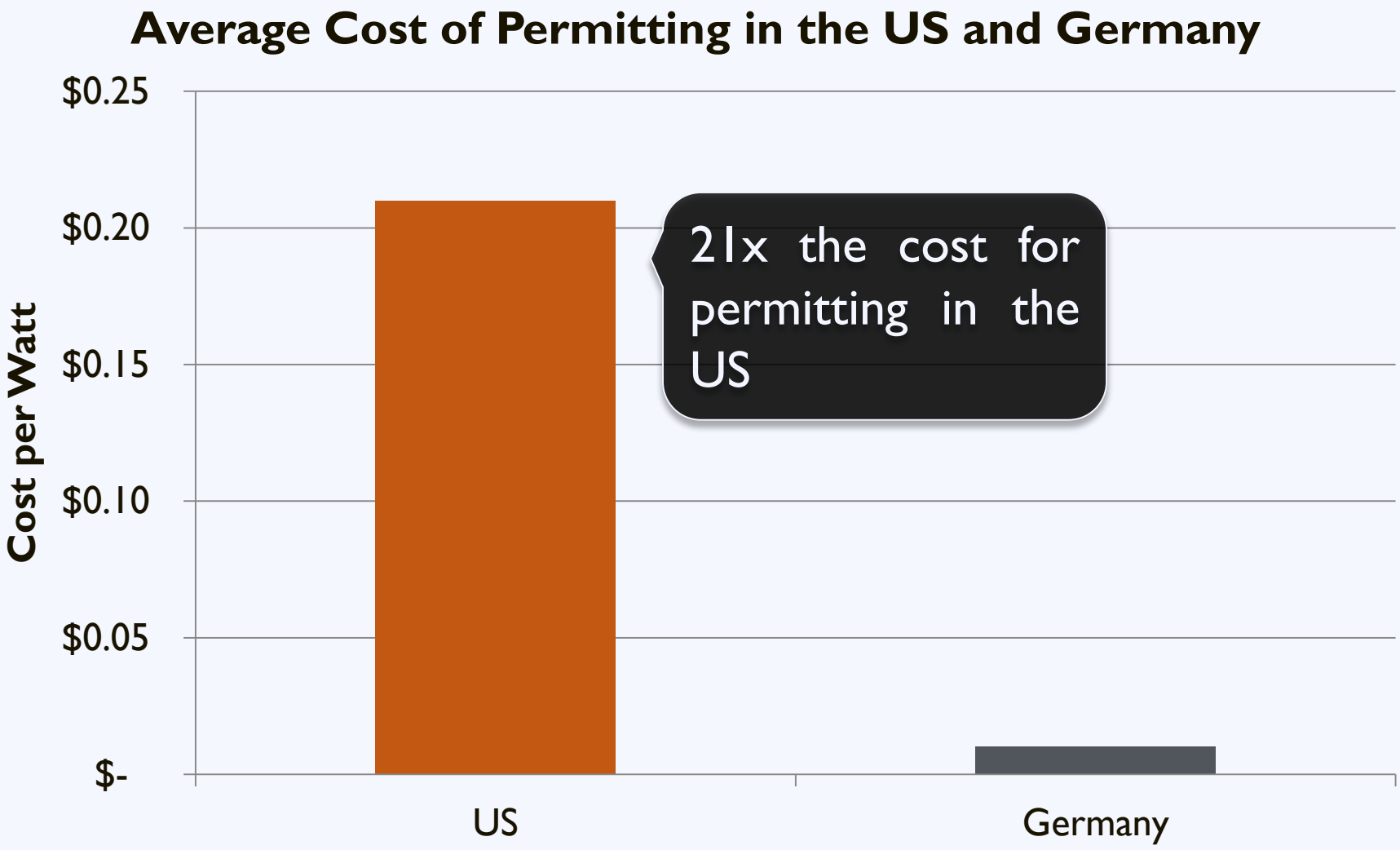
Photon Magazine

Time to Installation



Source: NREL, LBNL

Permitting Costs



Source: NREL, LBNL

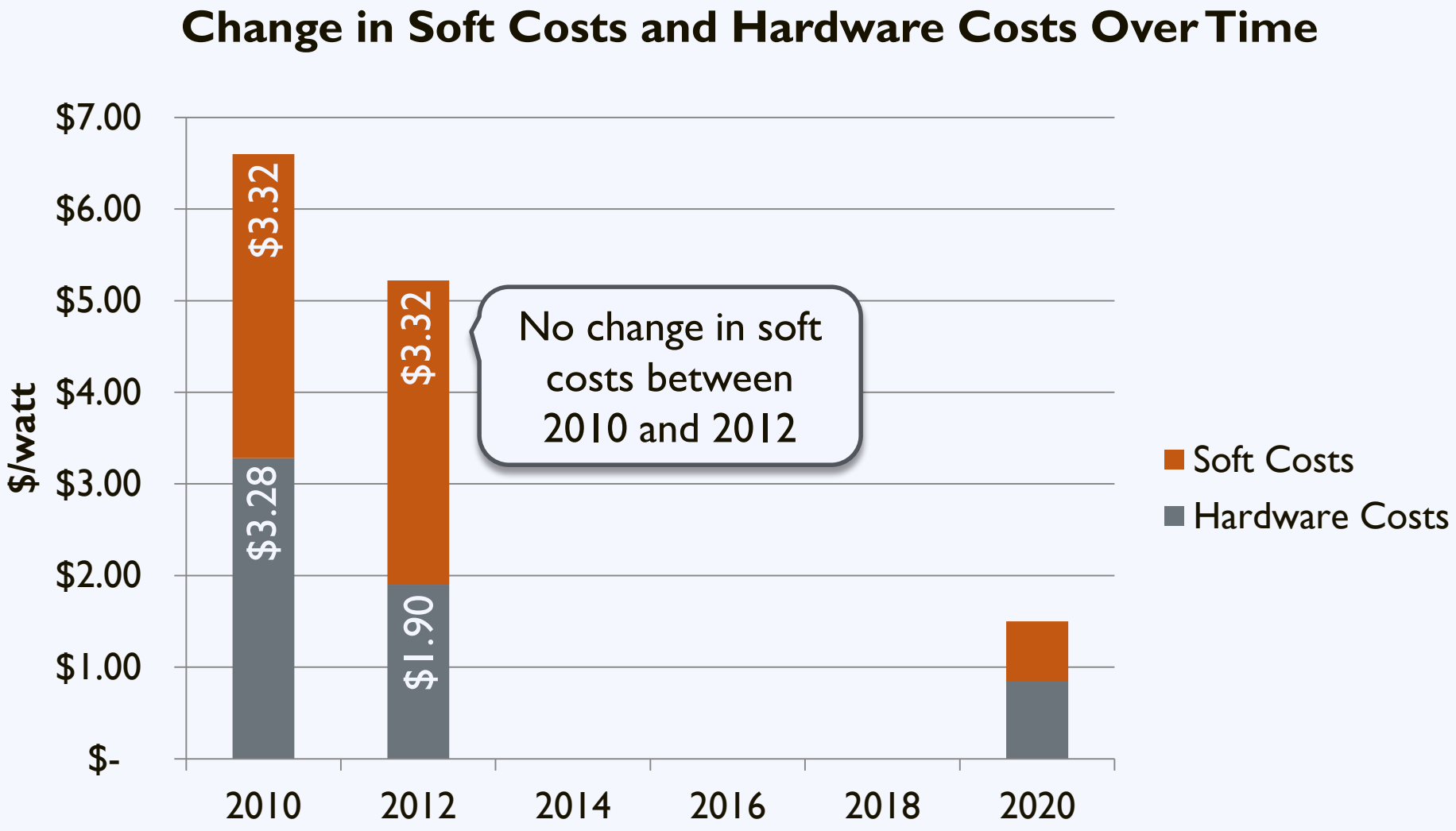
Germany's Success

Consistency and Transparency

through

Standardized Processes

The Cost of Solar in the US



Powered by SunShot
U.S. Department of Energy

Local Government Impact

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

Q4 2014 US Avg. Residential Installed Cost:	**$3.48/W**
Net Present Value:	$2,924
Payback Period:	14.8 years

After 25% Reduction in addressable soft costs:	**$3.26/W**
Net Present Value:	$3,696
Payback Period:	13.9 years

Difference:	**$0.22/W**
Net Present Value:	**+ 26%**
Payback Period:	**- 6%**

Powered by SunShot U.S. Department of Energy

Other Assumptions: Muskegon, MI TMY2 Weather Data; 5kW solar PV system (30 deg. tilt, 180 deg. azimuth); 0.86 DC to AC derate factor; 0.5%/year degradation rate; 100% debt financing for 25 years at 5%; 30 year analysis period; 28% federal income tax rate; 7% state income tax rate; 5% sales tax rate; 100% assessment for property taxes at 2% tax rate; 30% federal ITC; Consumers Energy Residential RS Rate; 2.5% annual rate escalator; 8,500 kWh/year electricity consumption

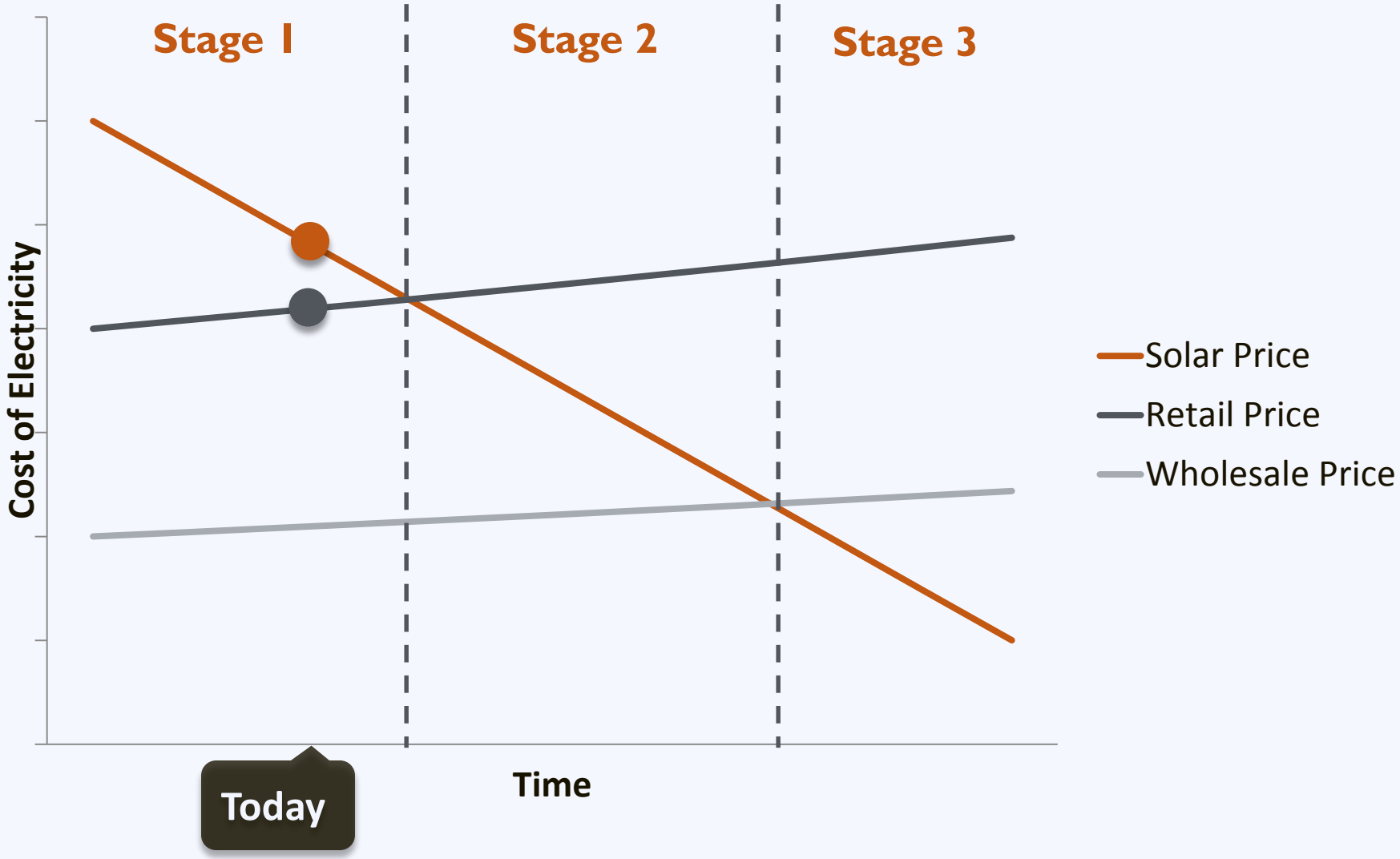
Workshop Goal

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

Agenda

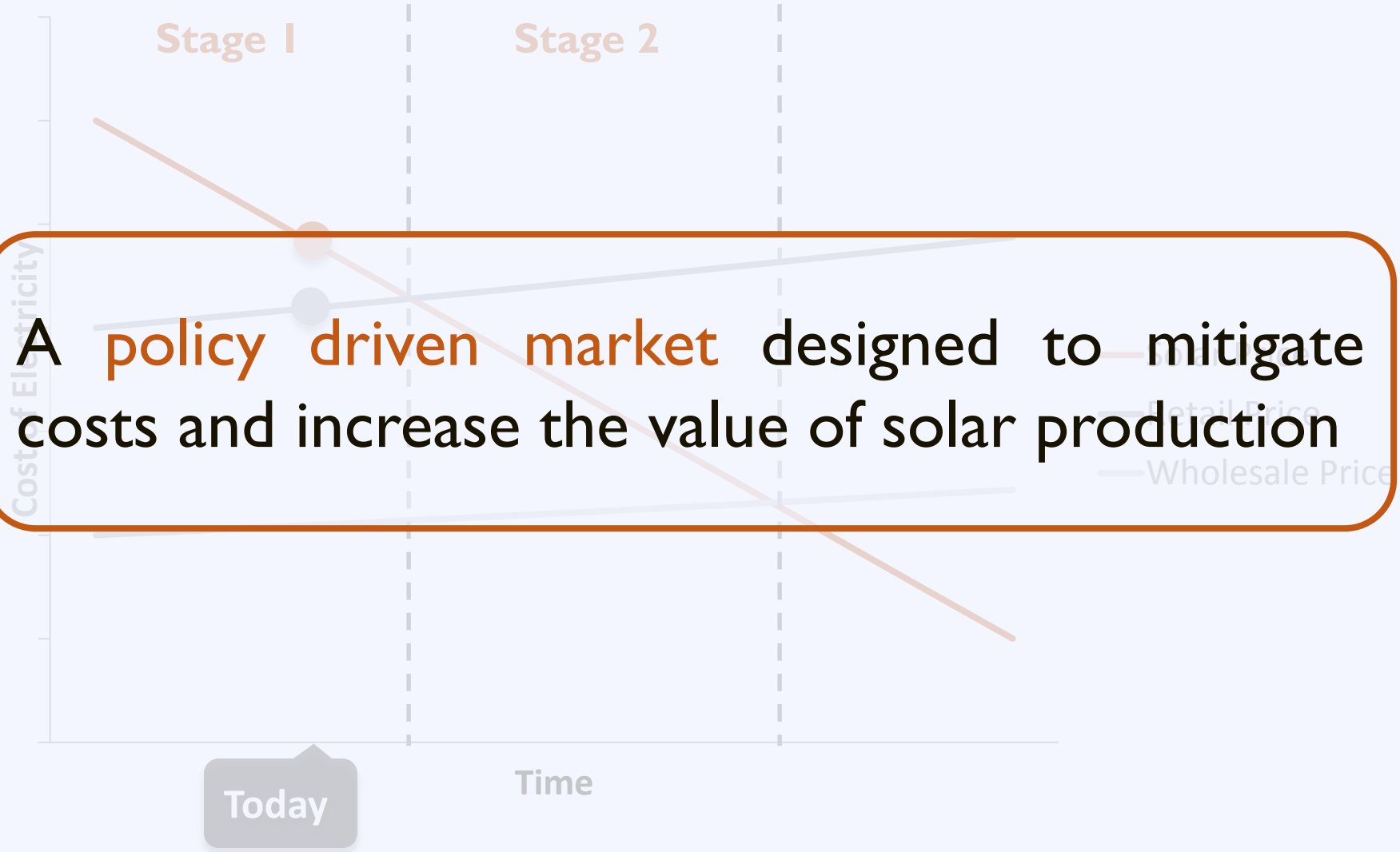
8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

Solar Market: Trends



Source: Solar Electric Power Association

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

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering and Production Incentives	Interconnection	Solar Access

A Policy Driven Market

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering and Production Incentives	Interconnection	Solar Access

