Regional Solar Workshop

Sept 26, 2013

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U.S. Department of Energy

NARC
Building Regional Communities

MAPC 50 YEARS
METROPOLITAN AREA PLANNING COUNCIL
SMART GROWTH AND REGIONAL COLLABORATION

Solar Powering Your Community

Addressing Soft Costs and Barriers

MAPC 50 YEARS
METROPOLITAN AREA PLANNING COUNCIL
SMART GROWTH AND REGIONAL COLLABORATION

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About the SunShot Solar Outreach Partnership

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

About the SunShot Solar Outreach Partnership

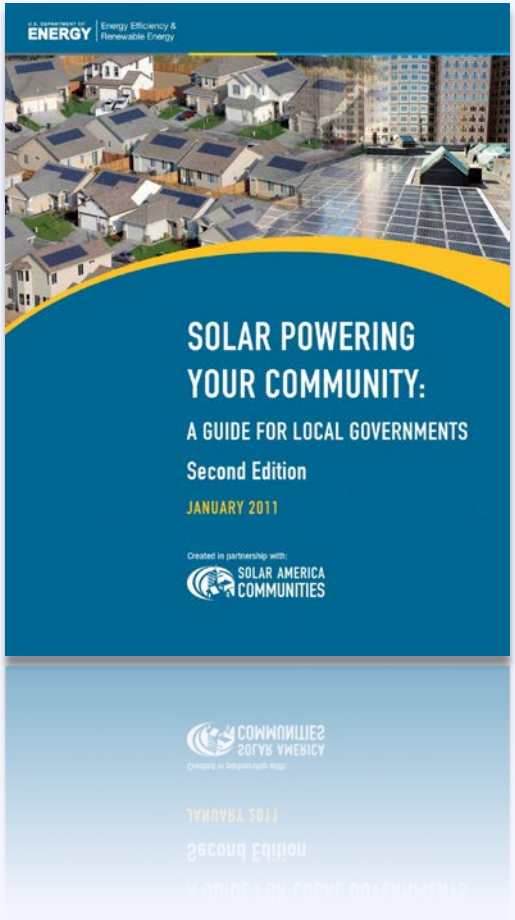
- Increase installed capacity of solar electricity in U.S. communities
- Streamline and standardize permitting and interconnection processes
- Improve planning and zoning codes/regulations for solar electric technologies
- Increase access to solar financing options

About the SunShot Solar Outreach Partnership

Resource **Solar Powering Your Community Guide**

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

www.energy.gov



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About the SunShot Solar Outreach Partnership

Resource Sunshot Resource Center

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

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

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About the SunShot Solar Outreach Partnership

Technical Support

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

www.solaroutreach.org

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Agenda

08:30 – 08:45	Welcome & Introductions
08:45 – 09:05	Interactive Activity: Benefits & Barriers
09:05 – 10:25	Promoting Solar Power in Your Community
10:25 – 10:35	*Break*
10:35 – 11:45	Solar Power on Public Properties
11:45 – 12:15	Best Practices & Local Examples
12:15 – 12:30	Wrap Up & Closing Remarks
12:30 – 01:30	Lunch & Expo

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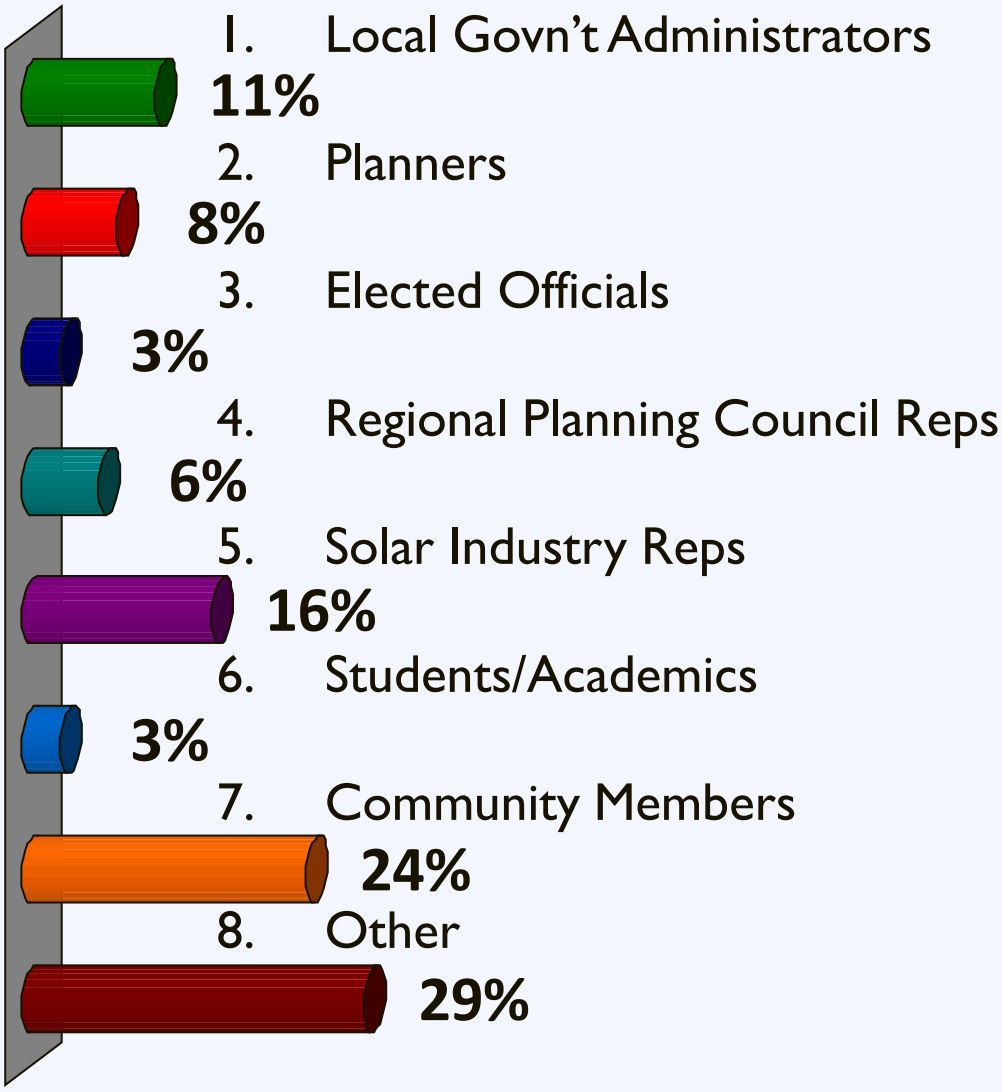
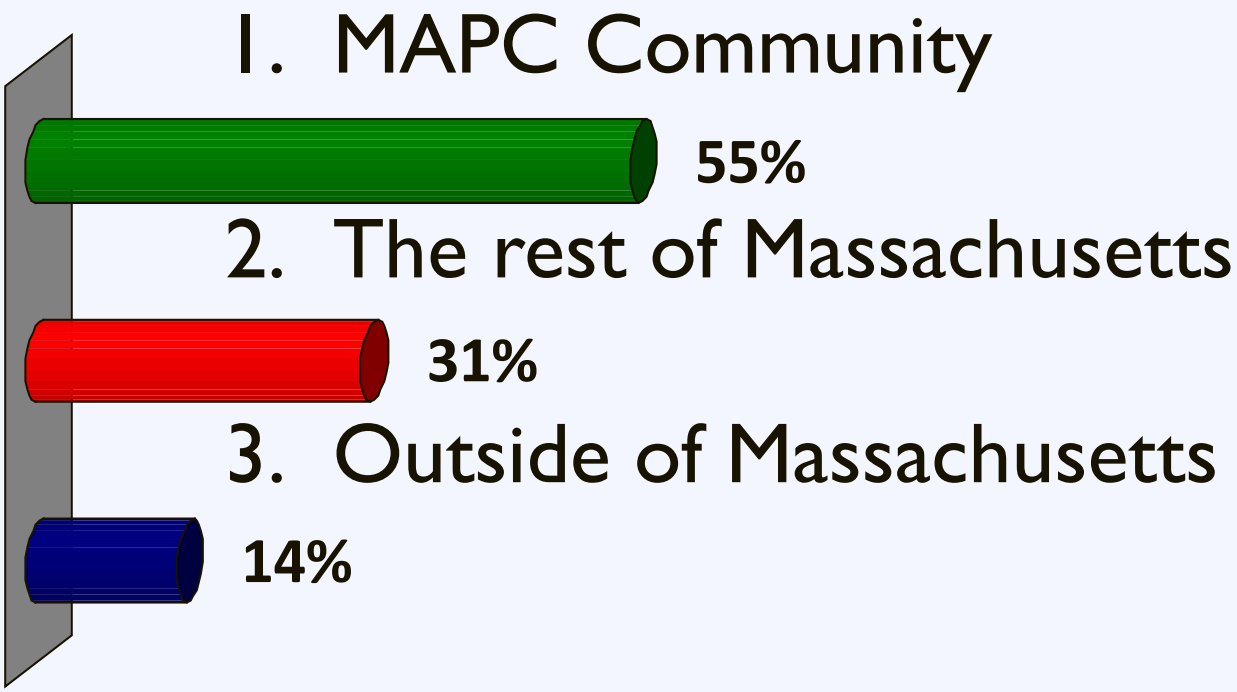
Who is in the room today?