Investment Tax Credit

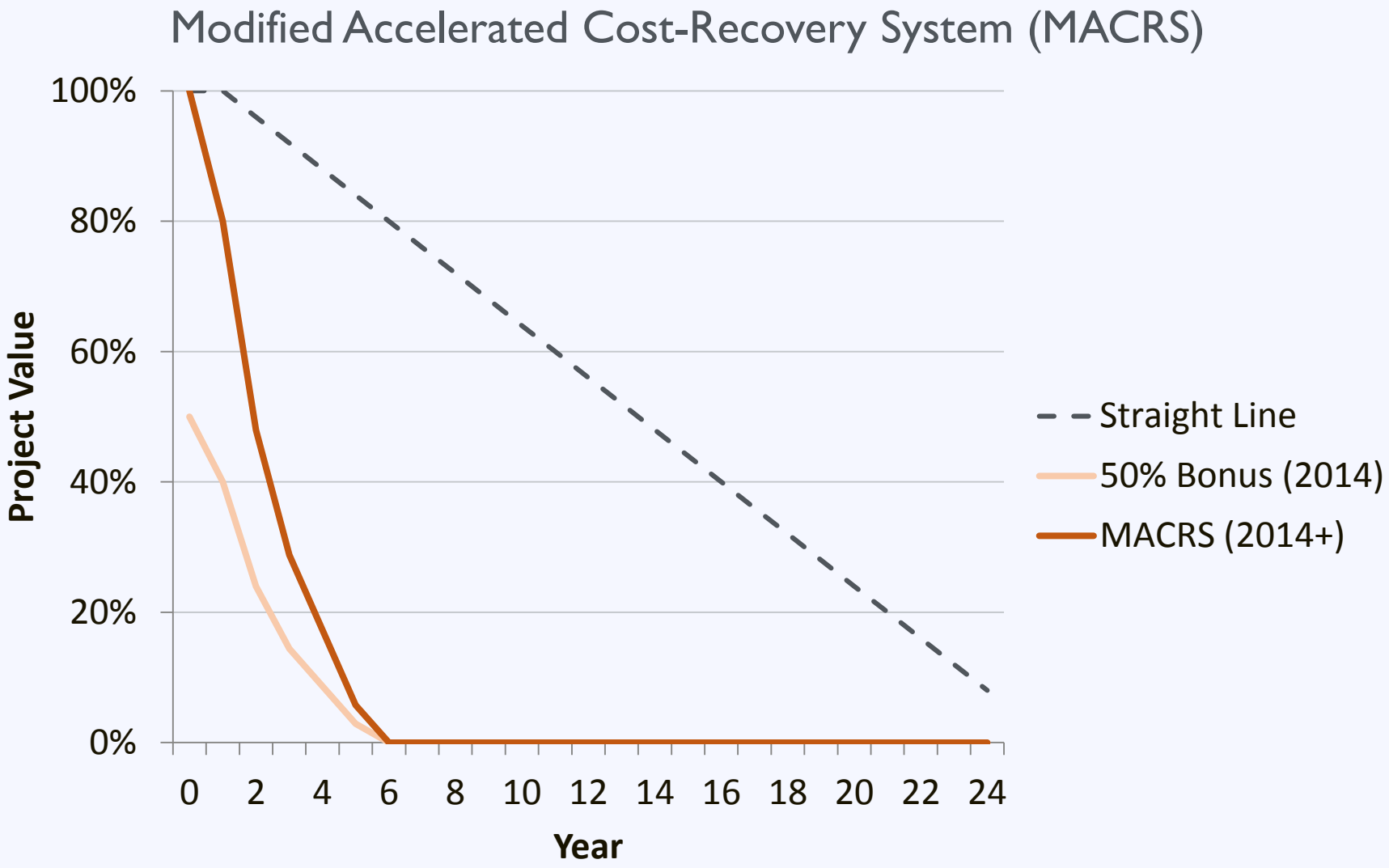
Type: Tax Credit

Eligibility: For-Profit Organization or Individual

Value: 30% of the installation cost

Availability: Through 12/31/2016

Accelerated Depreciation



Qualified Energy Conservation Bond

US Treasury

Local Gov

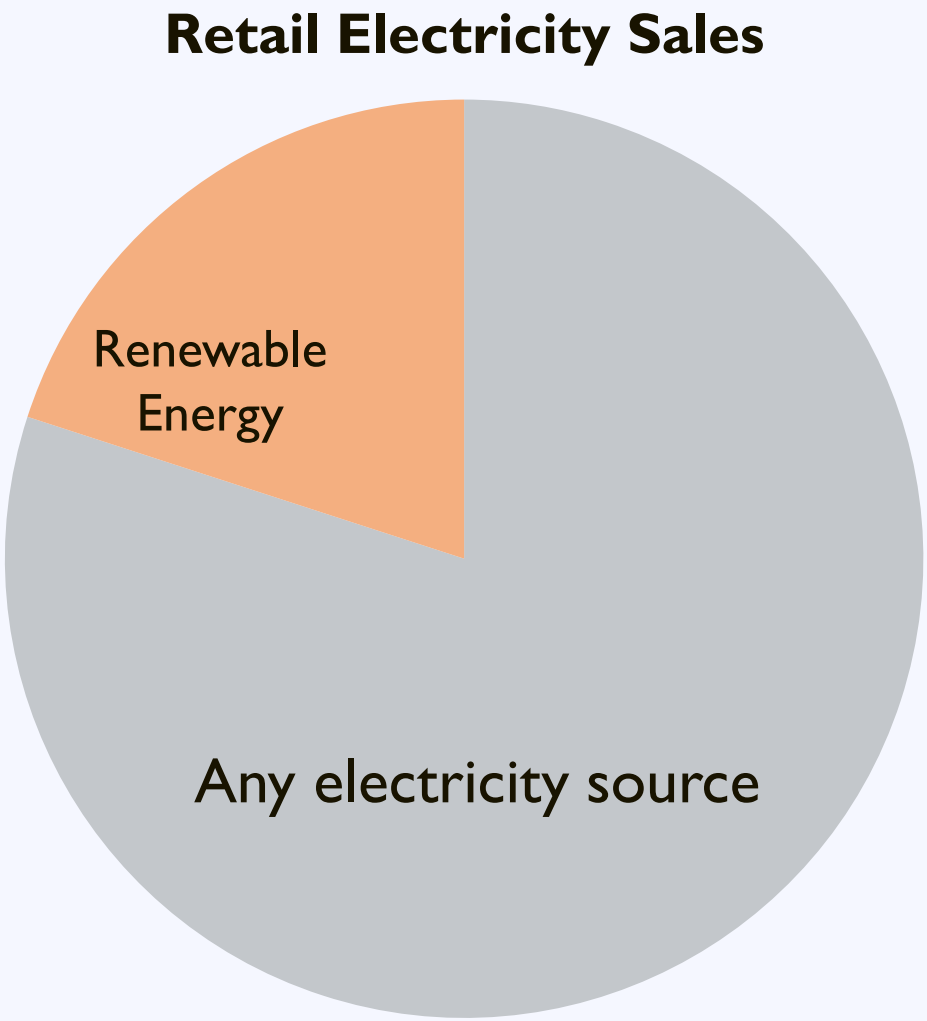
Project

Bond Holders

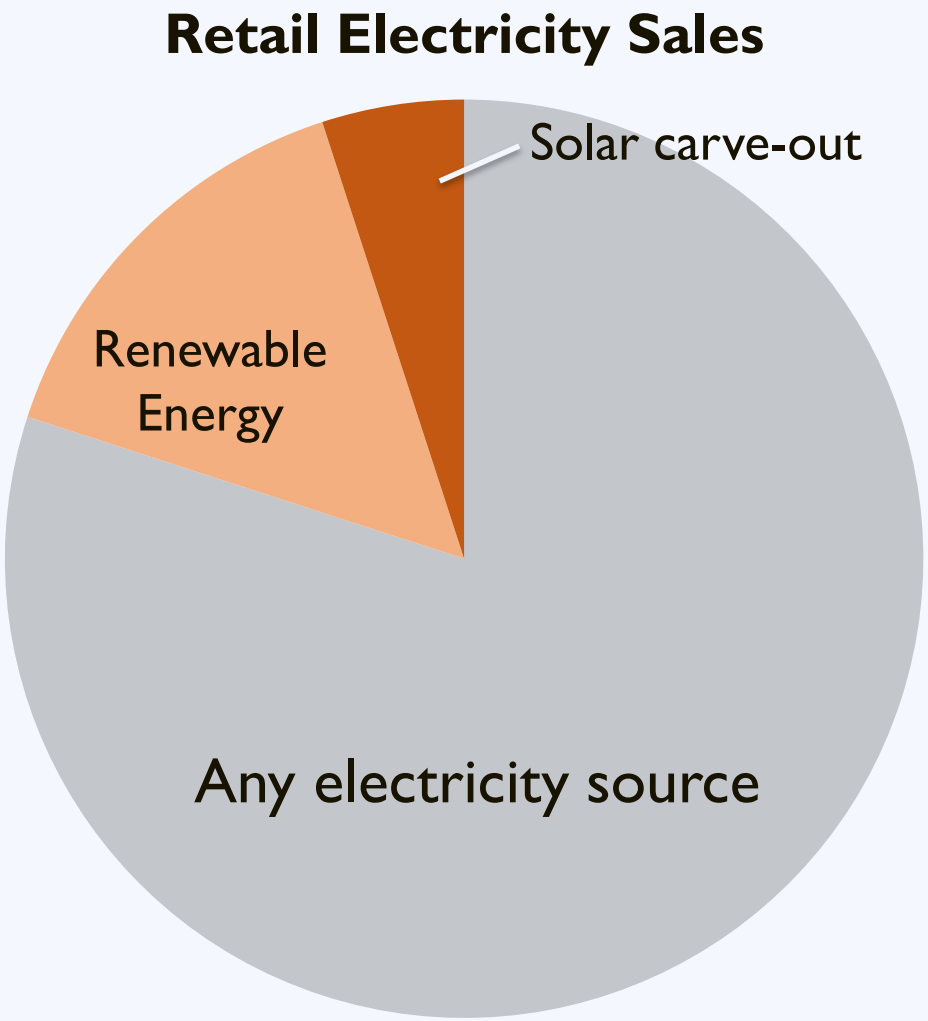
A Policy Driven Market

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering and Production Incentives	Interconnection	Solar Access

Renewable Portfolio Standard

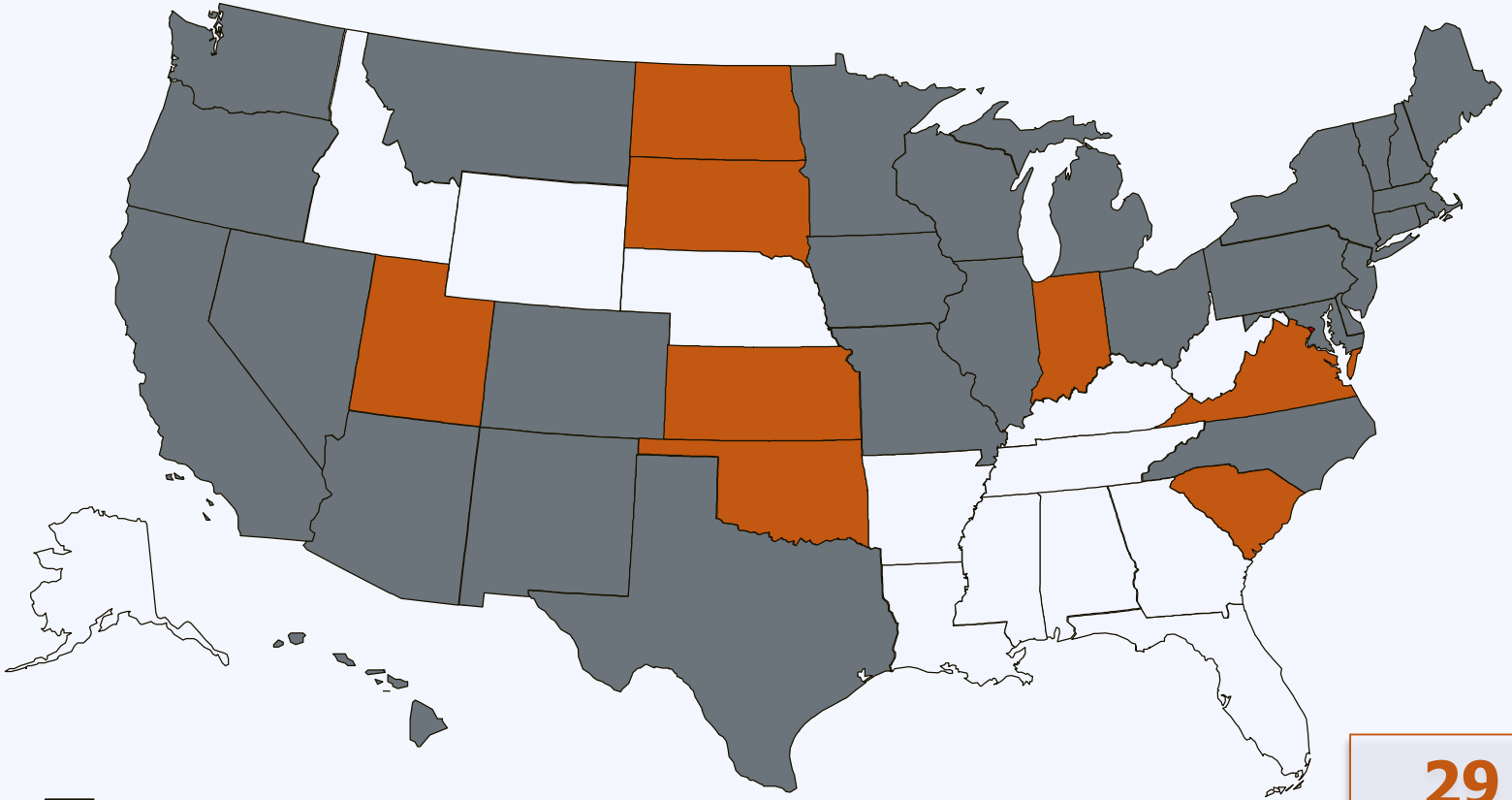


Renewable Portfolio Standard



Renewable Portfolio Standard

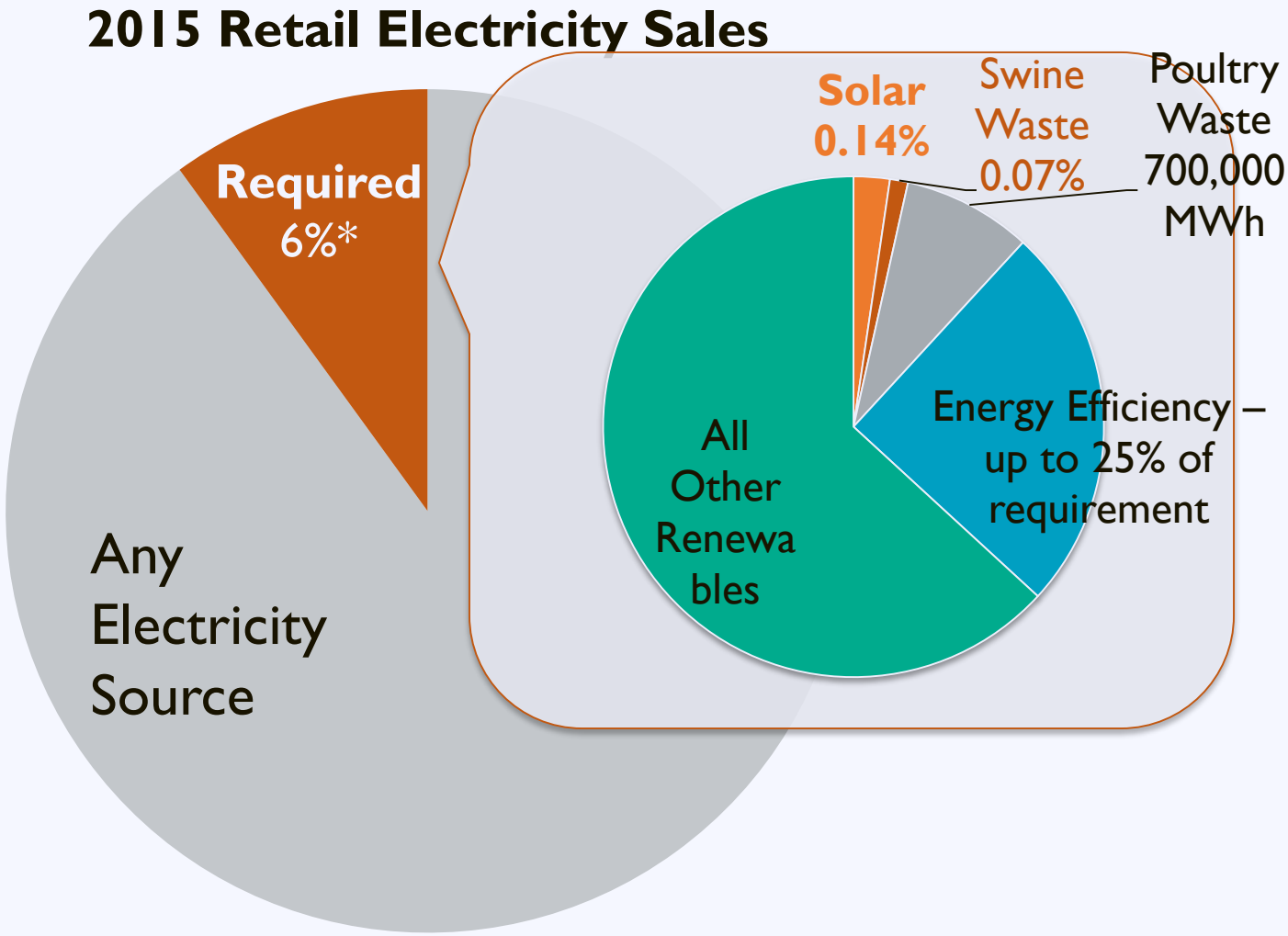
www.dsireusa.org / June 2015



29 states, +
Washington DC and 3 territories have Renewable Portfolio Standards
(8 states and 1 territory have renewable portfolio goals)

Powered by SunShot
U.S. Department of Energy

North Carolina REPS



Source: DSIRE

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

Powered by SunShot U.S. Department of Energy

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*

A Policy Driven Market

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering and Production Incentives	Interconnection	Solar Access

Renewable Energy Tax Credit

- 35% of cost of renewable energy project
- Available to North Carolina taxpayers for projects built and placed into service in NC during the tax year
- Residential PV max: $10,500/installation
- Non-residential PV max: $2.5 M/installation
- Expires at end of 2015
  - Sunset provision for partially completed projects

A Policy Driven Market

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering and Production Incentives	Interconnection	Solar Access

Property Tax Incentive

- Property Tax Abatement for Solar PV
  - 80% of the appraised value is exempt from property tax
  - Residential systems may be 100% exempt as non-business personal property.
    - Does not have to be net-metered, but owner cannot recognize income from a utility for the generation
- No sales tax exemption in NC
  - State rate is 4.75% for sales and use tax, plus local sales and use rates

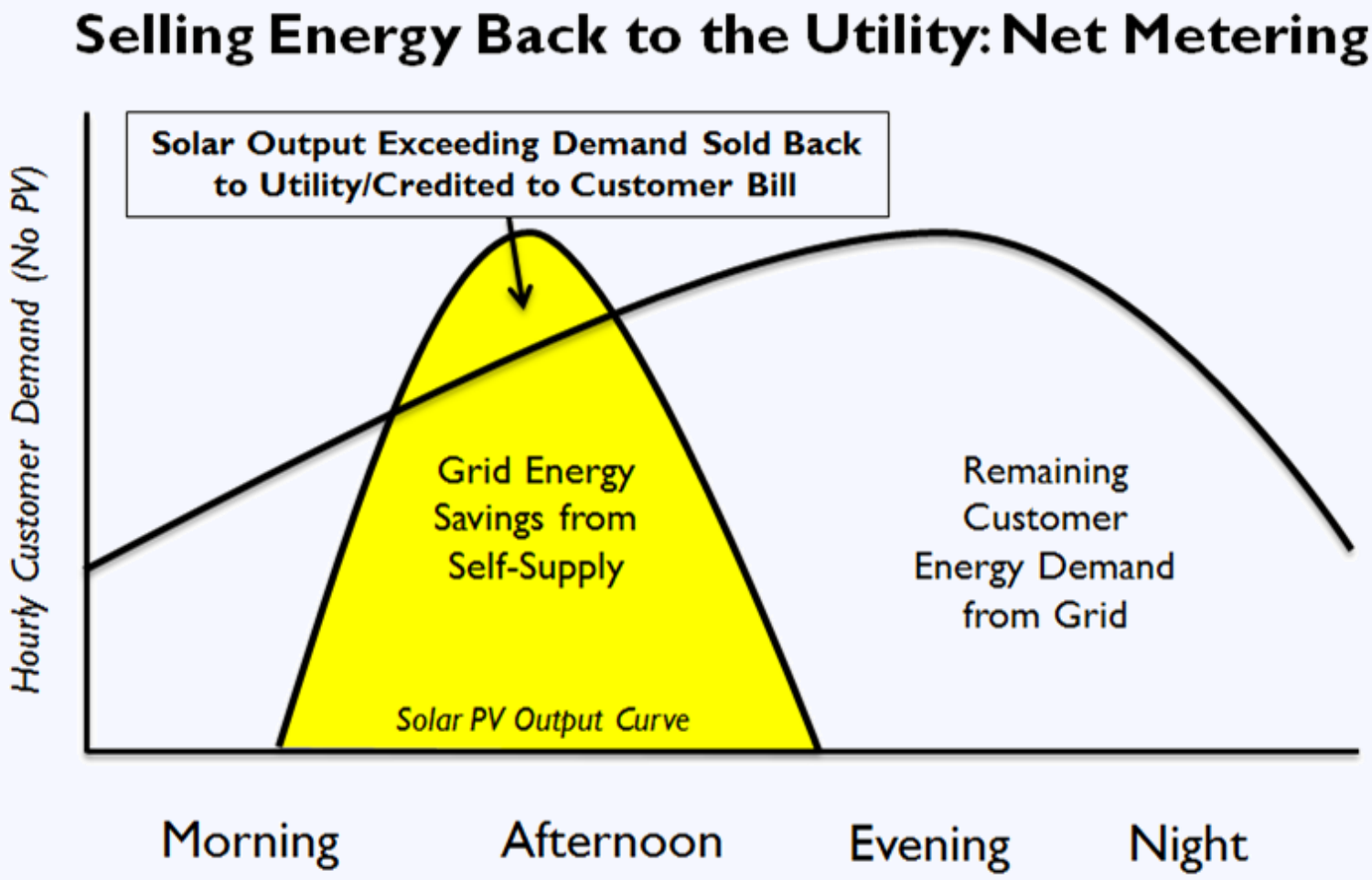
A Policy Driven Market

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering and Production Incentives	Interconnection	Solar Access