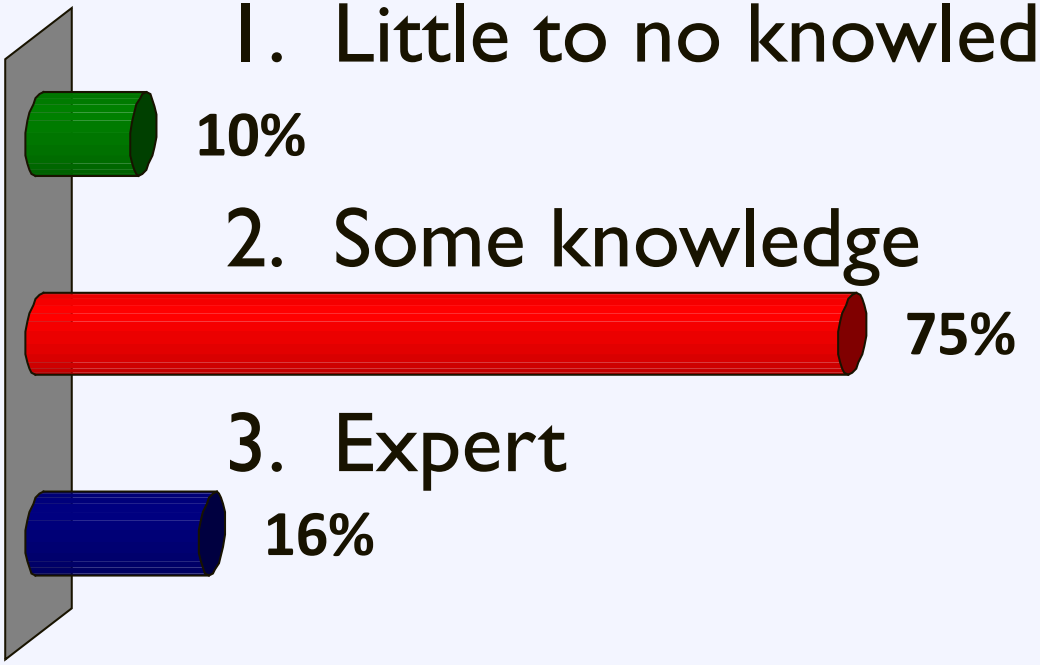


Where are you coming from?



How large is your community?

How familiar are you with solar?



Do you have solar at home / on your rooftop?

Solar Development in the US

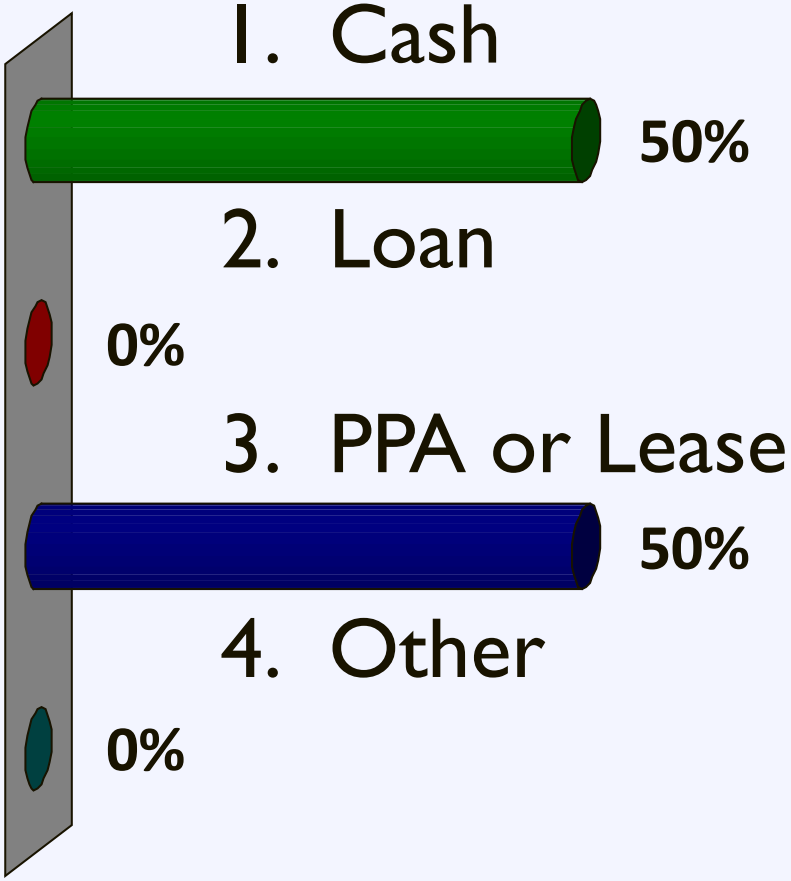
In 2012, the US solar industry installed

90,000 new solar installations

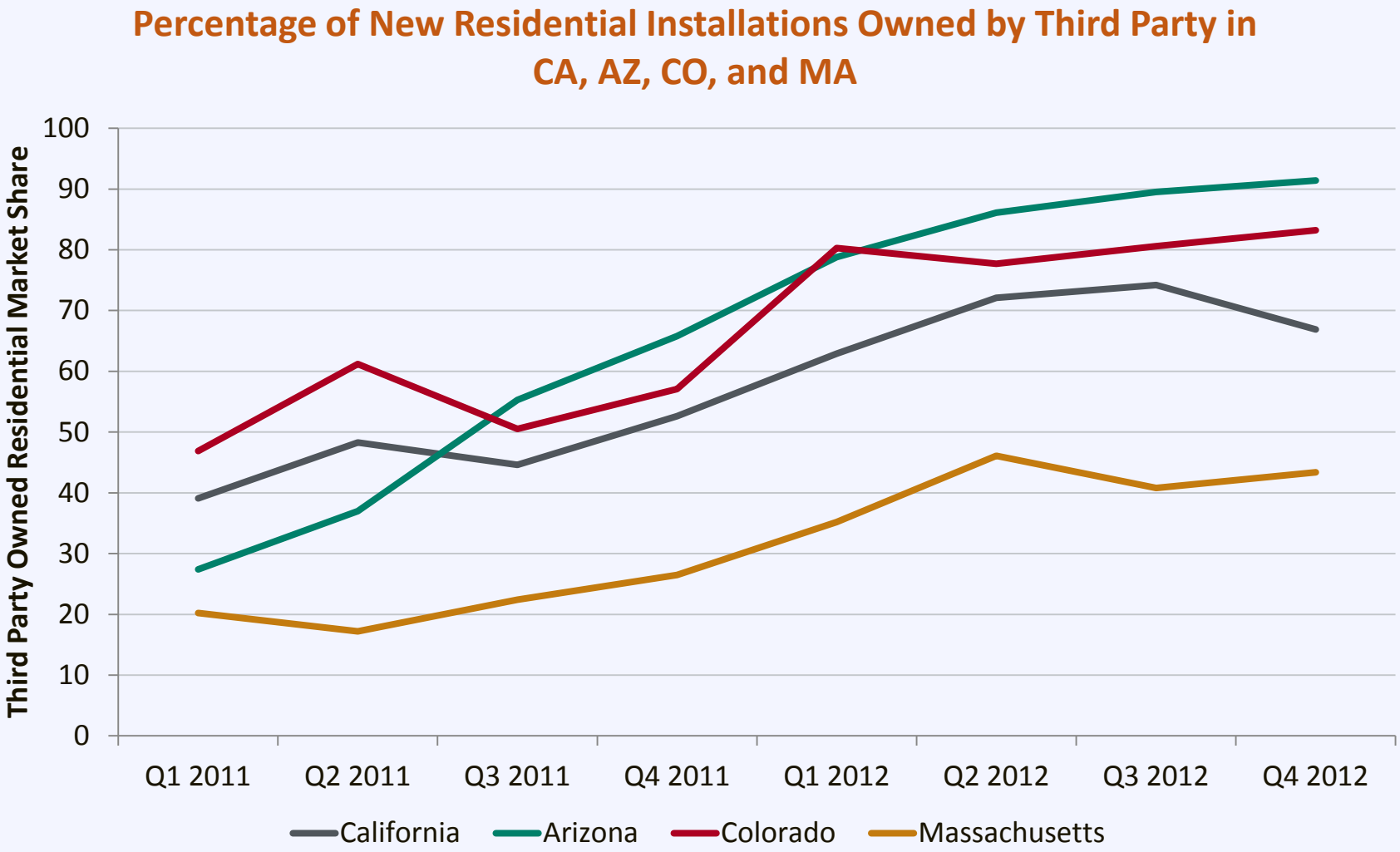
of which

93% were residential projects

If you have solar on your roof, how did you finance it?