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



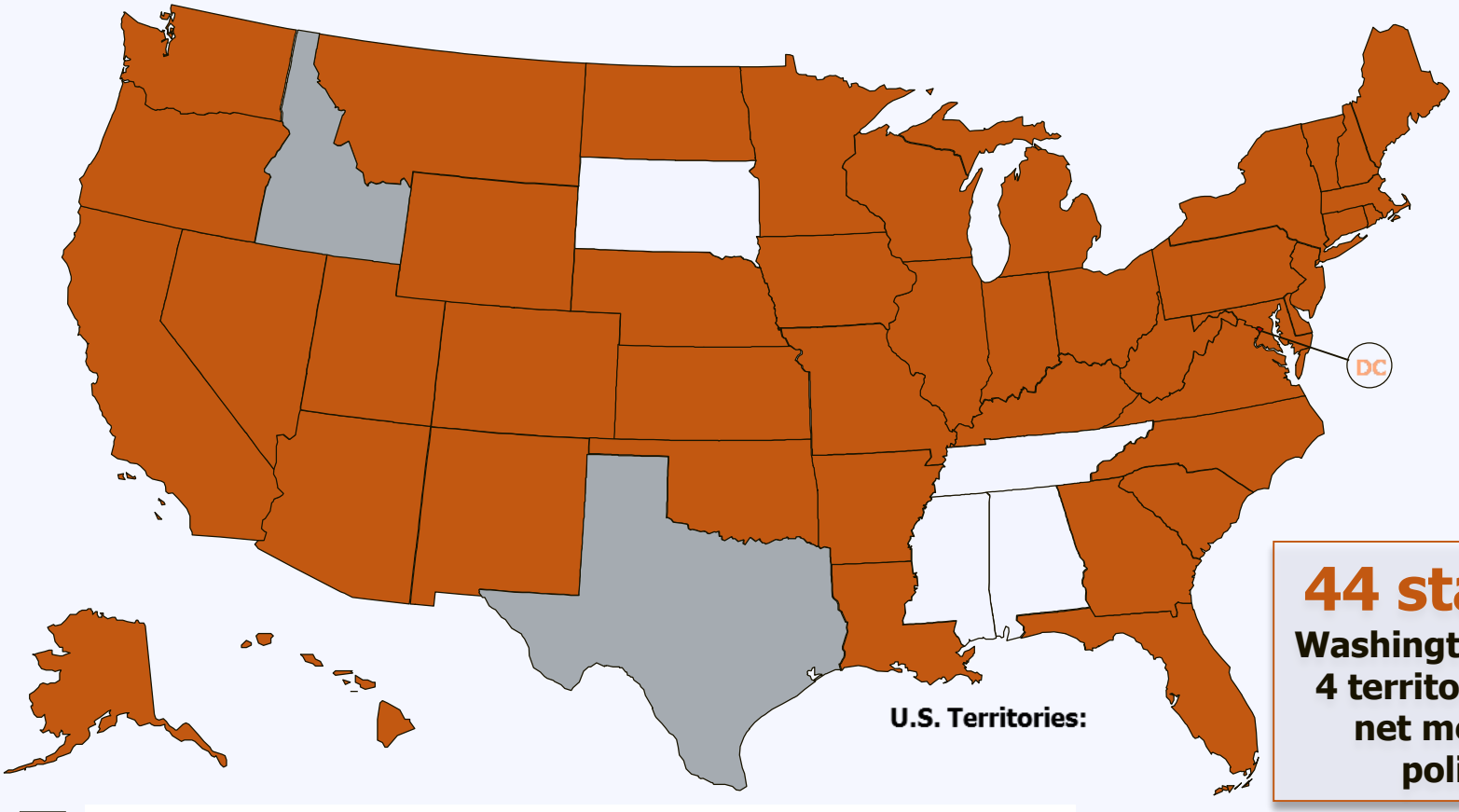
Net Metering: Market Share

Approximately **95%** of distributed PV Installations are net-metered

Powered by SunShot U.S. Department of Energy

Source: IREC Solar Market Trends 2013

Net Metering



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

State-developed mandatory rules for certain utilities

No uniform or statewide mandatory rules, but some utilities allow net metering

Powered by SunShot
U.S. Department of Energy

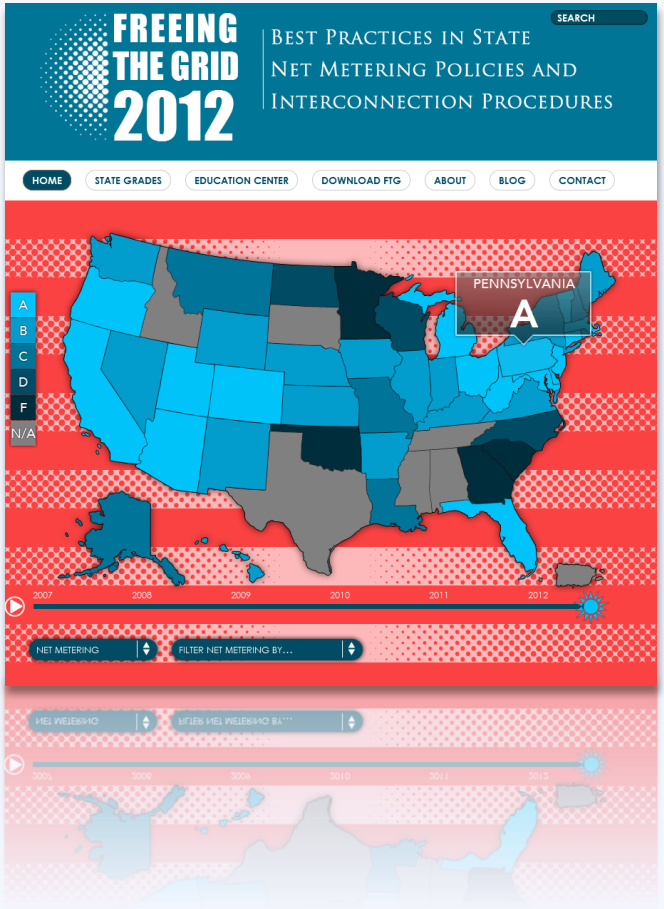
Source: DSIRE (April 2015)

Net Metering: Resources

Resource **Freeing the Grid**

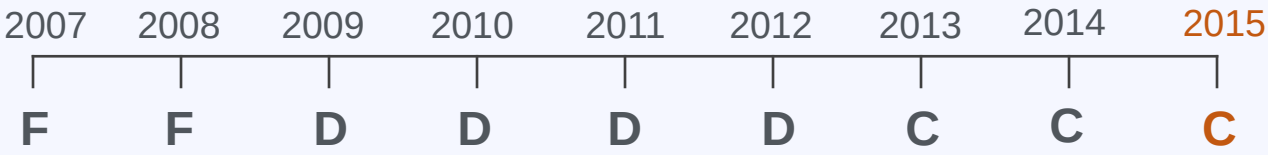
Provides a "report card" for state policy on net metering and interconnection

http://freeingthegrid.org/



Powered by SunShot
U.S. Department of Energy

Net Metering: North Carolina



Net Excess Credit Value
Retail Rate
Granted to utility at end of annual cycle

Applicable Utilities
IOUs Only

System Capacity Limit
1 MW

REC Ownership
Utility owns RECs*

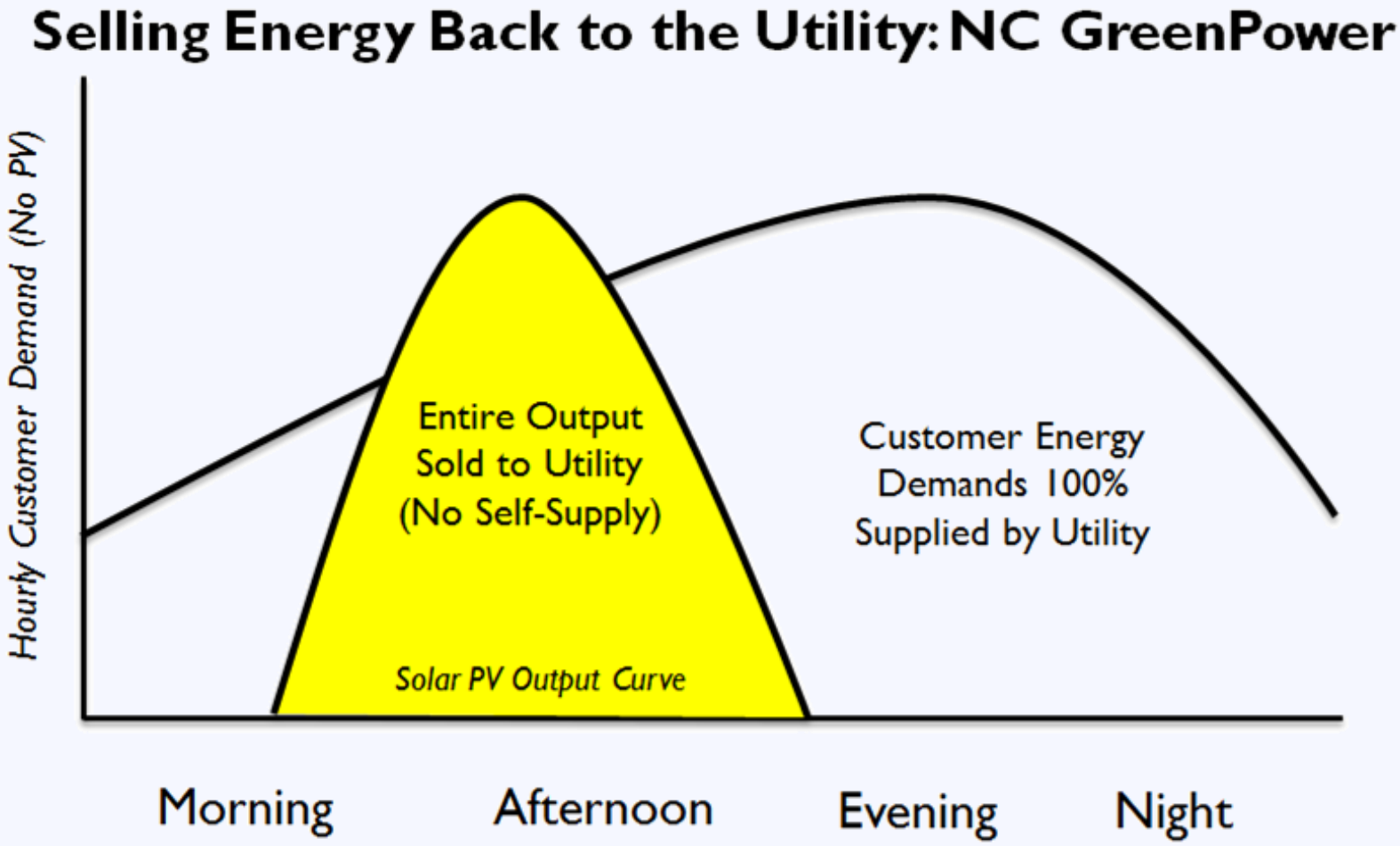
Powered by SunShot
U.S. Department of Energy

*Unless customer is on a time of use tariff with demand charges
Source: Freeing the Grid

NC GreenPower

- Alternative to net metering: "buy-all, sell-all"
- Production payments for grid-tied PV, funded by voluntary contributions
- Annual cap of 100 kW for small PV – currently full
- Must enter into a PPA with the utility
- Systems up to 5 kW receive $0.06/kWh plus utility PPA (~$0.04/kWh) for 5 years
- Larger systems must apply through an RFP

NC Green Power



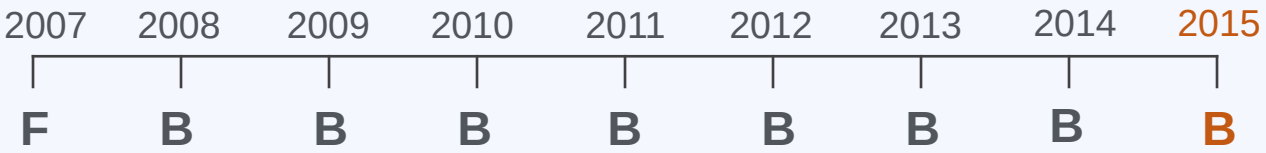
A Policy Driven Market

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering	Interconnection	Solar Access

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: North Carolina



Applicable Technologies

Includes solar PV, as well as other distributed generation technologies

System Capacity Limit

No limit specified

Applicable Utilities

IOUs

Bonus

Based on FERC Small Generator Interconnection Procedures

Powered by SunShot U.S. Department of Energy

Source: Freeing the Grid

A Policy Driven Market

Federal	Investment Tax Credit	Accelerated Depreciation	Qualified Energy Conservation Bond
State & Utility	Renewable Portfolio Standard	State Tax Credits	Property & Sales Tax Exemptions
	Net Metering	Interconnection	Solar Access

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

Powered by SunShot
U.S. Department of Energy

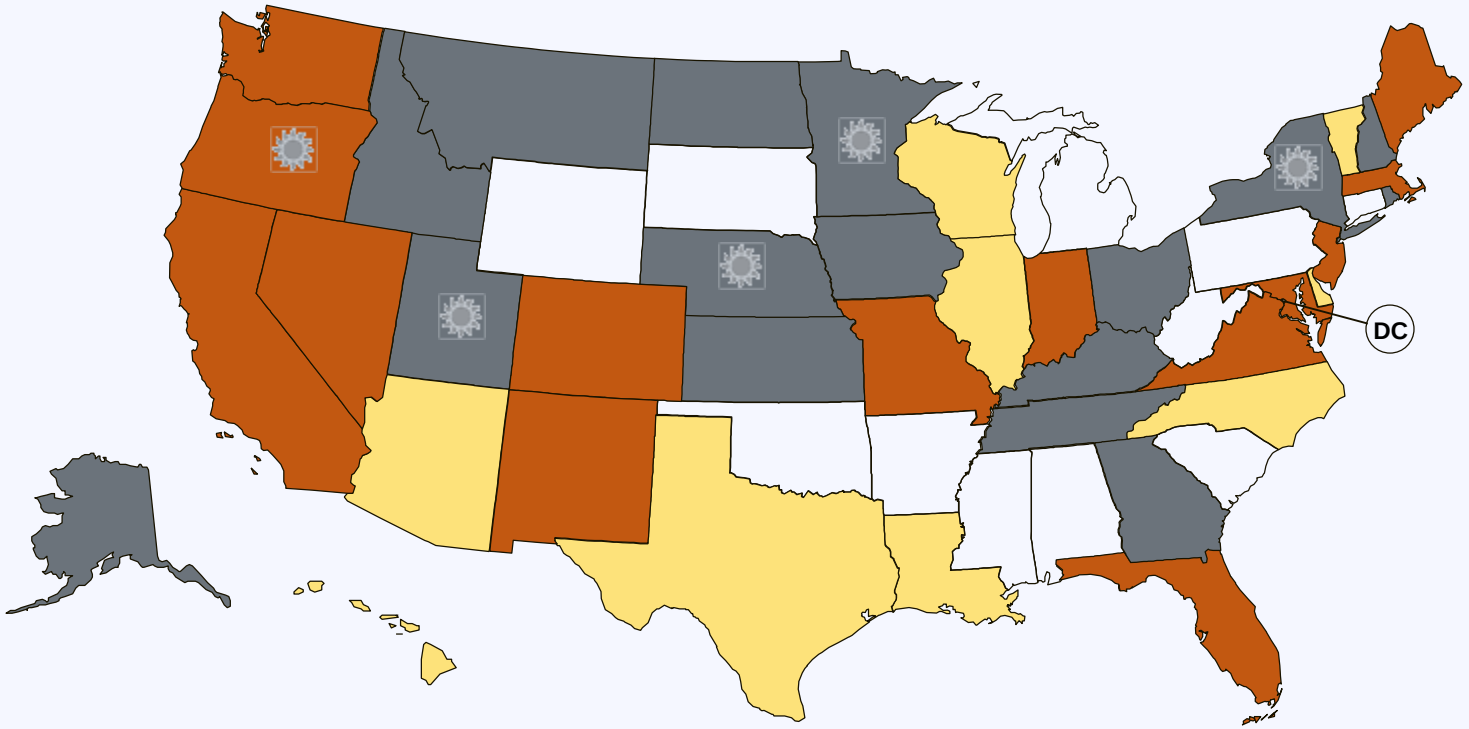
Source: Google Earth

Solar Access

Solar Access Laws:

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

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

Powered by SunShot
U.S. Department of Energy

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

North Carolina's Solar Rights

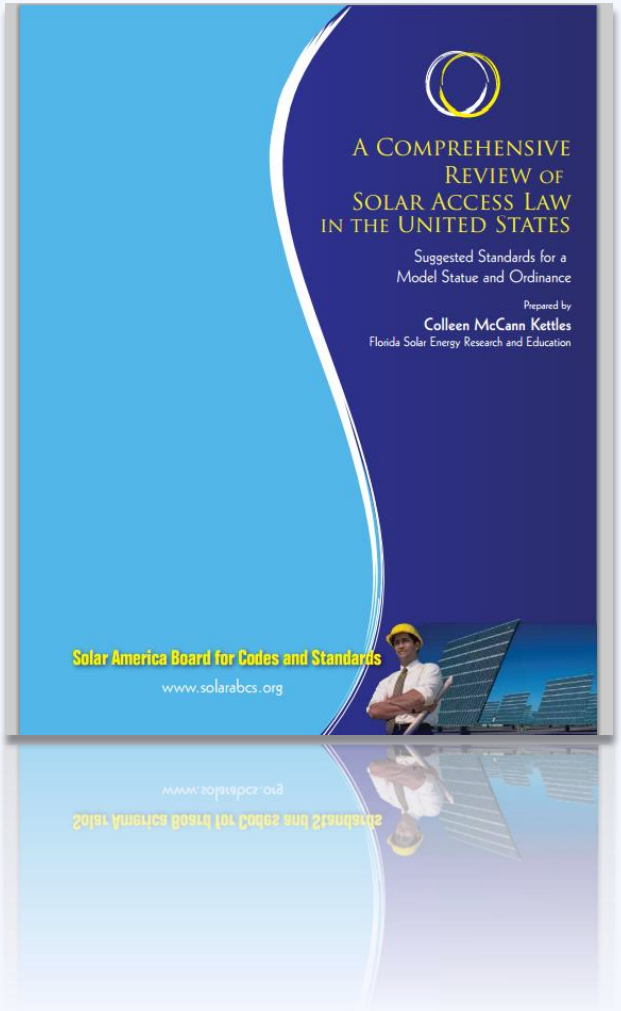
- Cities and counties generally may not prohibit solar energy installations
  - May place certain restrictions on installations visible from areas of common or public access
- Deed restrictions prohibiting solar installations are also not allowed

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



Powered by SunShot
U.S. Department of Energy

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

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

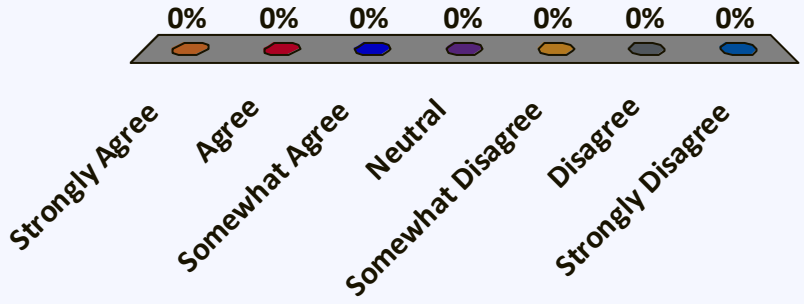
Visioning & goal setting

Effective Solar Permitting Process

Solar Market Development Tools

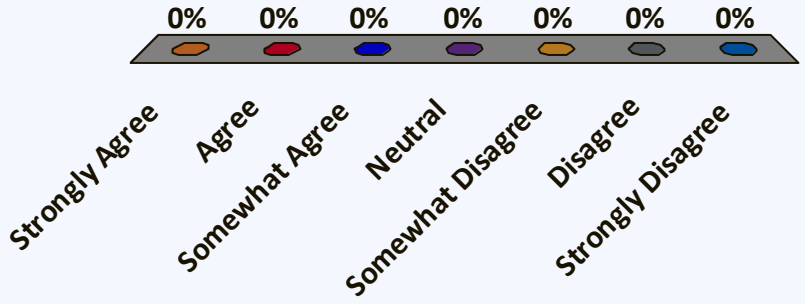
Solar advances your community's energy goals

A. Strongly Agree
B. Agree
C. Somewhat Agree
D. Neutral
E. Somewhat Disagree
F. Disagree
G. Strongly Disagree



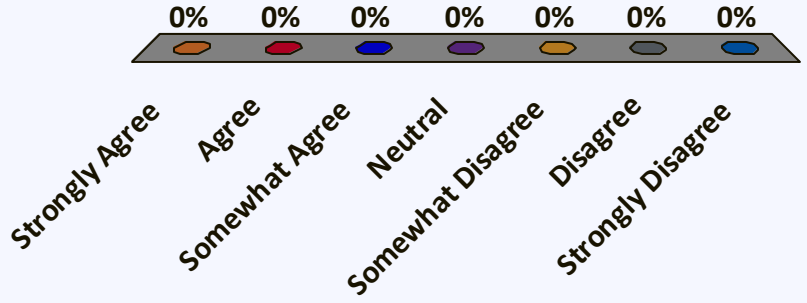
Solar advances your economic development goals

A. Strongly Agree
B. Agree
C. Somewhat Agree
D. Neutral
E. Somewhat Disagree
F. Disagree
G. Strongly Disagree



Solar advances your environmental and health goals

A. Strongly Agree
B. Agree
C. Somewhat Agree
D. Neutral
E. Somewhat Disagree
F. Disagree
G. Strongly Disagree



Visioning: Scales & Contexts

Poll

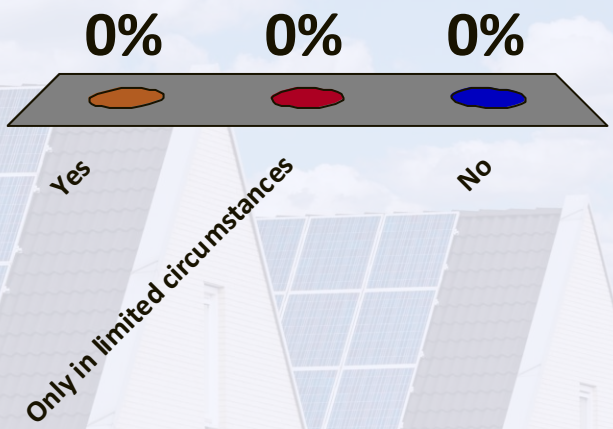
Is solar on residential rooftops appropriate for your community?

Visioning: Scales & Contexts

Poll

Is solar on residential rooftops appropriate for your community?

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



Visioning: Scales & Contexts

Poll

Is solar on commercial rooftops appropriate for your community?

Visioning: Scales & Contexts

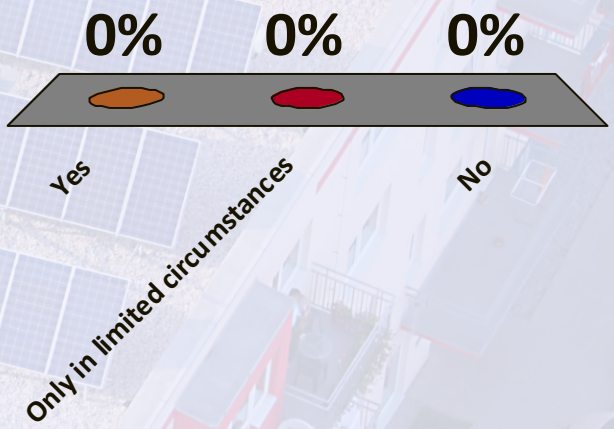
Poll

Is solar on commercial rooftops appropriate for your community?