PPA Adoption



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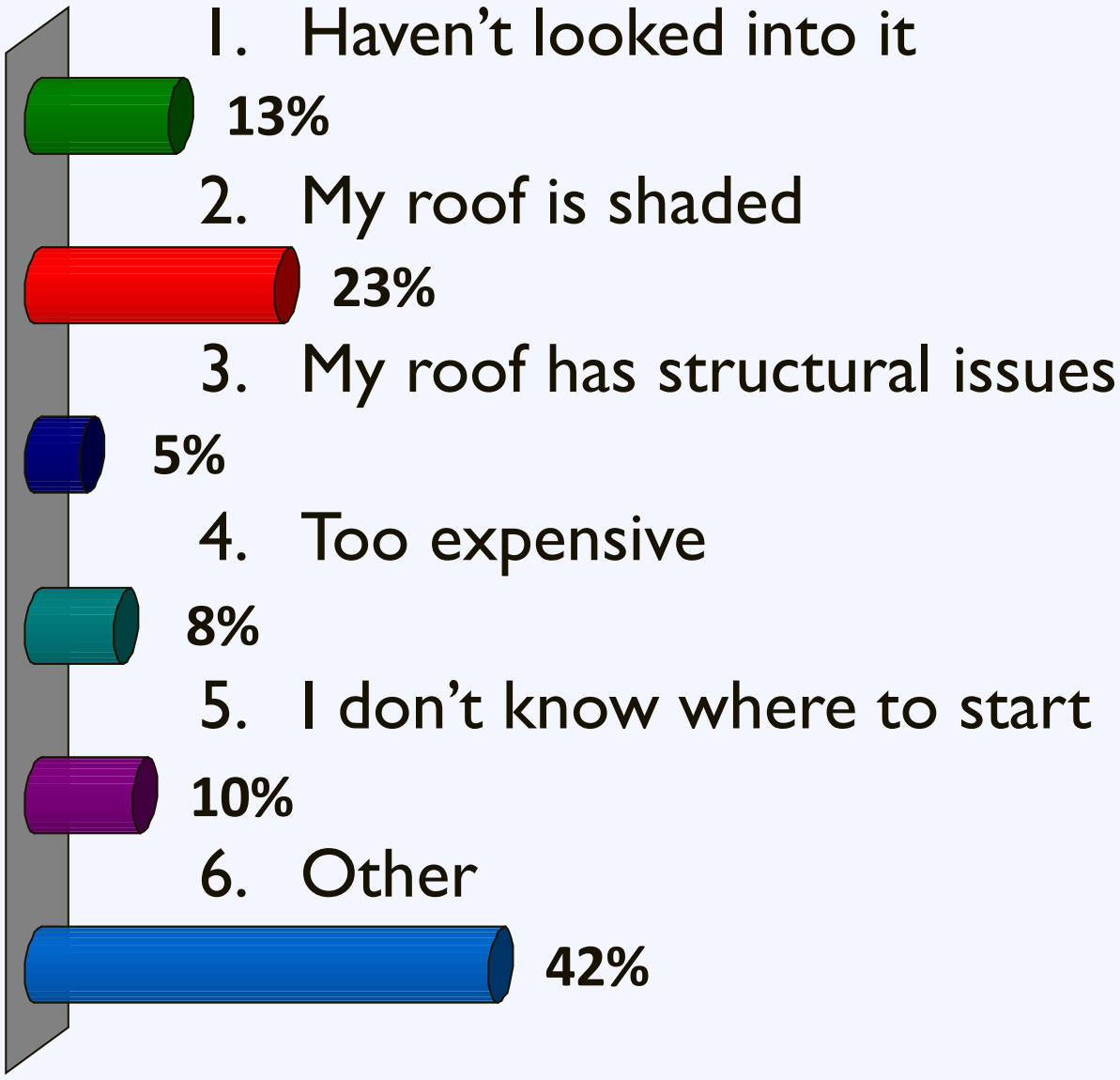
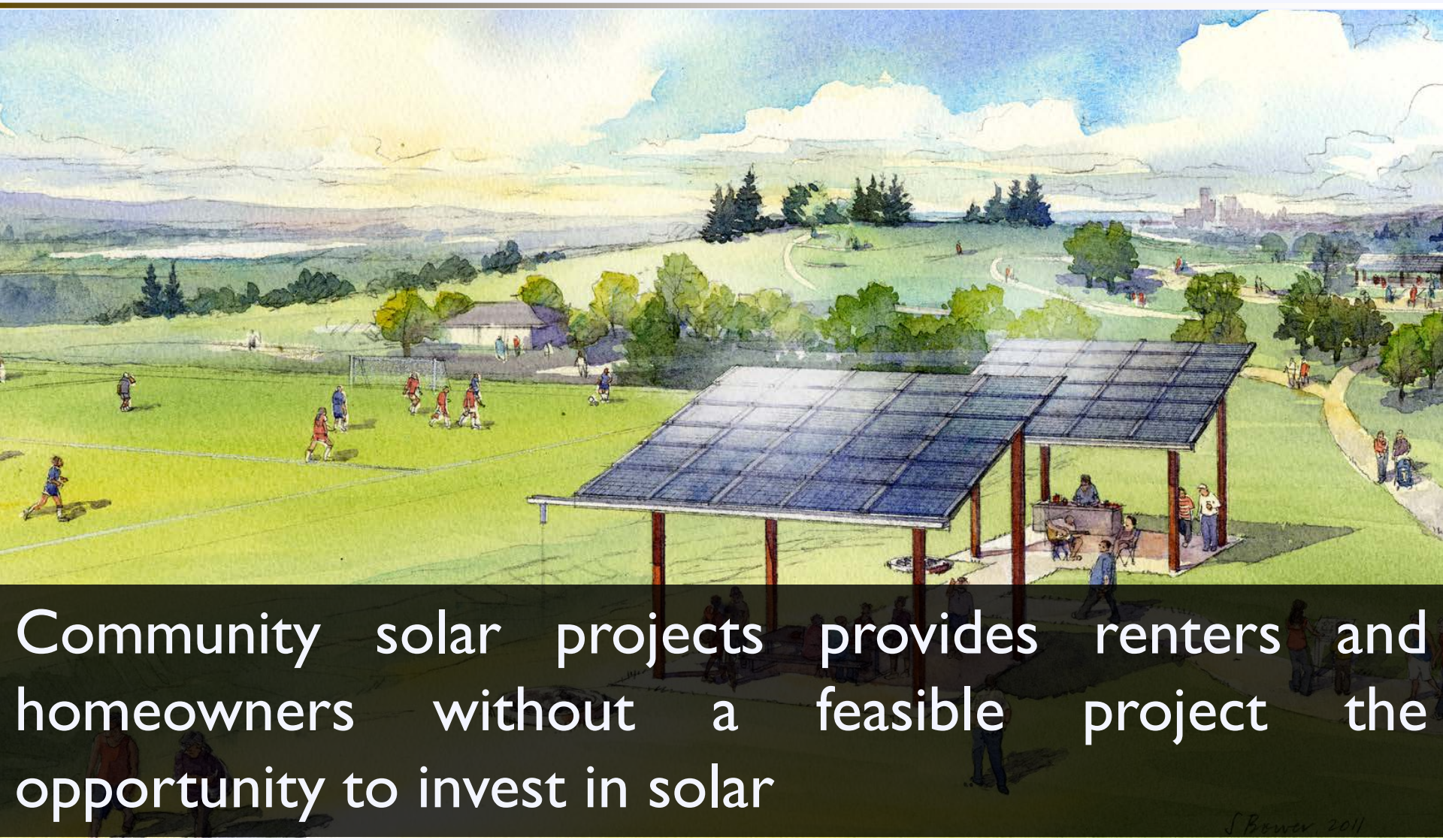
Source: GTM Research/ Solar Energy Industries Association, *U.S. Solar Market Insight 2012 Year-in-Review*

If you don't have solar on your roof, why not?



Community Ownership



Community solar projects provides renters and homeowners without a feasible project the opportunity to invest in solar

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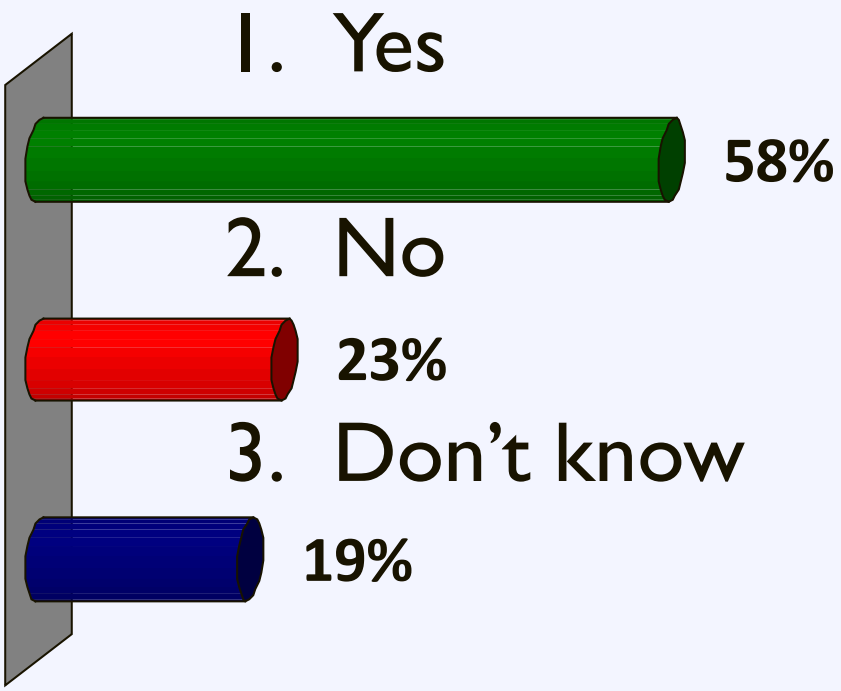
Source: Seattle City Light