A. Yes

B. Only in limited circumstances

C. No



Visioning: Scales & Contexts

Poll

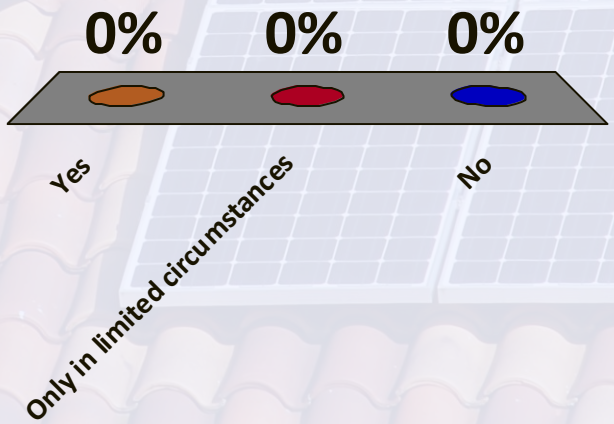
Is solar on historic structures appropriate for your community?

Visioning: Scales & Contexts

Poll

Is solar on historic structures appropriate for your community?

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



Visioning: Scales & Contexts

Poll

Is solar on brownfields appropriate for your community?

Visioning: Scales & Contexts

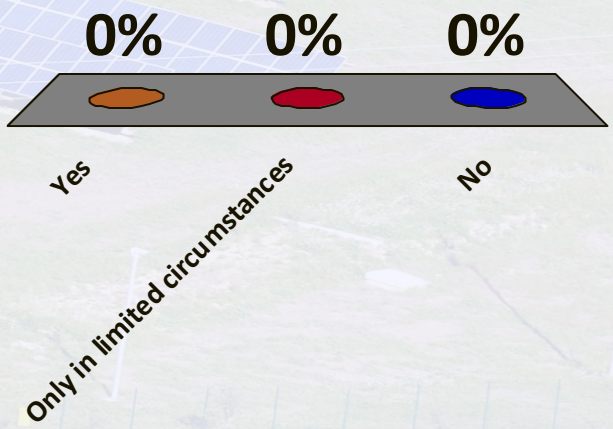
Poll

Is solar on brownfields appropriate for your community?

A. Yes

B. Only in limited circumstances

C. No



Visioning: Scales & Contexts

Poll

Is solar on greenfields appropriate for your community?

Visioning: Scales & Contexts

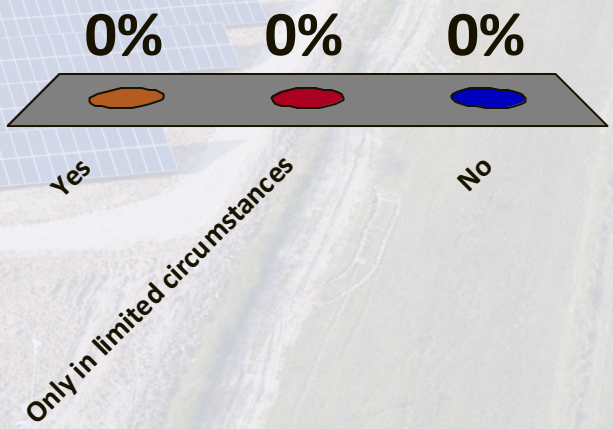
Poll

Is solar on greenfields appropriate for your community?

A. Yes

B. Only in limited circumstances

C. No



Visioning: Scales & Contexts

Poll

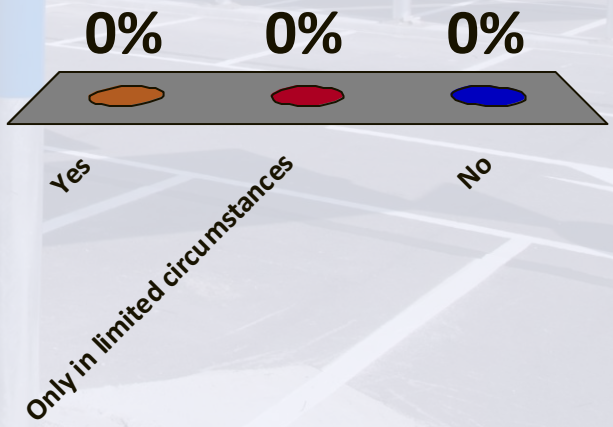
Is solar on parking lots appropriate for your community?

Visioning: Scales & Contexts

Poll

Is solar on parking lots appropriate for your community?

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



Visioning: Scales & Contexts

Poll

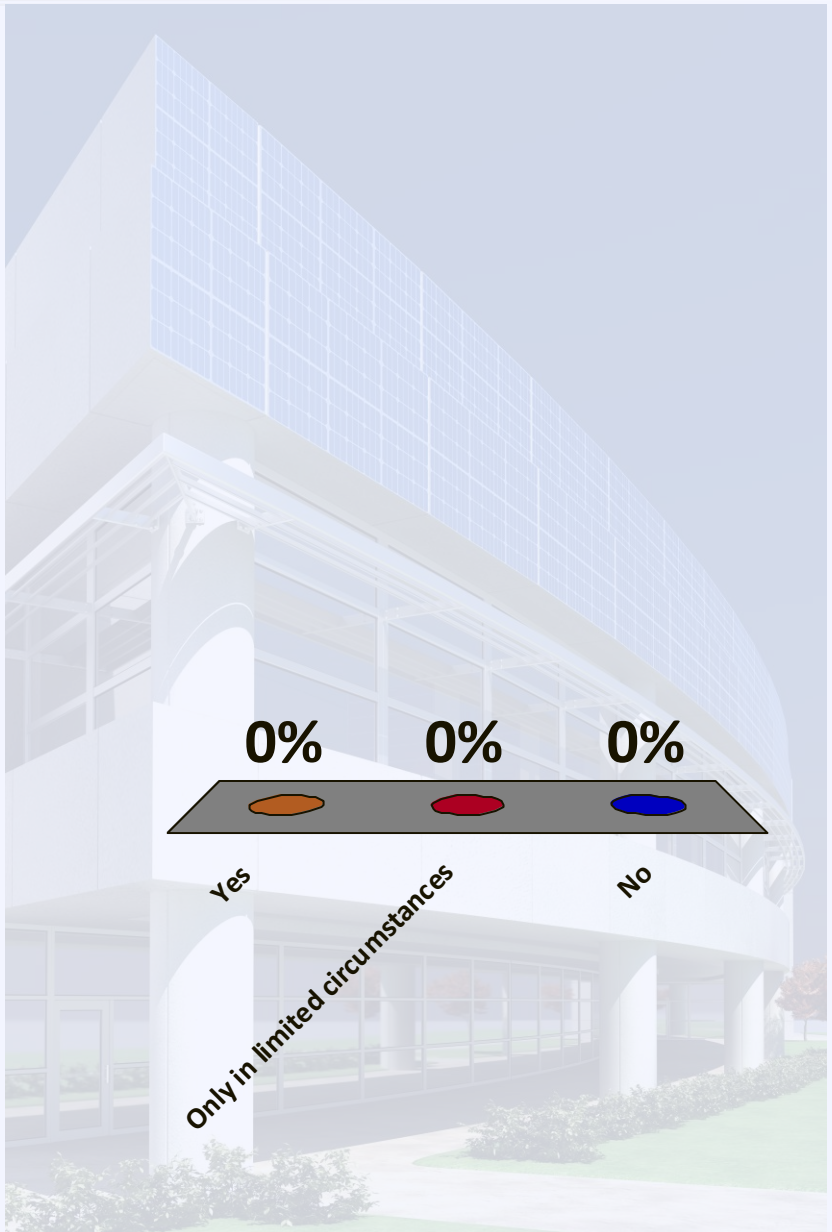
Is building-integrated solar appropriate for your community?

Visioning: Scales & Contexts

Poll

Is building-integrated solar appropriate for your community?

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



Planning for Solar Development

Communitywide Comprehensive Plan

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

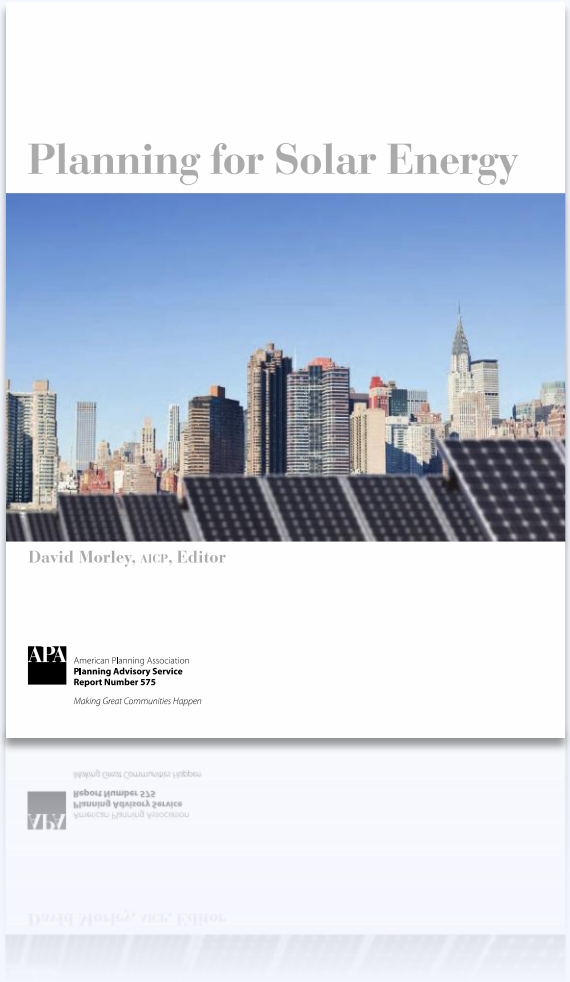
Source: American Planning Association

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



Powered by SunShot
U.S. Department of Energy

Effective Local Solar Policy

Local Solar Policy

Planning for Solar

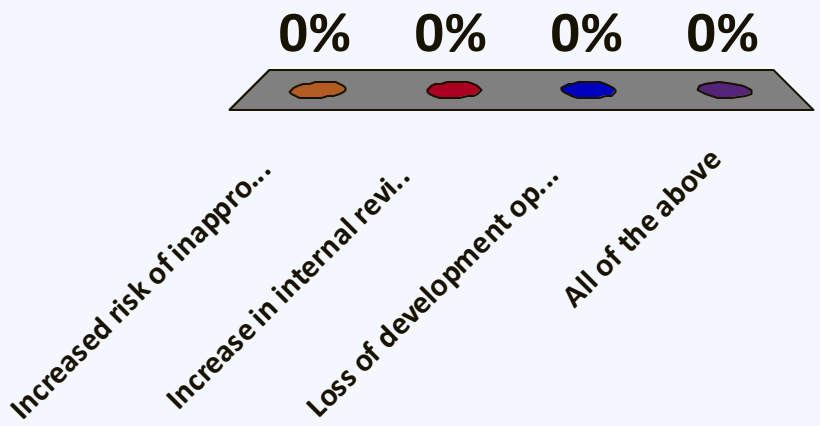
Solar in Development Regulation

Effective Solar Permitting Process

Solar Market Development Tools

What is the cost of convoluted regulations or "regulatory silence"?

A. Increased risk of inappropriate development
B. Increase in internal review costs
C. Loss of development opportunities
D. All of the above



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

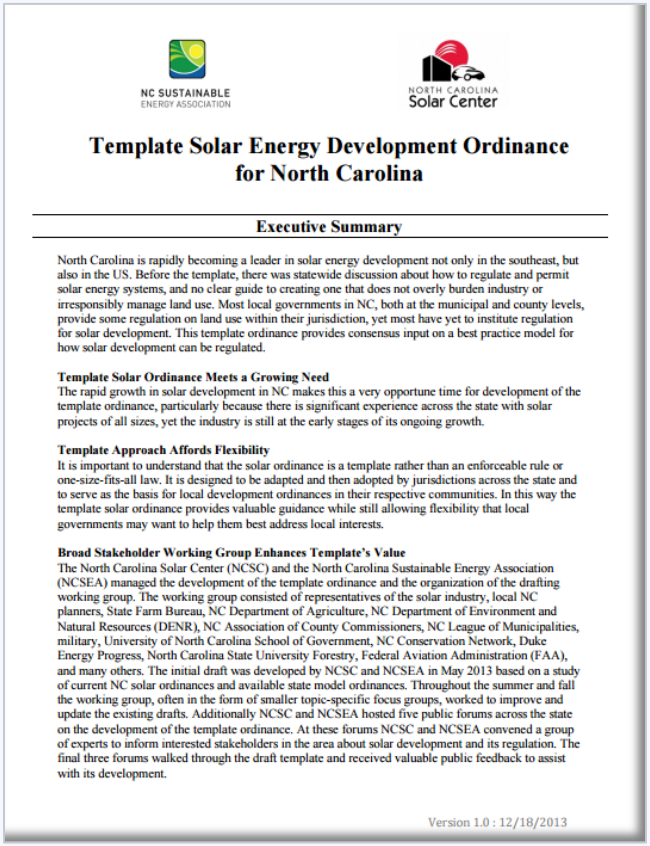
Typical Requirements:

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

Zoning Standards: Model Ordinances

Resource **NC Clean Energy Technology Center & NC Sustainable Energy Association**

This Model Ordinance is specific to North Carolina and was developed through a collaborative stakeholder process.



NC SUSTAINABLE ENERGY ASSOCIATION

NORTH CAROLINA Solar Center

Template Solar Energy Development Ordinance for North Carolina

Executive Summary

North Carolina is rapidly becoming a leader in solar energy development not only in the southeast, but also in the US. Before the template, there was statewide discussion about how to regulate and permit solar energy systems, and no clear guide to creating one that does not overly burden industry or irresponsibly manage land use. Most local governments in NC, both at the municipal and county levels, provide some regulation on land use within their jurisdiction, yet most have yet to institute regulation for solar development. This template ordinance provides consensus input on a best practice model for how solar development can be regulated.

Template Solar Ordinance Meets a Growing Need
The rapid growth in solar development in NC makes this a very opportune time for development of the template ordinance, particularly because there is significant experience across the state with solar projects of all sizes, yet the industry is still at the early stages of its ongoing growth.

Template Approach Affords Flexibility
It is important to understand that the solar ordinance is a template rather than an enforceable rule or one-size-fits-all law. It is designed to be adapted and then adopted by jurisdictions across the state and to serve as the basis for local development ordinances in their respective communities. In this way the template solar ordinance provides valuable guidance while still allowing flexibility that local governments may want to help them best address local interests.

Broad Stakeholder Working Group Enhances Template's Value
The North Carolina Solar Center (NCSC) and the North Carolina Sustainable Energy Association (NCSEA) managed the development of the template ordinance and the organization of the drafting working group. The working group consisted of representatives of the solar industry, local NC planners, State Farm Bureau, NC Department of Agriculture, NC Department of Environment and Natural Resources (DENR), NC Association of County Commissioners, NC League of Municipalities, military, University of North Carolina School of Government, NC Conservation Network, Duke Energy Progress, North Carolina State University Forestry, Federal Aviation Administration (FAA), and many others. The initial draft was developed by NCSC and NCSEA in May 2013 based on a study of current NC solar ordinances and available state model ordinances. Throughout the summer and fall the working group, often in the form of smaller topic-specific focus groups, worked to improve and update the existing drafts. Additionally NCSC and NCSEA hosted five public forums across the state on the development of the template ordinance. At these forums NCSC and NCSEA convened a group of experts to inform interested stakeholders in the area about solar development and its regulation. The final three forums walked through the draft template and received valuable public feedback to assist with its development.

Version 1.0 : 12/18/2013

http://nccleantech.ncsu.edu/new-resources-for-promoting-solar-friendly-north-carolina-homeowners-associations/

Zoning Standards: NC Model Ordinance

Three Solar Energy Systems (SES):

- **Level 1 SES**
  - roof-mounted, ground-mounted up to 50% structure footprint (≤1 acre), mounted over parking area, or building-integrated

- **Level 2 SES**
  - Ground-mounted *not* meeting Level 1 and ≤0.5 acre for all zoning areas
    - Exceptions:
      - ≤10 acres for Commercial / Institutional
      - Any size for Industrial

- **Level 3 SES**
  - All systems not meeting Level 1 or 2 criteria

http://nccleantech.ncsu.edu/new-resources-for-promoting-solar-friendly-north-carolina-homeowners-associations/

Zoning Standards: NC Model Ordinance

Three Solar Energy Systems (SES):

- **Level 1 SES**
  - Permitted Use
  - Not subject to screening requirements
  - Meet zoning district requirements for setbacks, height limits

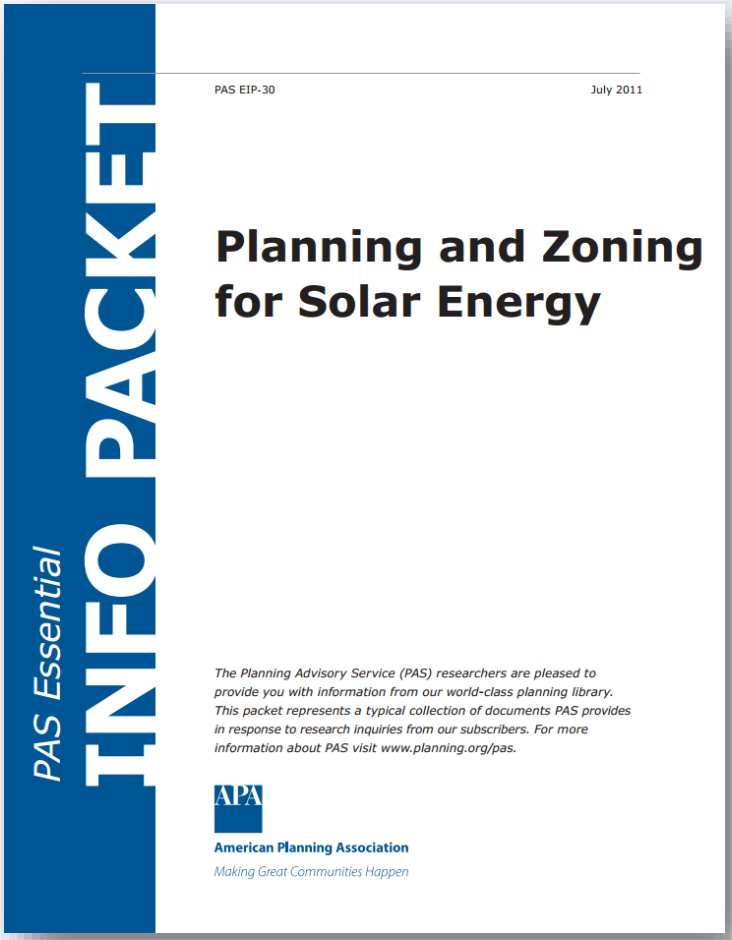
- **Level 2 & 3 SES**
  - Development Standards (≤0.5 acres) or Special Use Permit
  - 20 foot height limitation (ground-mounted)
  - Site plan submitted to Zoning Administrator
  - Buffering and signage requirements
  - Decommissioning plan

http://nccleantech.ncsu.edu/new-resources-for-promoting-solar-friendly-north-carolina-homeowners-associations/

Zoning Standards: Model Ordinances

Resource **American Planning Association**

This Essential Info Packet provides example development regulations for solar.



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

Zoning Standards: Model Ordinances

VANCE COUNTY, NC – ZONING ORDINANCES (Amended 2013)

- **Accessory use.** *Permitted*:
  - Must meet setbacks for the zoning category and height limits
- **Primary use ('Solar Farms').** *Conditional use minimum development requirements:*
  1. **Height**: 25' ground-mounted
  2. **Setback**: zoning district setback applies
  3. **Screening and Fencing**: Adequate to prevent trespassing
  4. **Lighting**: Shaded to reflect light away from streets, neighboring properties
  5. **Noise**: 50 decibels max if next to residential area
  6. **Power Transmission Lines**: Underground, to extent possible
  7. **Approved Solar Components**: UL listing
  8. **Compliance with Building and Electrical Codes**: building inspector checks
  9. **Utility Notification**: must demonstrate utility approves interconnection
  10. **Abandonment**: removed within 12 months of cessation of operations

http://www.vancecounty.org/wp-content/uploads/2014/12/Ord.-39-Zoning.pdf

Zoning Standards: Historic

Typical Requirements:

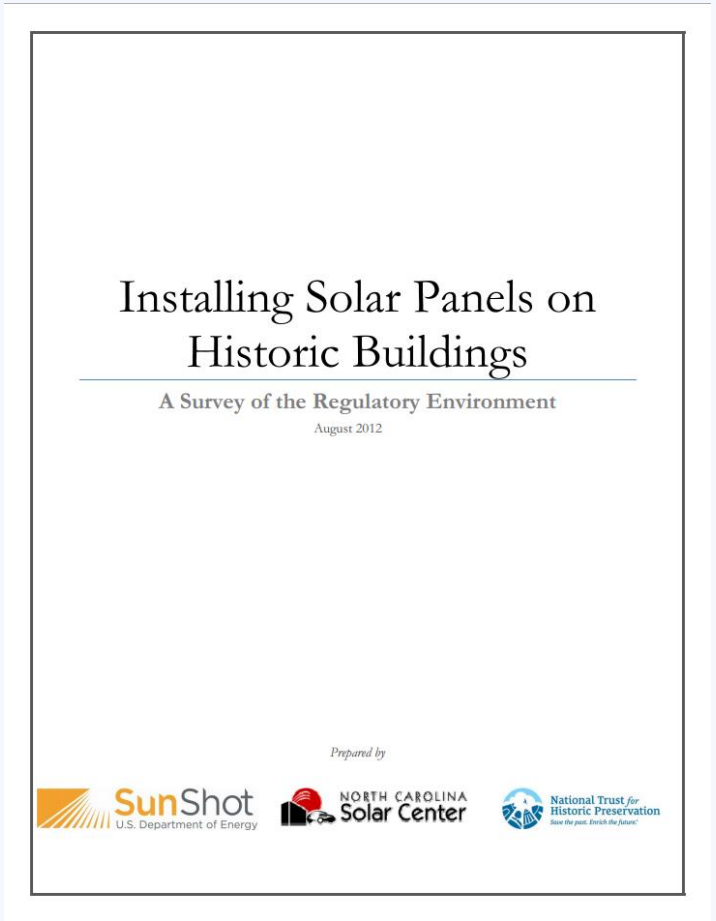
- Prevent permanent loss of "character defining" features
- Possible design requirements
  - Ground mounted
  - Flat roof with setback
  - Panels flush with roof
  - Blend color

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**

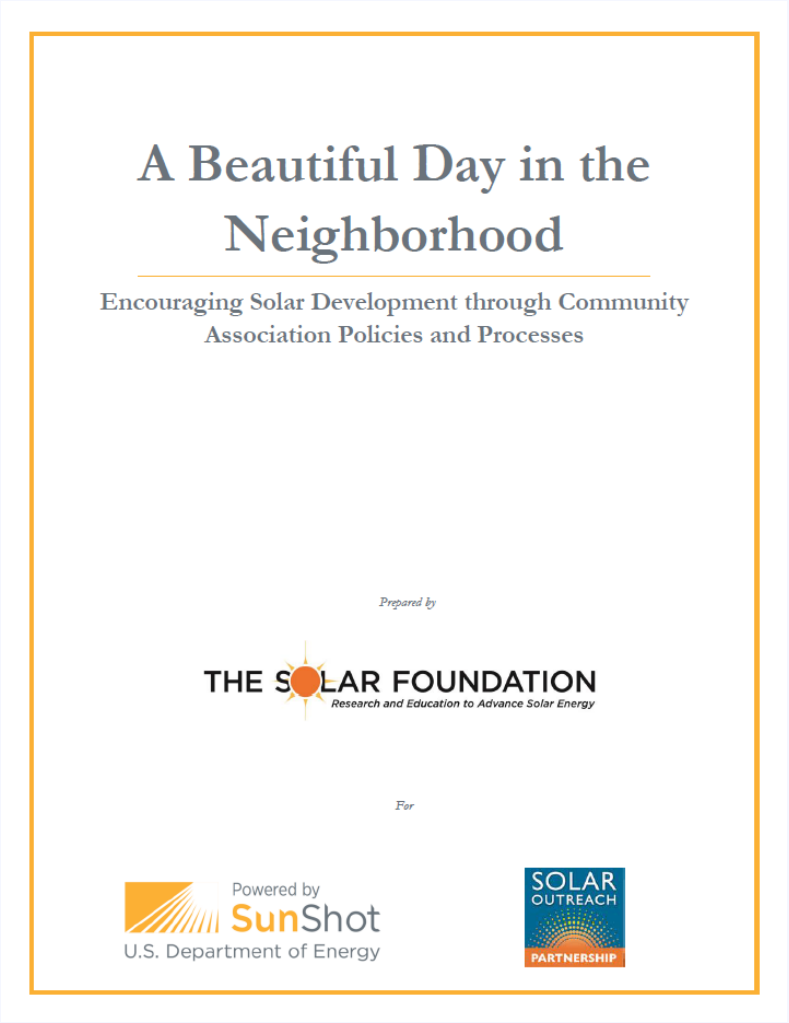
Provides sample design principles and example regulations incorporating historic preservation into sustainability and energy projects.



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.



Powered by SunShot U.S. Department of Energy

www.solaroutreach.org

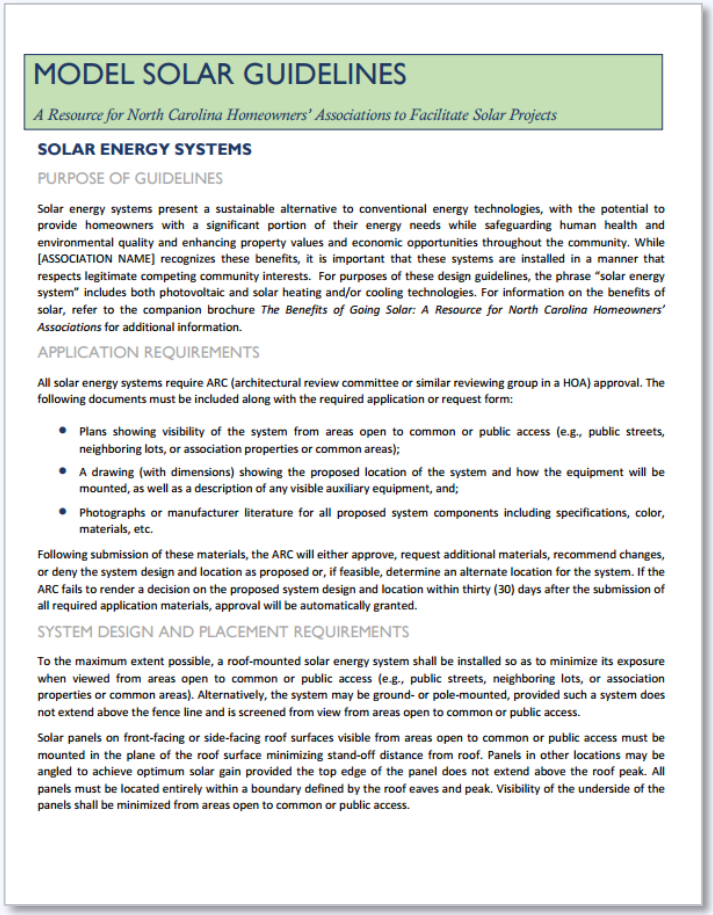
Solar in HOAs: Best Practices

- ✓ 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

Private Rules on Residential Solar

Resource **NC Clean Energy Technology Center**

Model solar guidelines for HOAs



MODEL SOLAR GUIDELINES

A Resource for North Carolina Homeowners' Associations to Facilitate Solar Projects

SOLAR ENERGY SYSTEMS

PURPOSE OF GUIDELINES

Solar energy systems present a sustainable alternative to conventional energy technologies, with the potential to provide homeowners with a significant portion of their energy needs while safeguarding human health and environmental quality and enhancing property values and economic opportunities throughout the community. While [ASSOCIATION NAME] recognizes these benefits, it is important that these systems are installed in a manner that respects legitimate competing community interests. For purposes of these design guidelines, the phrase "solar energy system" includes both photovoltaic and solar heating and/or cooling technologies. For information on the benefits of solar, refer to the companion brochure *The Benefits of Going Solar: A Resource for North Carolina Homeowners' Associations* for additional information.

APPLICATION REQUIREMENTS

All solar energy systems require ARC (architectural review committee or similar reviewing group in a HOA) approval. The following documents must be included along with the required application or request form:

- Plans showing visibility of the system from areas open to common or public access (e.g., public streets, neighboring lots, or association properties or common areas);
- A drawing (with dimensions) showing the proposed location of the system and how the equipment will be mounted, as well as a description of any visible auxiliary equipment, and;
- Photographs or manufacturer literature for all proposed system components including specifications, color, materials, etc.

Following submission of these materials, the ARC will either approve, request additional materials, recommend changes, or deny the system design and location as proposed or, if feasible, determine an alternate location for the system. If the ARC fails to render a decision on the proposed system design and location within thirty (30) days after the submission of all required application materials, approval will be automatically granted.

SYSTEM DESIGN AND PLACEMENT REQUIREMENTS

To the maximum extent possible, a roof-mounted solar energy system shall be installed so as to minimize its exposure when viewed from areas open to common or public access (e.g., public streets, neighboring lots, or association properties or common areas). Alternatively, the system may be ground- or pole-mounted, provided such a system does not extend above the fence line and is screened from view from areas open to common or public access.

Solar panels on front-facing or side-facing roof surfaces visible from areas open to common or public access must be mounted in the plane of the roof surface minimizing stand-off distance from roof. Panels in other locations may be angled to achieve optimum solar gain provided the top edge of the panel does not extend above the roof peak. All panels must be located entirely within a boundary defined by the roof eaves and peak. Visibility of the underside of the panels shall be minimized from areas open to common or public access.

http://nccleantech.ncsu.edu/wp-content/uploads/Model-HOA-Solar-Guidelines_Formatted_TSF-1.pdf

Update Building Code

Solar Ready Construction:

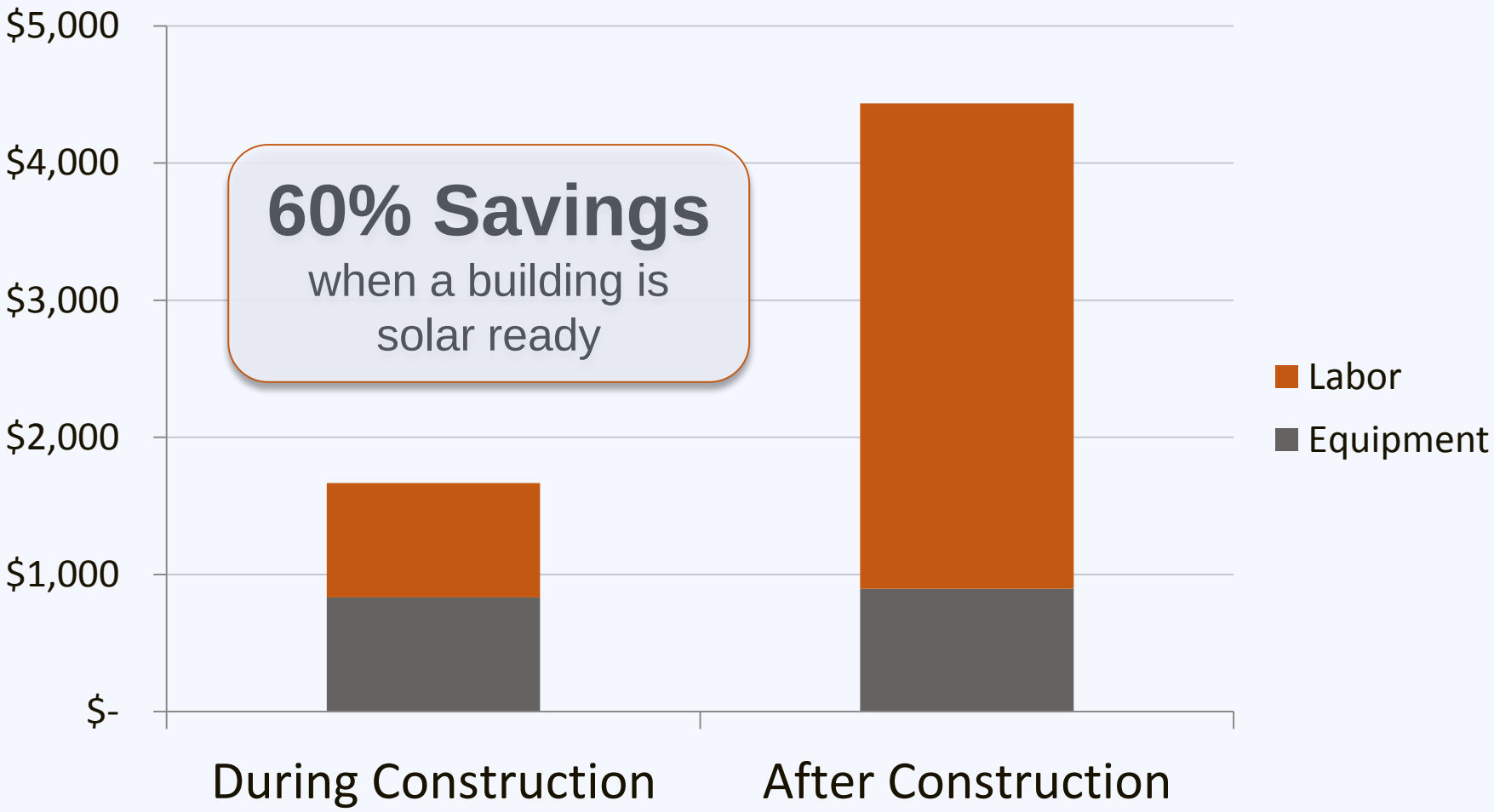
Preparing a building for solar at the outset can help make future solar installations easier and more cost effective.

Update Building Code

Require builders to:

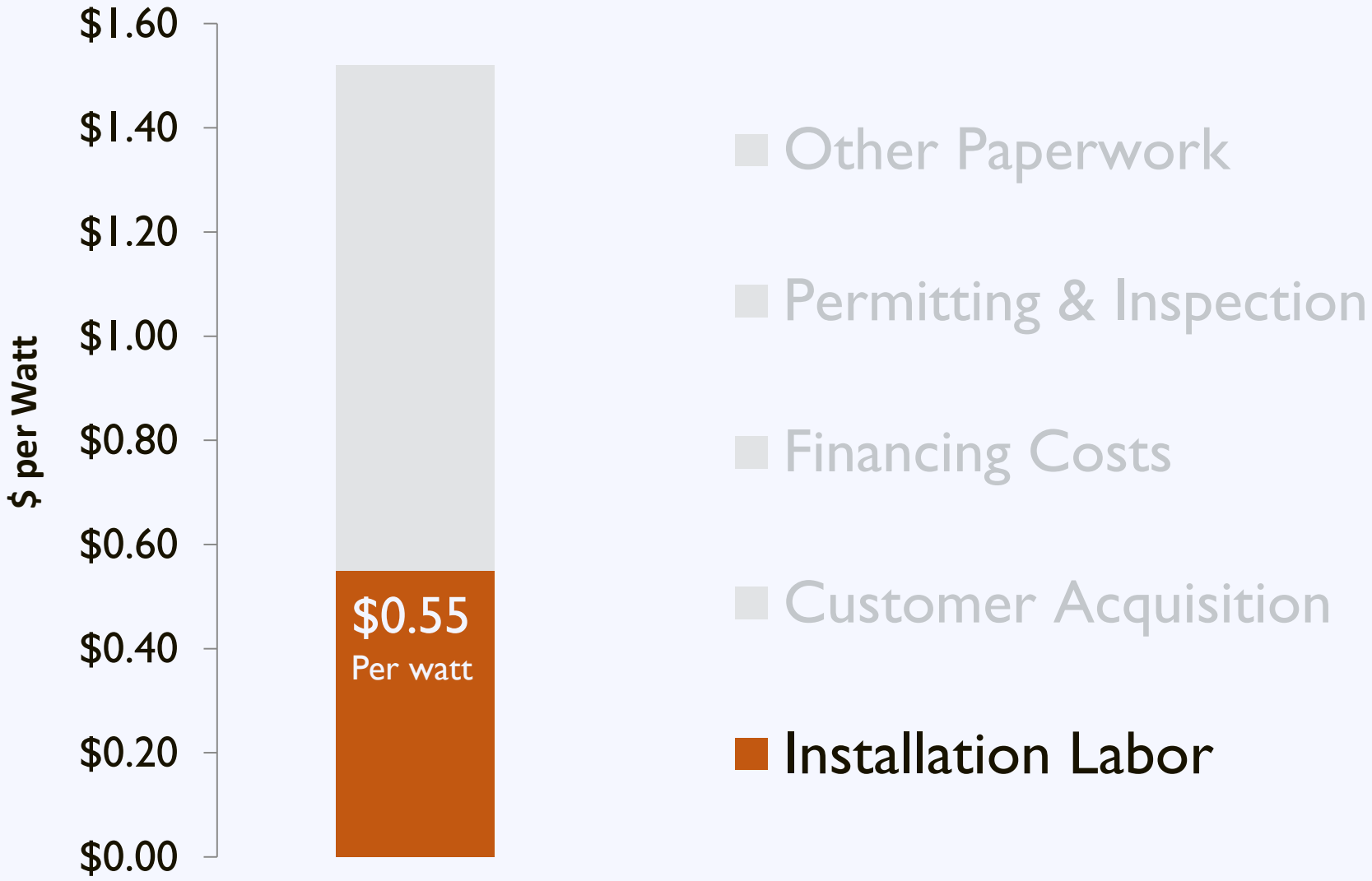
- ✓ Minimize rooftop equipment
- ✓ Plan for structure orientation to avoid shading
- ✓ Install a roof that will support the load of a solar array
- ✓ Record roof specifications on drawings
- ✓ Plan for wiring and inverter placement

Update Building Code



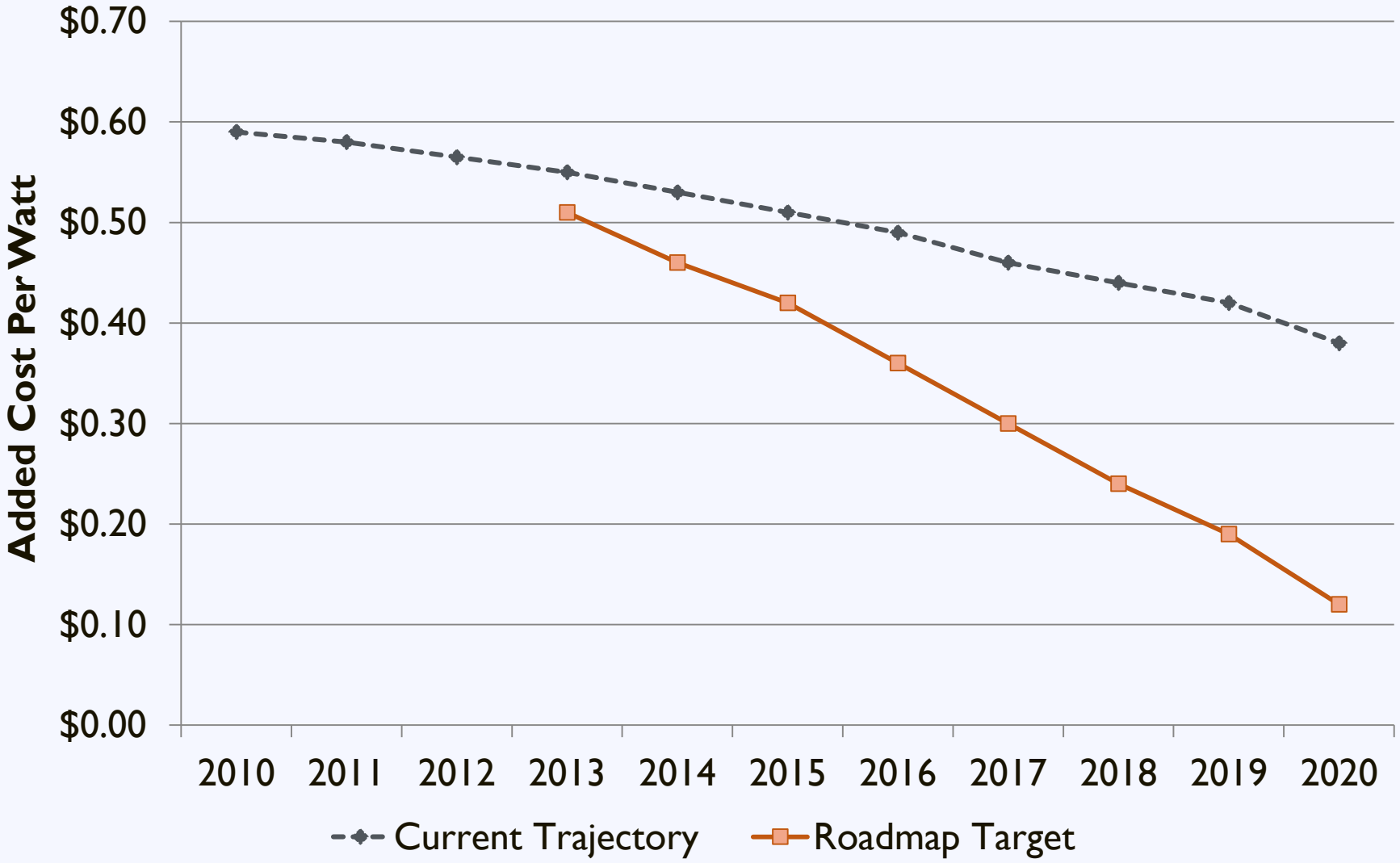
Source: Solar Ready: An Overview of Implementation Practices [Draft]. NREL, Feb. 18, 2011.