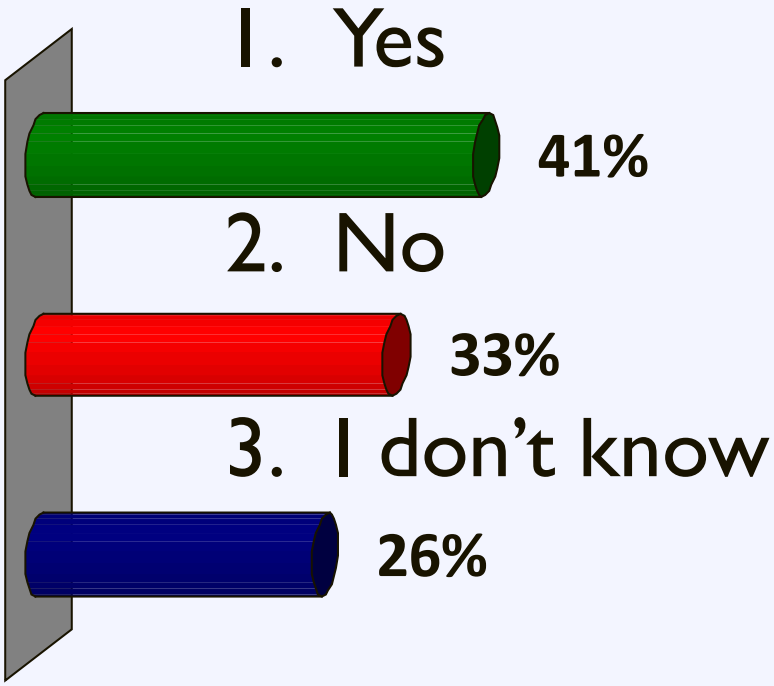
Does your local government have a solar installation?



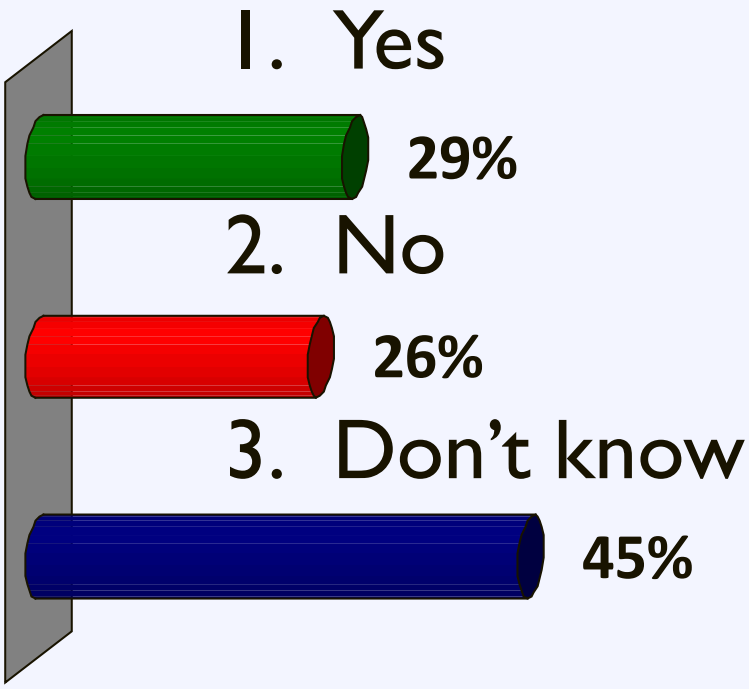
Benefit: Smart Investment for Government