Installation Soft Costs



Powered by SunShot
U.S. Department of Energy

Installation Labor Roadmap



Source: NREL (http://www.nrel.gov/docs/fy13osti/59155.pdf)

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

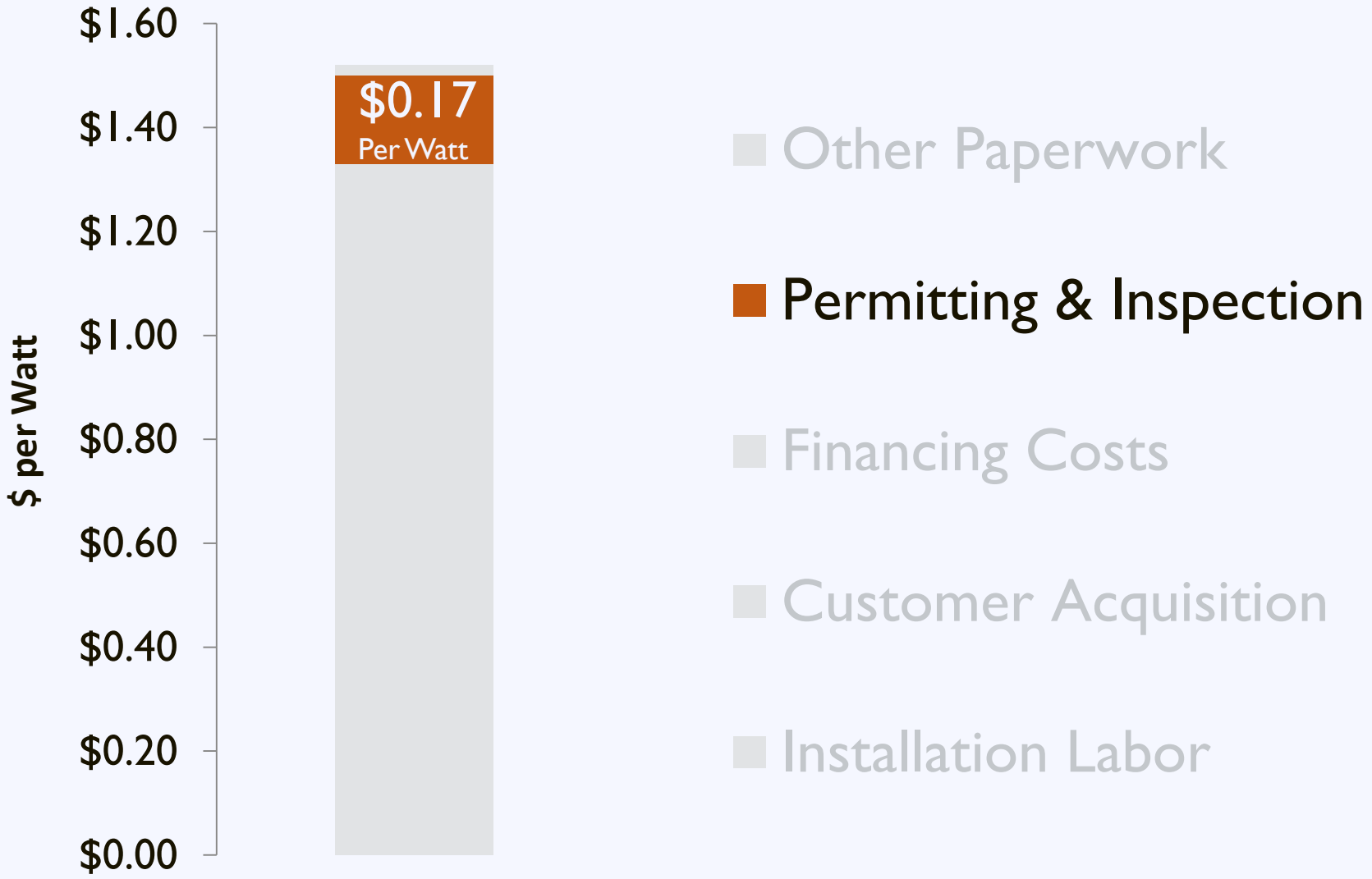
Powered by SunShot
U.S. Department of Energy

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

Consumer Challenges

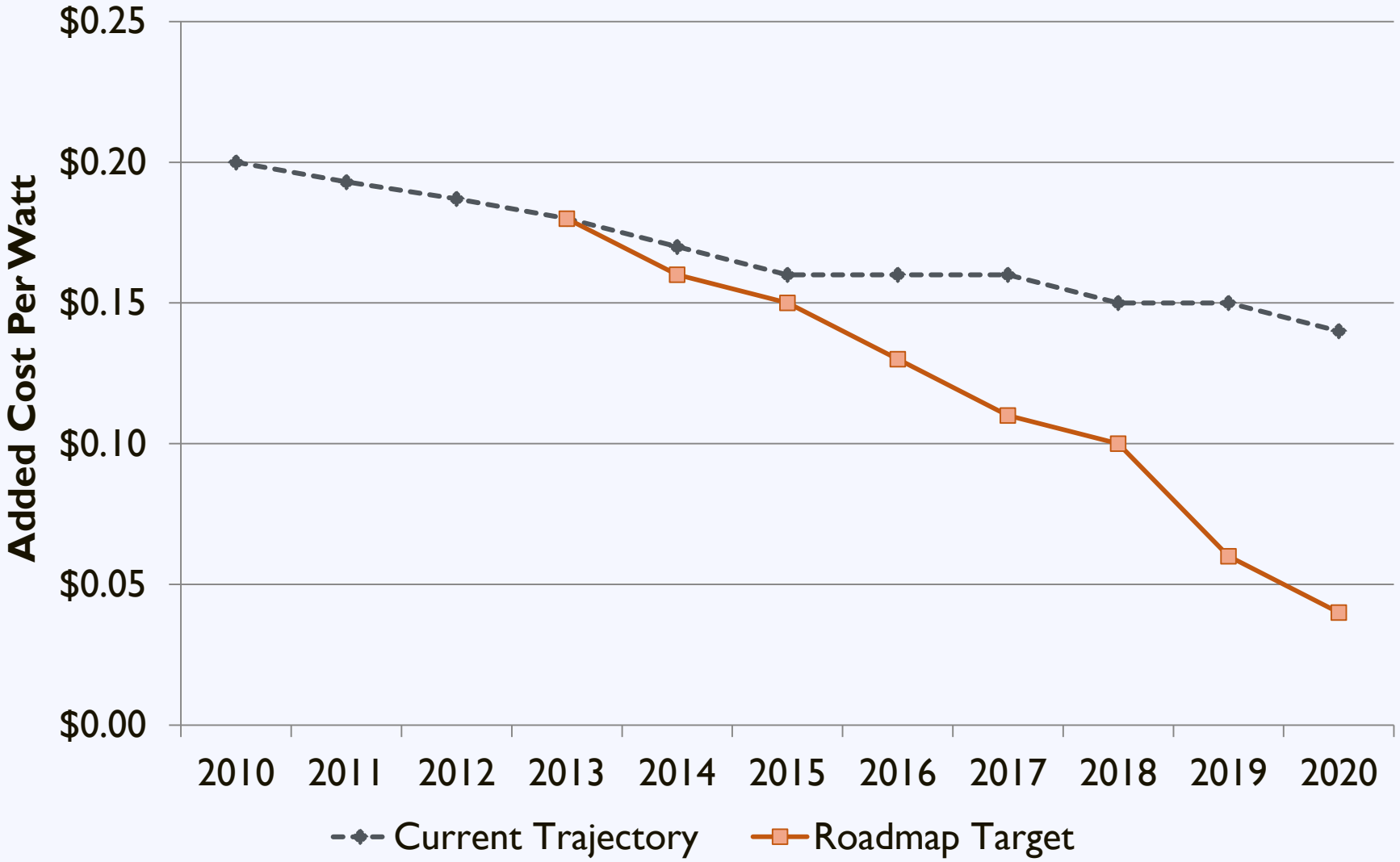
Source: Forbes

Regulatory Barriers



Powered by SunShot
U.S. Department of Energy

Planning & Permitting Roadmap



Powered by SunShot
U.S. Department of Energy

Identifying Challenges

Solar Developer Perspective:

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

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

Identifying Challenges

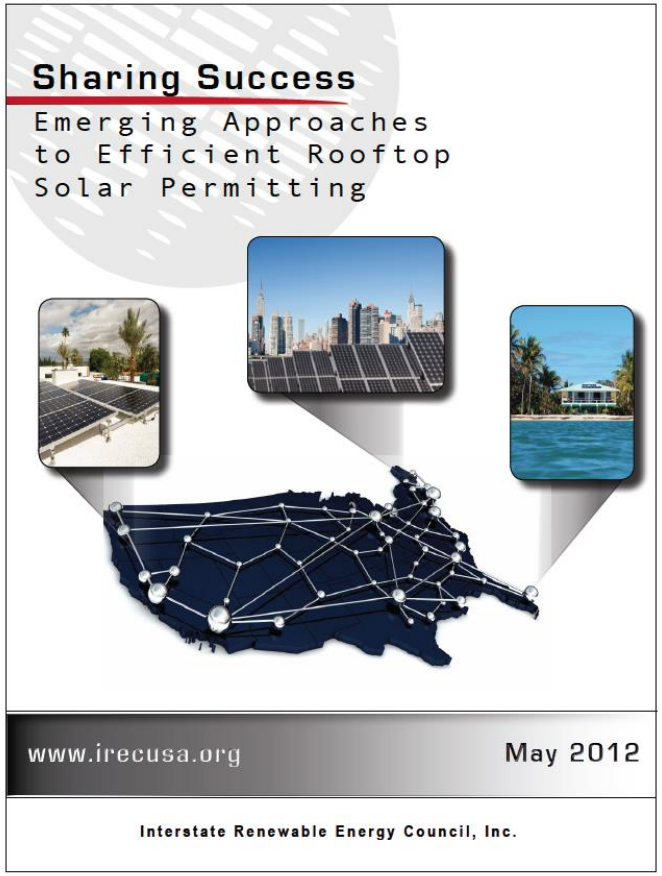
Local Government Perspective:

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

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

Implementing Improvements

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



Powered by SunShot U.S. Department of Energy

www.irecusa.org/sharing-success/

Expedited Permitting

Solar Permitting Best Practices:

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

Powered by SunShot U.S. Department of Energy

Source: IREC/ Vote Solar

Expedited Permitting

Solar Permitting Best Practices:

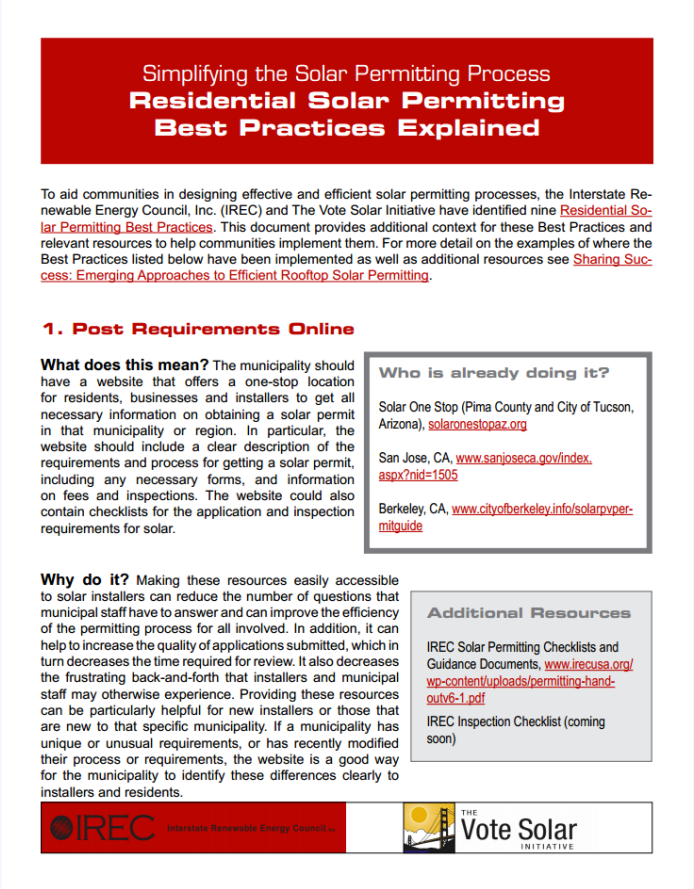
- ✓ Collect Reasonable Permitting Fees
- ✓ No Community-Specific Licenses
- ✓ Narrow Inspection Appointment Windows
- ✓ Eliminate Excessive Inspections
- ✓ Train Permitting Staff in Solar

Source: IREC/Vote Solar

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

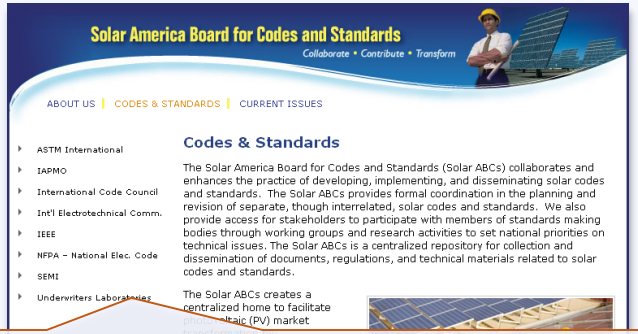
http://projectpermit.org/wp-content/uploads/2013/04/Expanded-Best-Practices-7.23.13_VSI.pdf

Model Permitting Process

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

Expedited Permitting:

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



1-1. Example Design Criteria:

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

Powered by SunShot
U.S. Department of Energy

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

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

- Other Paperwork
- Permitting & Inspection
- **Financing Costs**
- Customer Acquisition
- Installation Labor

Powered by SunShot
U.S. Department of Energy

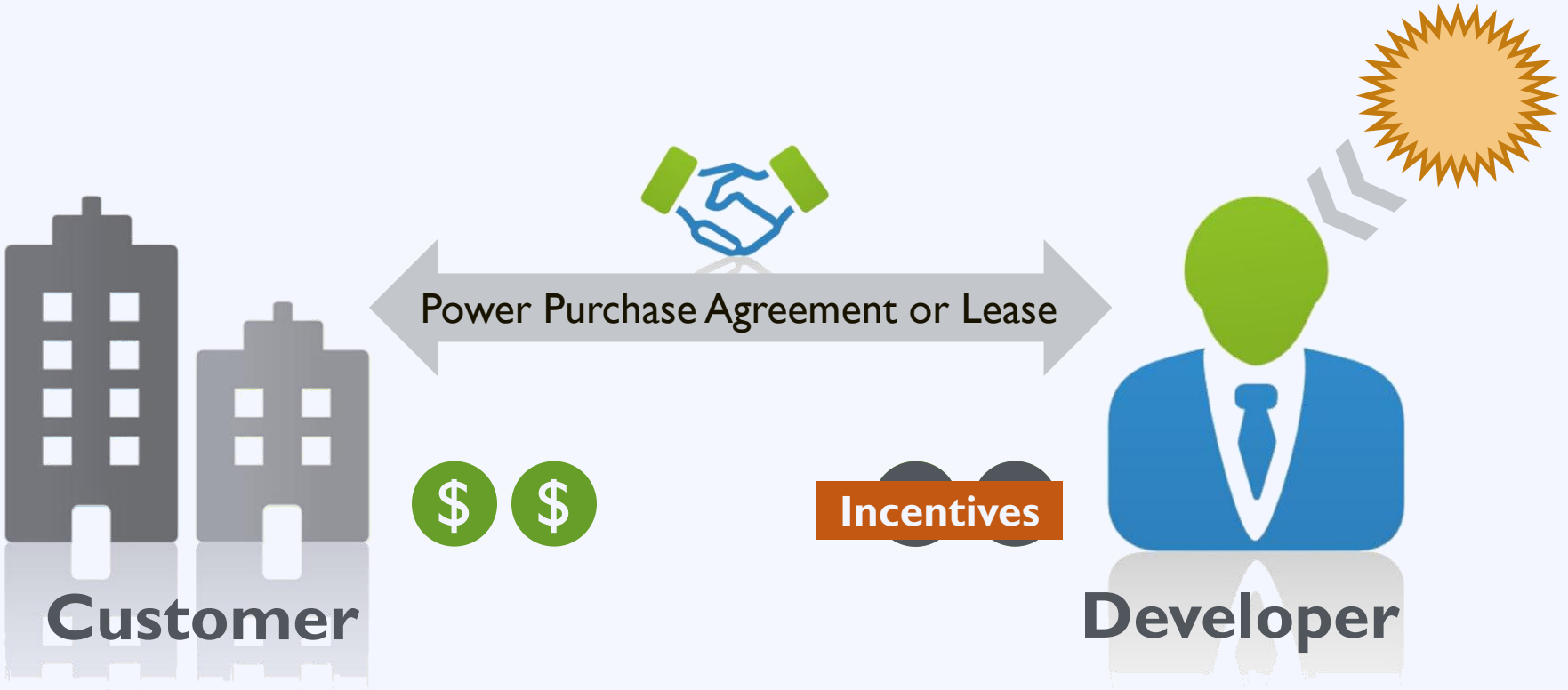
Ownership Options for Solar

Direct Ownership

Third-Party Ownership

Direct Ownership

Third Party Ownership



Third Party Ownership

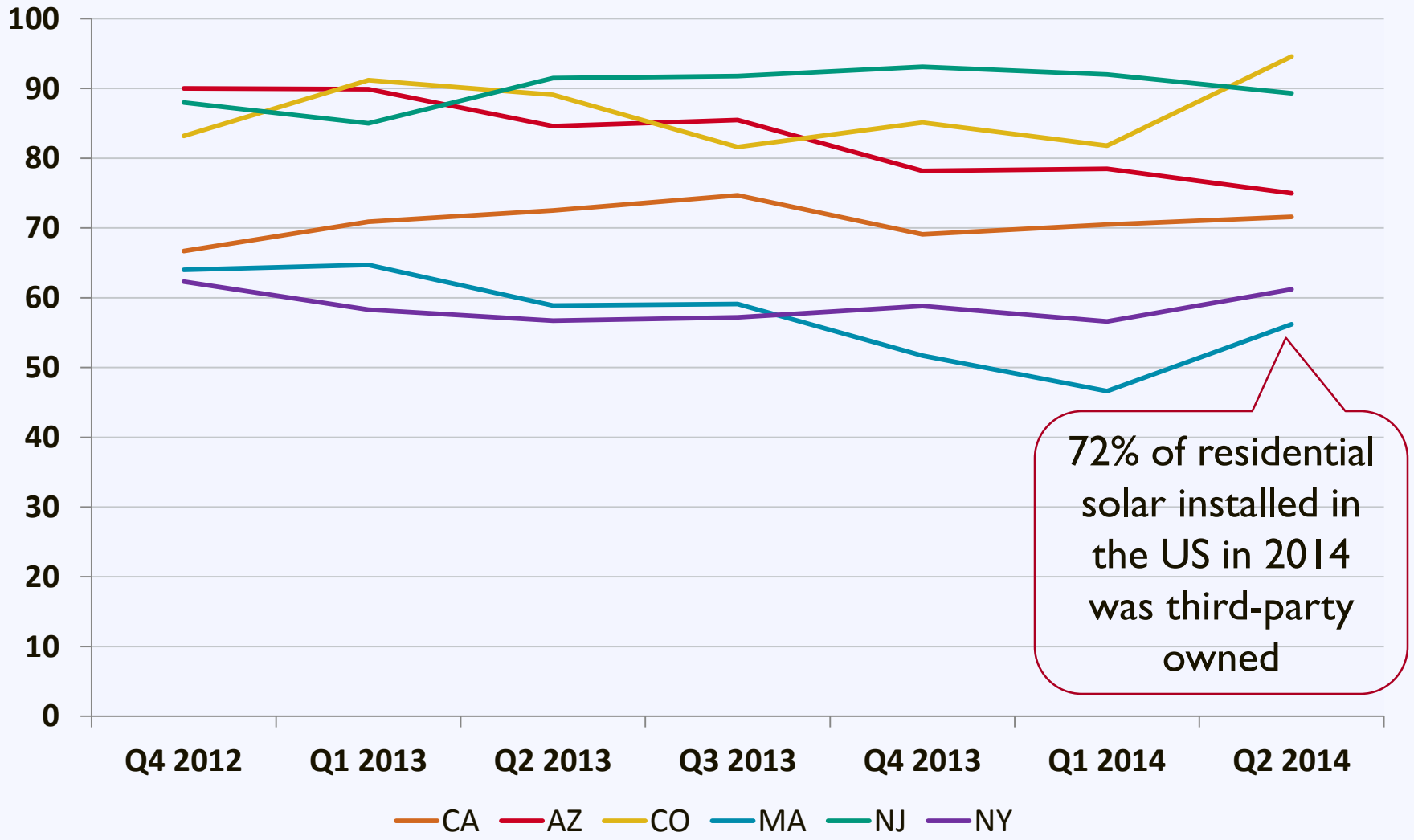
Benefits

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

Drawbacks

- Investor needs higher ROI
- PPAs not currently available in North Carolina

Third Party Ownership



Powered by SunShot U.S. Department of Energy

Source: GTM Research/ Solar Energy Industries Association, *U.S. Solar Market Insight Q2 2014*
GTM Research, U.S. Residential Solar Financing 2015-2020