Source: Borrego Solar

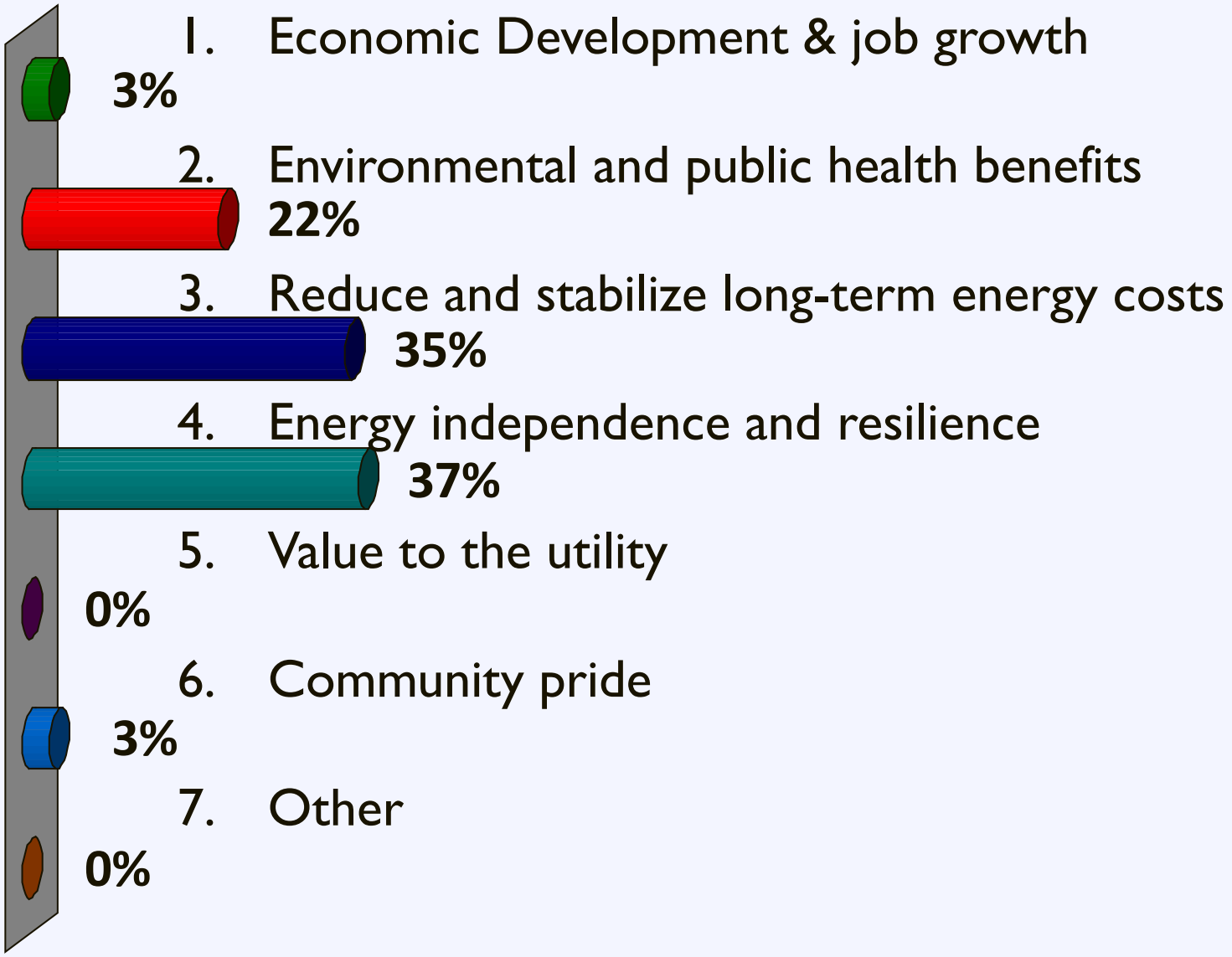
Is your local government a designated Green Community?



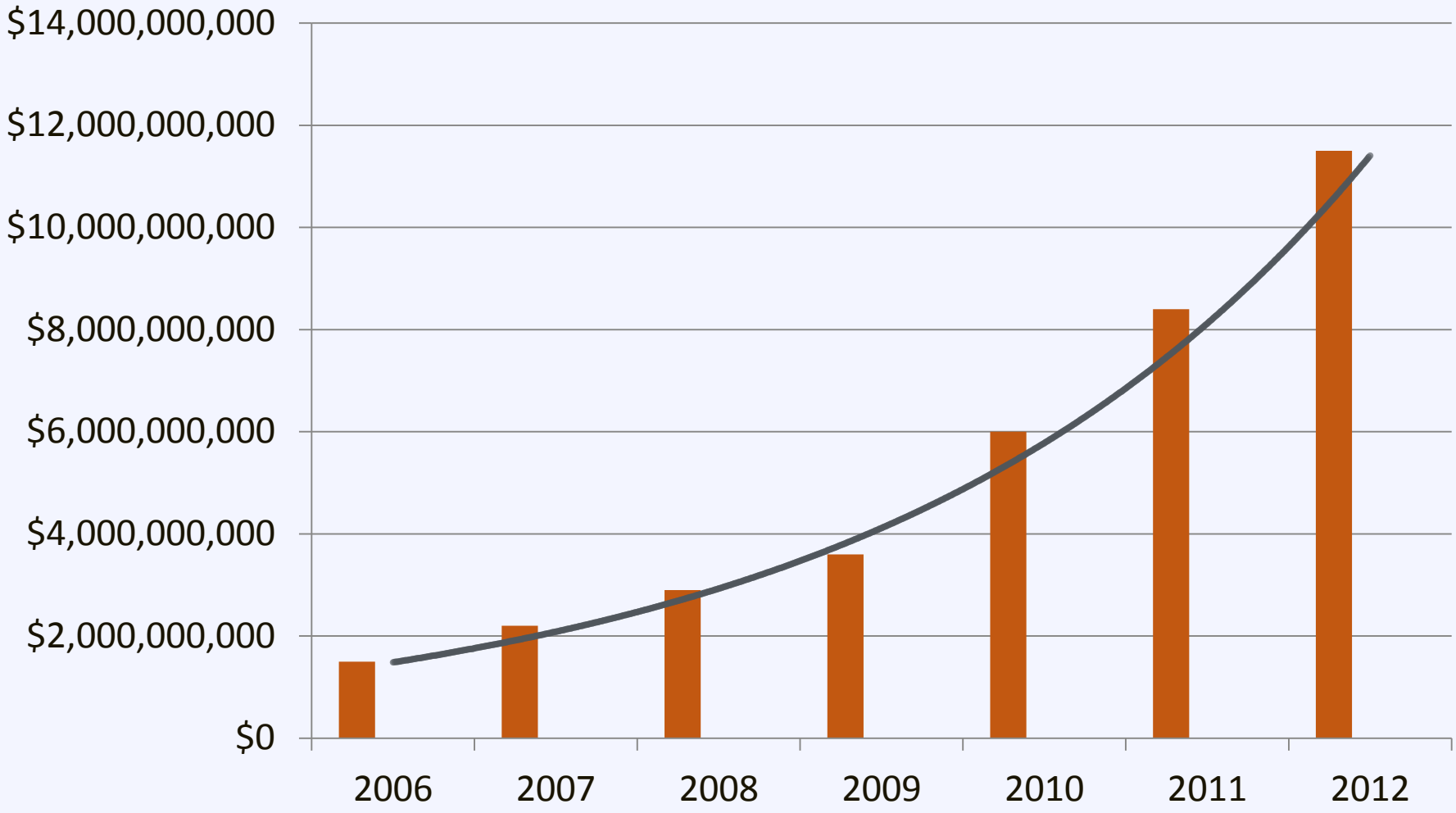
Has your local government addressed solar in the permitting process and/or zoning code?