Ownership Options for Solar

Direct Ownership

Third-Party Ownership

Expand direct ownership options by engaging local lenders

Engage Local Lenders

Fewer than **5%**

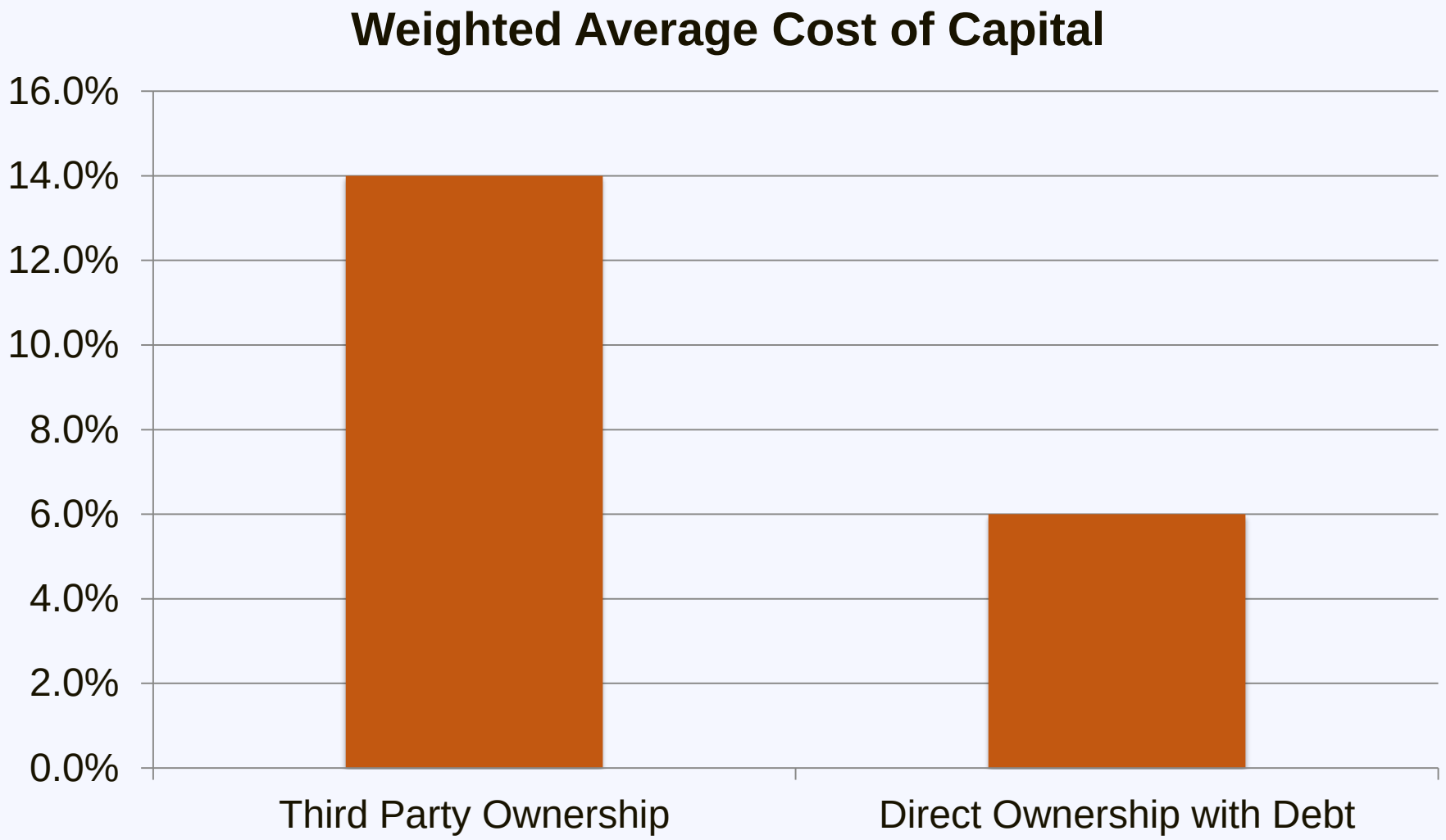
of the

6,500 banks in the US

are

actively financing solar PV projects

Third Party Ownership: Cost



Engage Local Lenders: Resources

Resource **Local Lending for Solar PV**

A guide for local governments seeking to engage financial institutions

www.solaroutreach.org

Powered by SunShot
U.S. Department of Energy

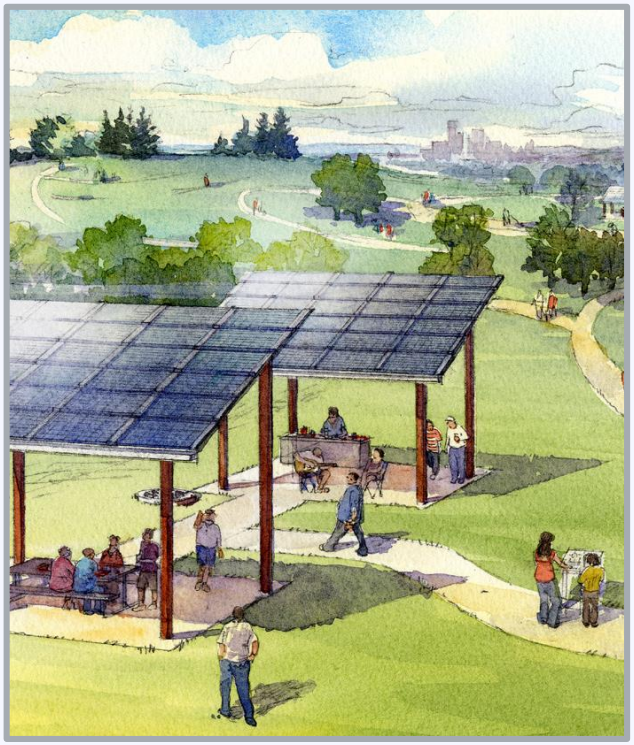
Community Shared Solar

Source: Seattle City Light

Community Shared Solar

Program Models:

- Utility Model
- Special Purpose Entity Model
- Nonprofit Model



Community Shared Solar

Benefits

- Accessible for everyone
- Economies of scale

Drawbacks

- Administrative challenge
- Tax credit issues
- Securities compliance

Community Solar: North Carolina

- Policy Barriers:
  - Net metering limited to a single site; no "aggregate/virtual net metering"
  - No third-party PPAs

- Opportunities:
  - Work with local utility to develop community solar program ("utility model")
  - Special-purpose entity model- sell power to utility

Customer Acquisition

Other Paperwork

Permitting & Inspection

Financing Costs

Customer Acquisition

Installation Labor

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

Online Solar Marketplaces

- Address customer acquisition barriers by providing information quickly and easily, saving both customers and installers time and money
- Match interested customers with vetted local installers
- Allow residential customers to obtain solar quotes from multiple companies
- Can include financing options such as loans
- Often provide additional information and guidance

Online Solar Marketplaces

energysage

COMPARE SOLAR PRICES ONLINE & SAVE

energysage.com/nccleantech

pure energies

pureenergies.com/us

Geostellar

Geostellar.com

The Solarize Program

Group purchasing for residential solar PV

SOLARIZE MASS

Solarize CONNECTICUT

solarize ASHEVILLE

solarize portland

Solarize Blacksburg

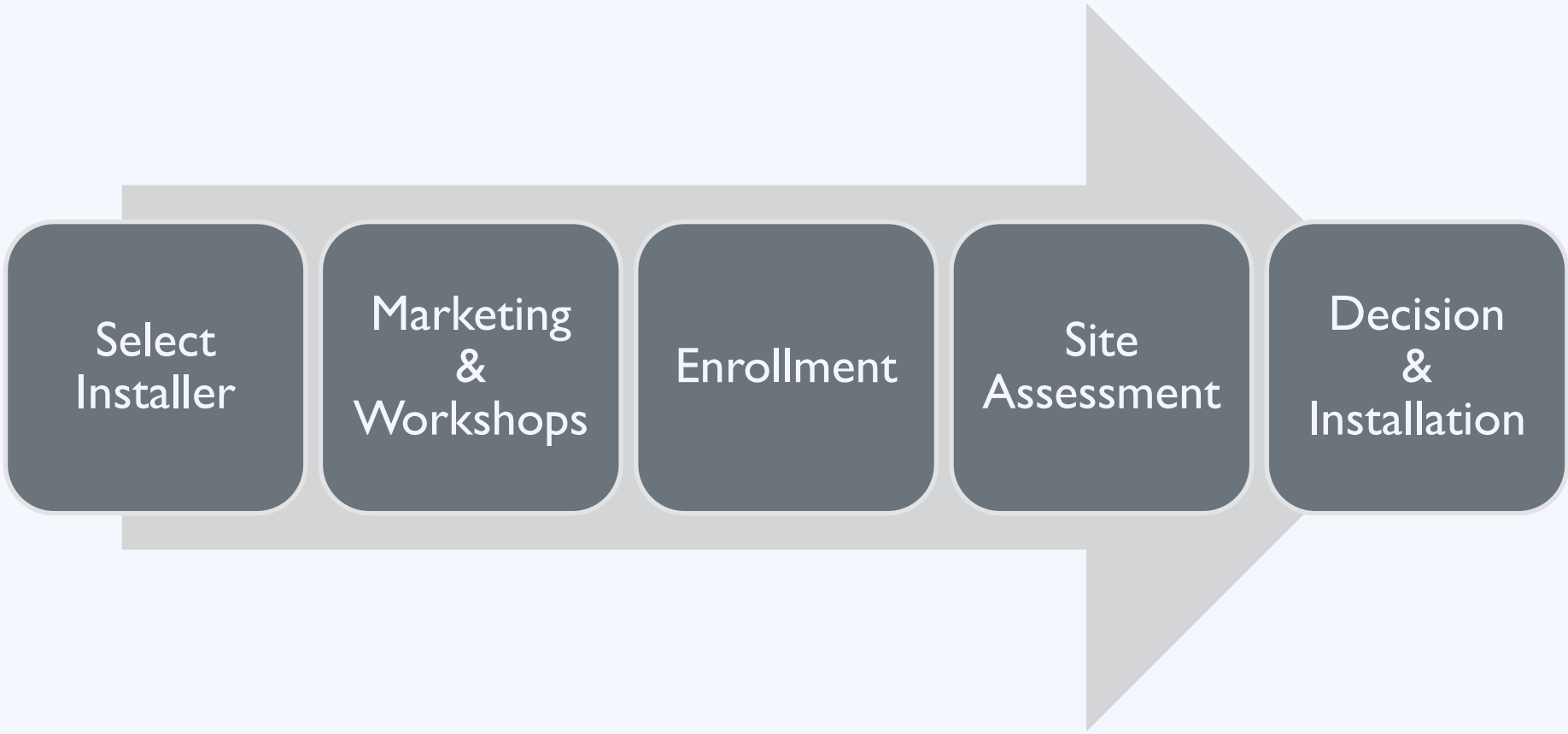
SOLARIZE ROANOKE

Powered by SunShot
U.S. Department of Energy

The Solarize Program

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

Solarize: Process



Solarize: Lasting Impact

A household is

0.78% more likely to adopt solar

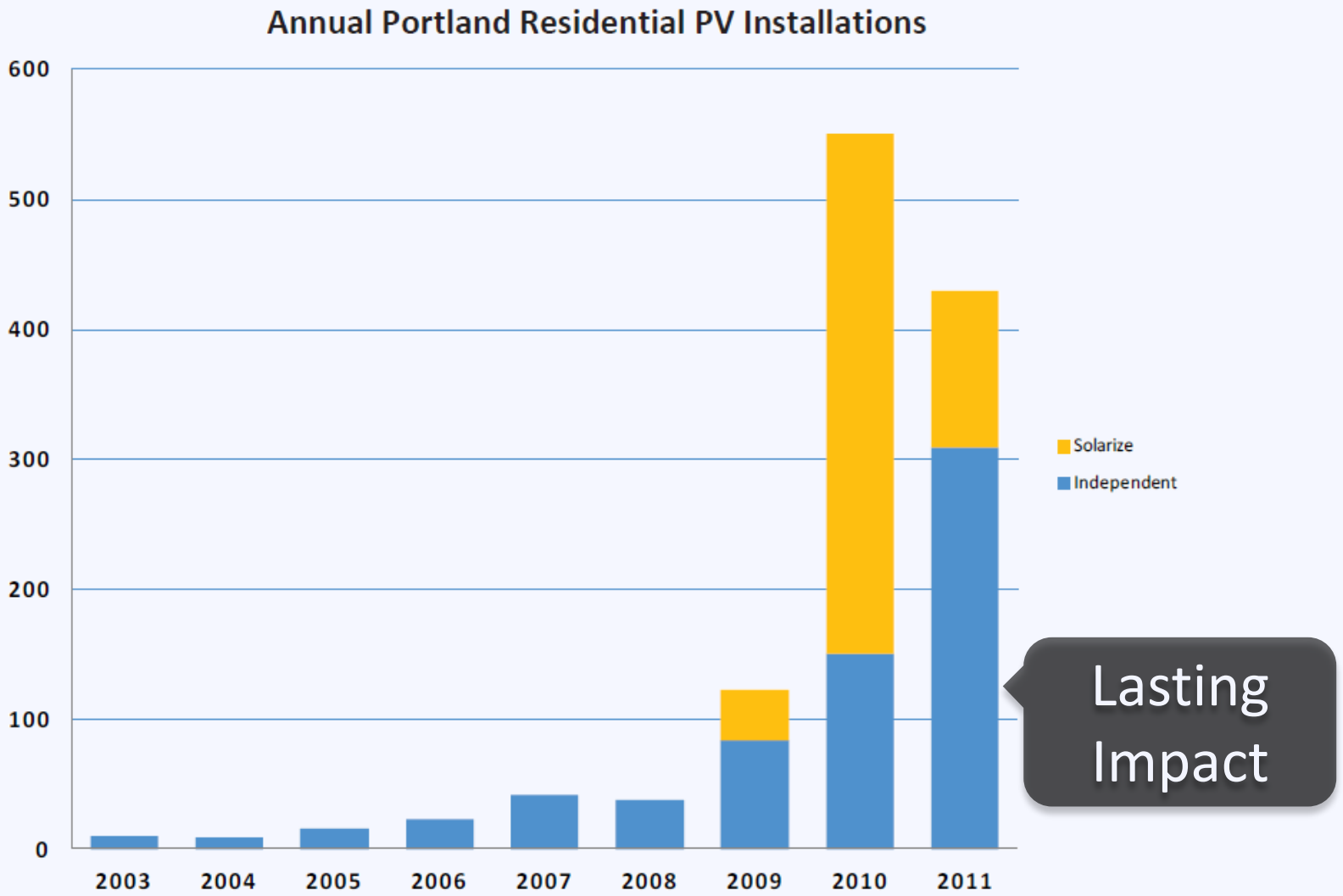
for

each additional installation in their zip code

Powered by SunShot
U.S. Department of Energy

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

Solarize: Lasting Impact



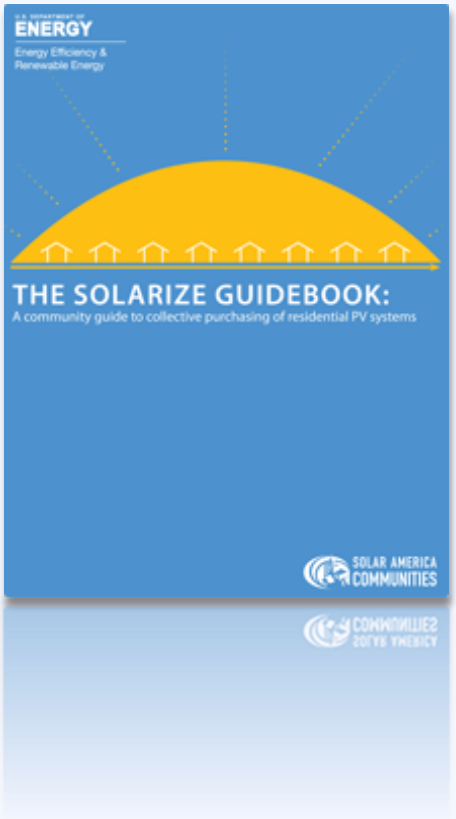
Source: NREL

Solarize: Resources

Resource **The Solarize Guidebook**

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

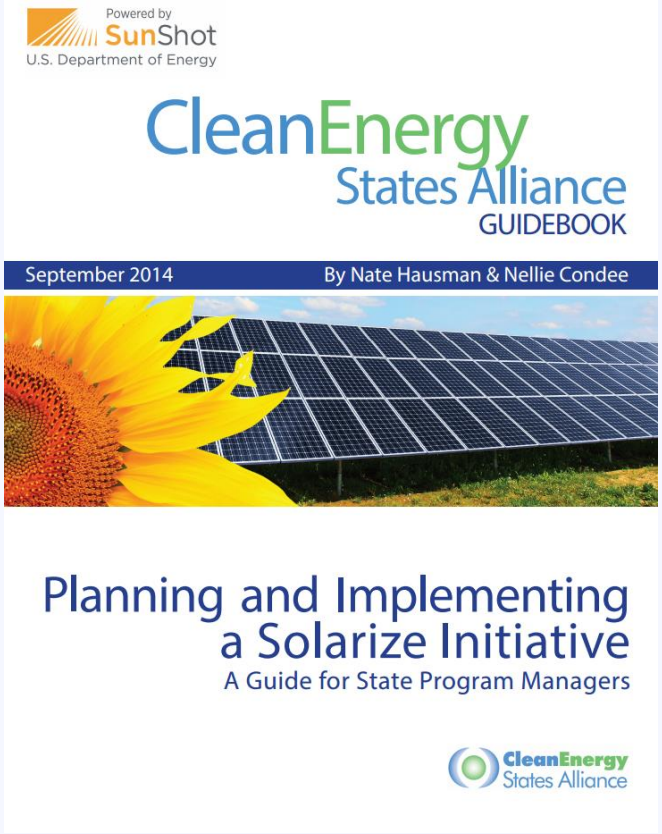
www.nrel.gov



Solarize: Resources

Resource **Planning and Implementing a Solarize Initiative**

Presents two successful state-driven Solarize programs (Solarize Mass and Solarize Connecticut) to provide best practices to stakeholders interested in replicating these successes.



Powered by SunShot U.S. Department of Energy

http://solaroutreach.org/wp-content/uploads/2014/04/CESA-Solarize-Guide-September-2014-Final.pdf

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

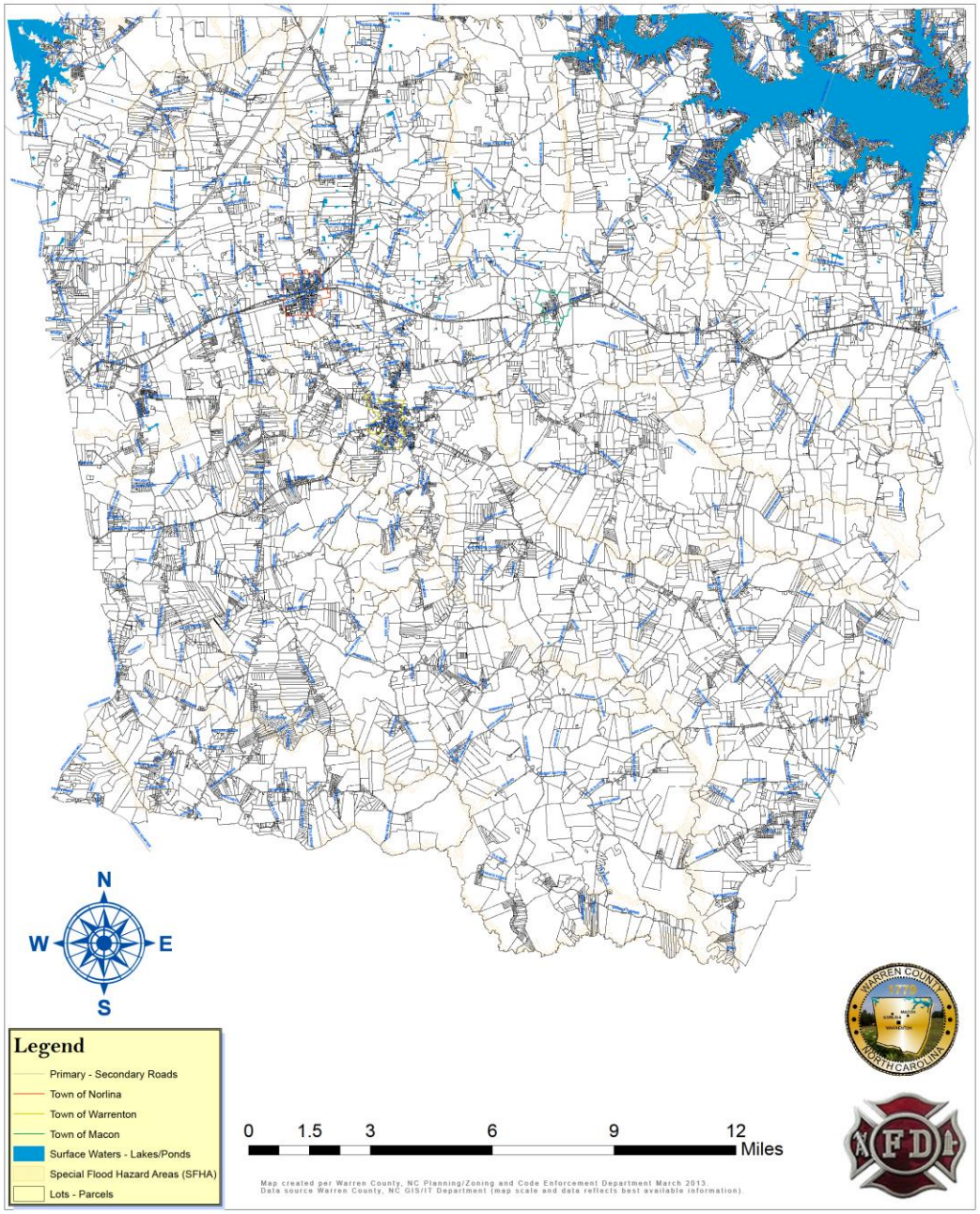
Solar Powering Your Community
Kerr-Tar C.O.G. Workshop
August 20, 2015

Warren County, NC
Sites and Permitting
Review/Process

Warren County, NC ……..

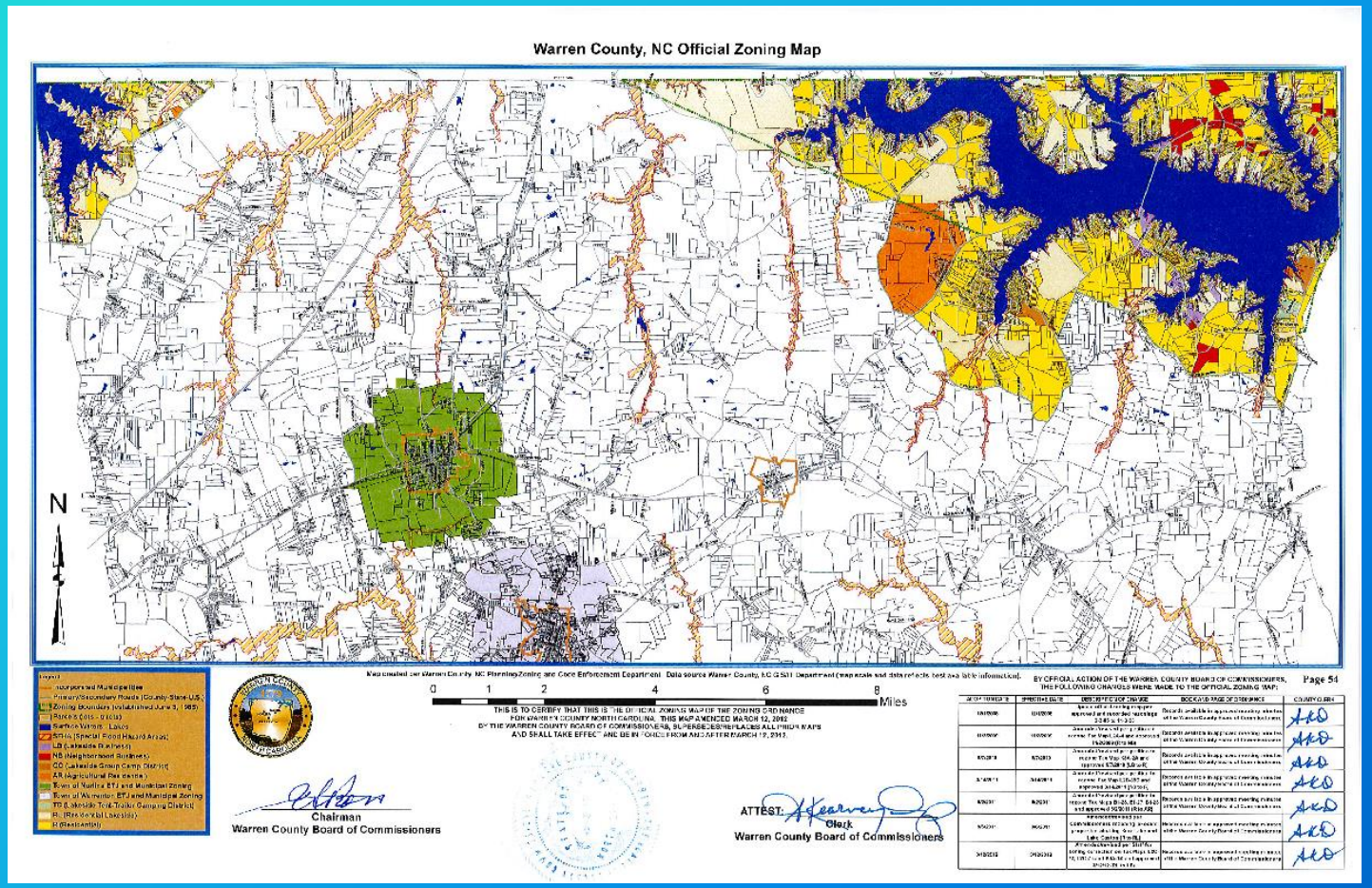
- Tier 1 County, predominantly agricultural.
- Three incorporated municipalities: Warrenton, Norlina and Macon.
- Population of 20,962 with a land area of 444 square miles (15 square miles of water inclusive of Kerr Lake and lake Gaston) .
- Rural county with low-population density.

Warren County, NC Base Map 2013



There are TWO Warren Counties…..

- Zoned (areas of Kerr Lake & Lake Gaston) and un-zoned (everywhere else - minus the Towns of Warrenton and Norlina).



Solar Farm Permit Requirements UN-ZONED AREAS (SIMPLE process)

- Apply for and obtain an E-911 address (police, fire and rescue need to know where to go for an emergency).
- Development permit ($50.00).
- Building permit ($60.00 non-residential electrical permit).
- Erosion and sedimentation control plan (permit approval) from NC-DENR Land Quality Section (sites are more than one-acre of land disturbance) – approval letter/permit to the Warren County Planning and Zoning Administrator.
- NC-DOT driveway permit – approval letter/permit to the Warren County Planning and Zoning Administrator.
- ***BUT***, if a solar farm locates in a zoned area (closest approximate use = "radio, television, microwave towers, electric substations, high voltage power lines, transmission towers cell towers, relay stations, office and studios in conjunction with these") .....

Solar Farm Permit Requirements ZONED AREAS (a little LESS simple)

- Permitted (with a zoning permit) in AR zoning districts.
- Requires a CU permit (w/BOA approval) in these districts: LB (Lakeside Business), NB (Neighborhood Business), HB (Heavy Business), LI (Light Industrial) and HI (Heavy Industrial).
- Apply for and obtain an E-911 address (police, fire and rescue STILL need to know where to go for emergencies).
- Zoning permit ($75.00), unless a CU permit required ($250.00).
- Building permit ($60.00 non-residential electrical permit).
- Erosion and sedimentation control plan (permit approval) from NC-DENR Land Quality Section (sites are more than one-acre of land disturbance) – approval letter/permit to the Warren County Planning and Zoning Administrator.
- NC-DOT driveway permit – approval letter/permit to the Warren County Planning and Zoning Administrator.

Solar Farm CU Permit Requirements ZONED AREAS

- Towers shall not interfere with normal radio and television reception in the vicinity. Commercial messages shall not be displayed on any tower. Violations shall be considered zoning violations and shall be corrected under the enforcement provisions.
- Lighting shall not exceed the Federal Aviation Administration (FAA) minimum if lighting is required by the FAA. The lights shall be oriented so as not to project directly onto surrounding residential property, consistent with FAA requirements. Prior to issuance of a building permit, the applicant shall be required to submit documentation from the FAA that the lighting is the minimum lighting required by the FAA.
- Towers shall be constructed and maintained in conformance with all applicable building code requirements.
- In order to protect the public from unnecessary exposure to electromagnetic radiation, the tower owner shall provide appropriate Federal Communications Commissioner (FCC) documentation indicating that the power output levels do not exceed federally approved levels.
- In allowed districts, towers of seventy five (75) feet or more require that a Conditional Use Permit be granted by the Board of Adjustment. The Board of Adjustment may consider variances up to ten percent (10%) of the setback requirements for such towers as a part of the Conditional Use Permit approval.
- To encourage shared use of towers, no new tower shall be located within one (1) mile of an existing tower. The Board of Adjustment may allow a tower to be placed within one (1) mile of an existing tower upon being presented written documentation that (1) appropriate space on the tower is not available, (2) the new sponsor has made good faith efforts to negotiate an agreement with the owner of the current tower, or (3) equipment currently on the tower is not compatible with the proposed equipment. If the petitioner cannot locate on an existing tower and a new tower has to be constructed, the height of the tower cannot exceed two hundred (200) feet.
- All new towers shall be constructed to be able to accommodate at least two users so that future co-location will be available. In addition, reasonable accommodation for public service uses is recommended.
- Towers shall conform to the following dimensional requirements: (1) With the exception of concealed towers, such structures may not be located on top of structures in any residential district. Towers which are located on top of structures in nonresidential districts which are not tower accessory structures shall not be more than seventy five (75) feet above the top of the structure. The structure shall meet the normal setbacks of the zone. (2) Those located on the ground or top of a tower accessory structure are required to incorporate a fall zone buffer which is a land buffer around a tower base to provide for containment of the tower to the site in the event that it falls.
- To encourage shared use of towers, applications for towers which will operate with more than one user, immediately upon completion may reduce setbacks from adjacent nonresidential property. The setback from adjacent nonresidential property may be reduced by twenty five percent (25%) when two users occupy the tower immediately upon its completion, or reduced by fifty percent (50%) when three or more users commit to occupy the tower immediately upon its completion. However, the required setback distance may not be reduced to less than fifty (50) feet. The reductions do not apply if the tower adjoins a residential zone on any side and a fall zone buffer as identified in this ordinance shall be required.
- No setbacks shall be required if the tower is to be located on an existing structure, and a fall zone buffer as identified in this ordinance shall be required.
- Towers (with the exception of concealed towers) where allowed in residential districts shall conform to the following additional setback requirements:: 1) To prevent a clear view of the base of the tower, the setback shall contain an established forested area with a depth of at least one hundred (100) feet. (2) When the one hundred (100) foot forested area requirement note above cannot be met, a natural buffer shall be provided as required in this ordinance. (3) The Board of Adjustment, when deciding the Conditional Use Permit, may reduce the setback adjacent to nonresidential property upon consideration of circumstances which reduce the offsite effects of the tower such as topography, berms, the proximity of other existing or potential uses, and existing vegetation and improvements made to the site to obscure or reduce the visibility of the tower (a fall zone buffer as identified in this ordinance shall be required).. (4) The Board of Adjustment shall not reduce the required setback from adjacent property which has residential use.
- No outdoor storage yards shall be allowed on tower sites, storage buildings that are secondary and/or incidental to the primary use of the site are allowed within the provisions of the designated zoning category.
- The base of the tower, any guy wires, and any associated structures, walls or fences shall be surrounded by a landscaped buffer. The developer may have the option of: (1) providing a buffer around the tower base and associated items individually or (2) providing a buffer around the perimeter of the entire site. A ten (10) foot vegetative buffer shall be provided between the tower and the property boundaries in all zones other than residential. In all residential zones, the vegetative buffer shall be a minimum of twenty five (25) feet in width.

- **ETC, ETC, (more pages in the Zoning Ordinance).....**

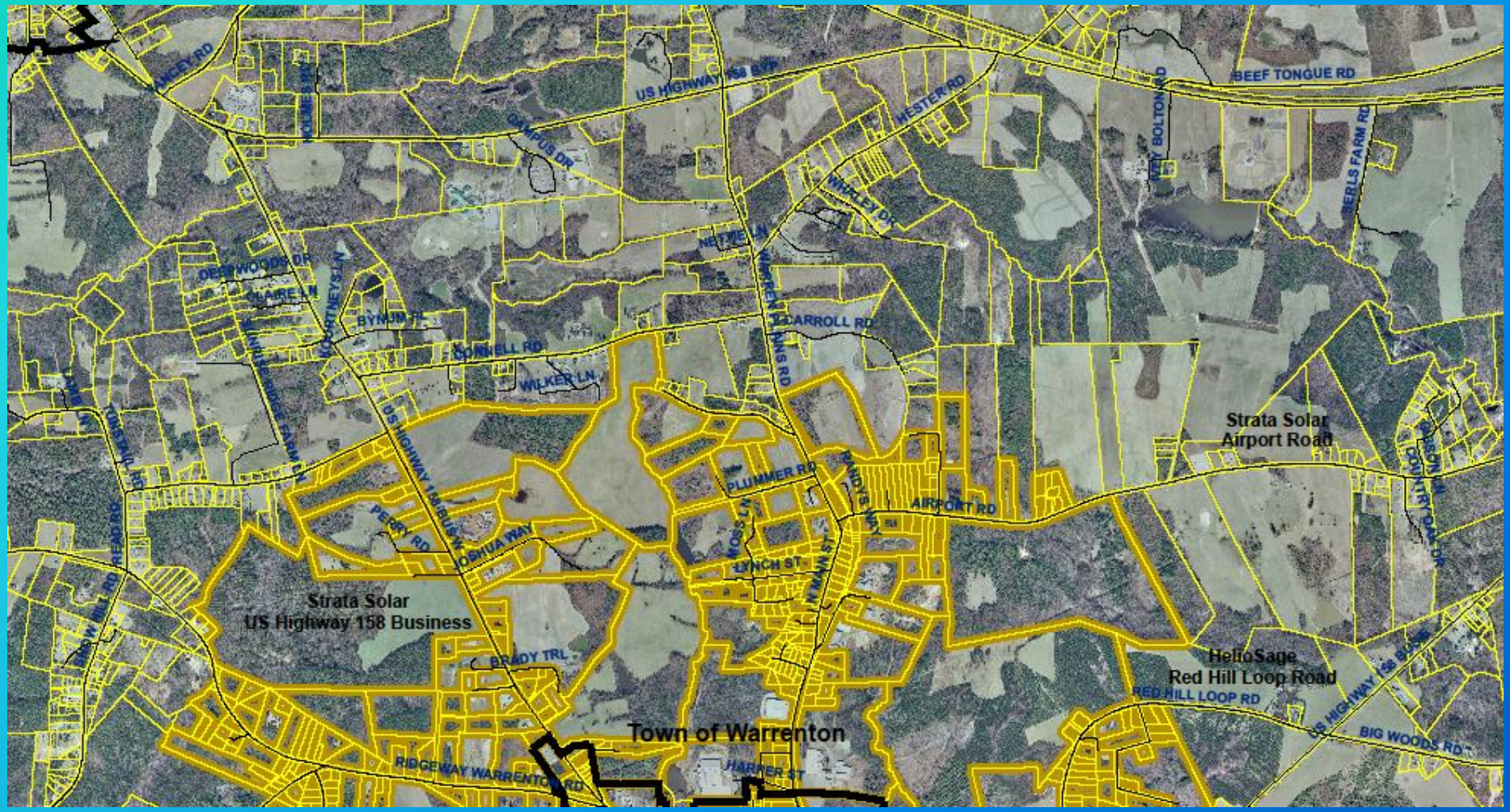
Buffer Requirements
ZONED AREAS (all uses)

- Buffers are those features that preserve existing vegetation and minimize potential erosion by providing a natural buffer (PB/BOA may allow appropriate existing vegetation to substitute for landscape requirements).
- Buffers are permitted to be located within the setbacks (minimum yards) of the development or individual lot/parcel for the respective zoning district (a buffer is not in addition to the setback requirements).
- If a lot or parcel adjacent to new development is vacant, then no buffer is required, except when it's required for specific protection of natural resources per Warren County regulations and/or NC-DENR regulations.
- Between incompatible land uses the developer shall either maintain to the maximum extent feasible a twenty foot (20') buffer of undisturbed natural area or provide an appropriate level of vegetative replanting as determined by the Planning and Zoning Administrator.
- If the new development incorporates a solid wall, opaque wood fence or other approved materials is proposed then a fifty percent (50%) reduction is to be allowed in the depth of the buffer and plant material.
- Buffers shall leave space for an ingress /egress and shall be maintained (damage to the buffer shall be remedied within 14 days).

Warren County
Solar Farm Locations

- Three active-built sites: Warrenton (ETJ) on Hicksville Rd, County (just outside Warrenton's ETJ) on Red Hill Loop Rd and Airport Rd
- Two in the works: County (Soul City) on Crescent Dr and US Highway 158 between Macon &Vaughn
- As of August 20, 2015 another three proposed (one on Norlina's ETJ, one in Warrenton's ETJ and one potentially in the Lake Gaston area)
- Companies include (not limited to) Strata Solar, HelioSage, FLS Energy and Sunlight Partners

Active Solar Farm Site Locations



Strata Solar
US Highway 158 – Warrenton ETJ

- All zoning authority/permitting through the Town of Warrenton – R20 District (building permit issued by Warren County).
- "Utilities" use requires a special use permit (Warrenton SU #303-BOA approved 5/14/12).
- Site is 32 acres leased for the solar farm out of 145 total acres.
- 5.58 MW system with 23,520 modules (panels) on mounted racking system (supports are posts driven into ground – avg. 8 ft. depth).

Strata Solar - Airport Road

- Warren County development permit, building permit, NC-DENR approval and NC-DOT approval.
- Site is 33 acres leased for the solar farm out of 325 total acres.
- 5 MW system with 21,660 modules (panels – fewer # due to higher wattage panels) on mounted racking system (supports are posts driven into ground – avg. 8 ft. depth).

HelioSage – Red Hill Loop Road

- Warren County development permit, building permit, NC-DENR approval and NC-DOT approval.
- Site is approx. 50 acres leased for the solar farm out of 283 total acres.
- 5 MW system with 22,000 modules (panels)

Contact Information

- **Ken Krulik, Planning and Zoning Administrator - Warren County Planning/Zoning and Code Enforcement Department**
- **252-257-7027**
- **KenKrulik@warrencountync.gov**

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

Activity: Solar in Your Community

1. Recognize successes
2. Identify opportunities
3. Select strategies & best practices
4. Outline implementation plan
5. Discuss barriers to implementation

Activity: Solar in Your Community

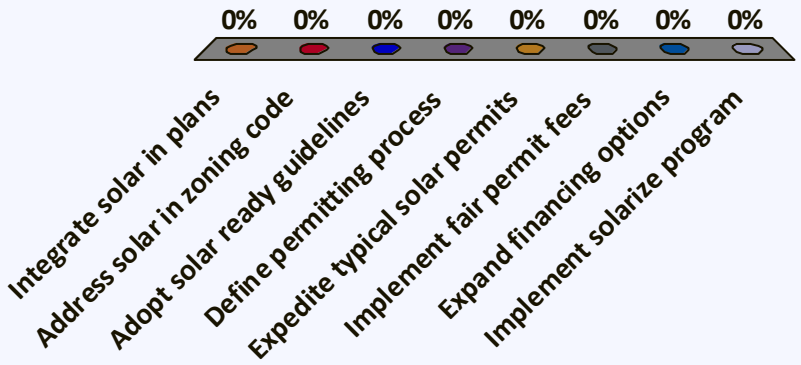
Part 1: Take 5 minutes to complete the questions in the *Developing Effective Solar Policies in Your Community* handout.

Activity: Solar in Your Community

Part 2: Spend the next 10 minutes discussing your responses to Questions 8 – 12 with the others at your table. Discuss strategies for overcoming potential obstacles to implementation.

Which "best practice" did you select to pursue first?

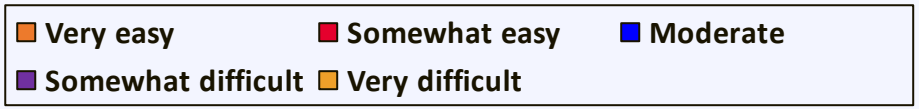
A. Integrate solar in plans
B. Address solar in zoning code
C. Adopt solar ready guidelines
D. Define permitting process
E. Expedite typical solar permits
F. Implement fair permit fees
G. Expand financing options
H. Implement solarize program



How difficult will it be to implement this policy/program?

1. Very easy
2. Somewhat easy
3. Moderate
4. Somewhat difficult
5. Very difficult

0%



Discussion

What obstacles stand in the way of implementation?

Discussion

What are possible strategies to overcome those obstacles?

Agenda

8:50 – 9:20	Putting Solar Energy on the Local Policy Agenda
9:20 – 9:50	State of the Local Solar Market
9:50 – 10:20	Federal, State, and Utility Policy Drivers
10:20 – 10:40	*Break*
10:40 – 11:10	Planning for Solar: Getting Solar Ready
11:10 – 11:45	Solar Market Development Tools
11:45 – 11:55	*Break*
11:55 – 12:30	Local Speakers
12:30 – 12:50	Developing a Solar Policy Plan for Your Community
12:50 – 1:00	Next Steps
1:00 – 2:00	Lunch & Networking

Activity: Next Steps

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

Powered by SunShot

U.S. Department of Energy

Ben Inskeep

Energy Policy Analyst

ben_inskeep@ncsu.edu

Kate Daniel

Energy Policy Analyst

kdaniel2@ncsu.edu

NC CLEAN ENERGY TECHNOLOGY CENTER