What is the greatest benefit solar can bring to your community?

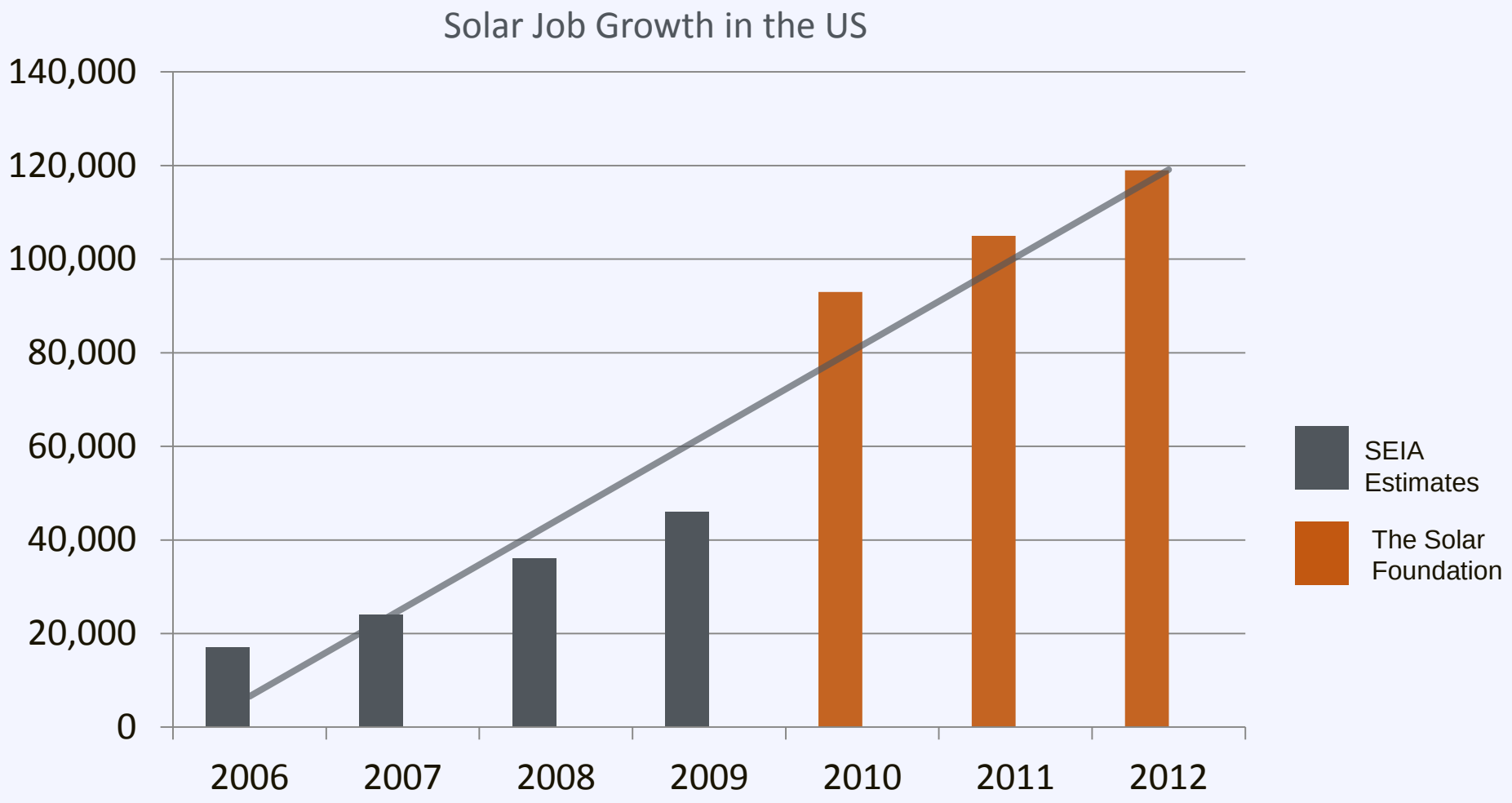


Benefit: Economic Growth



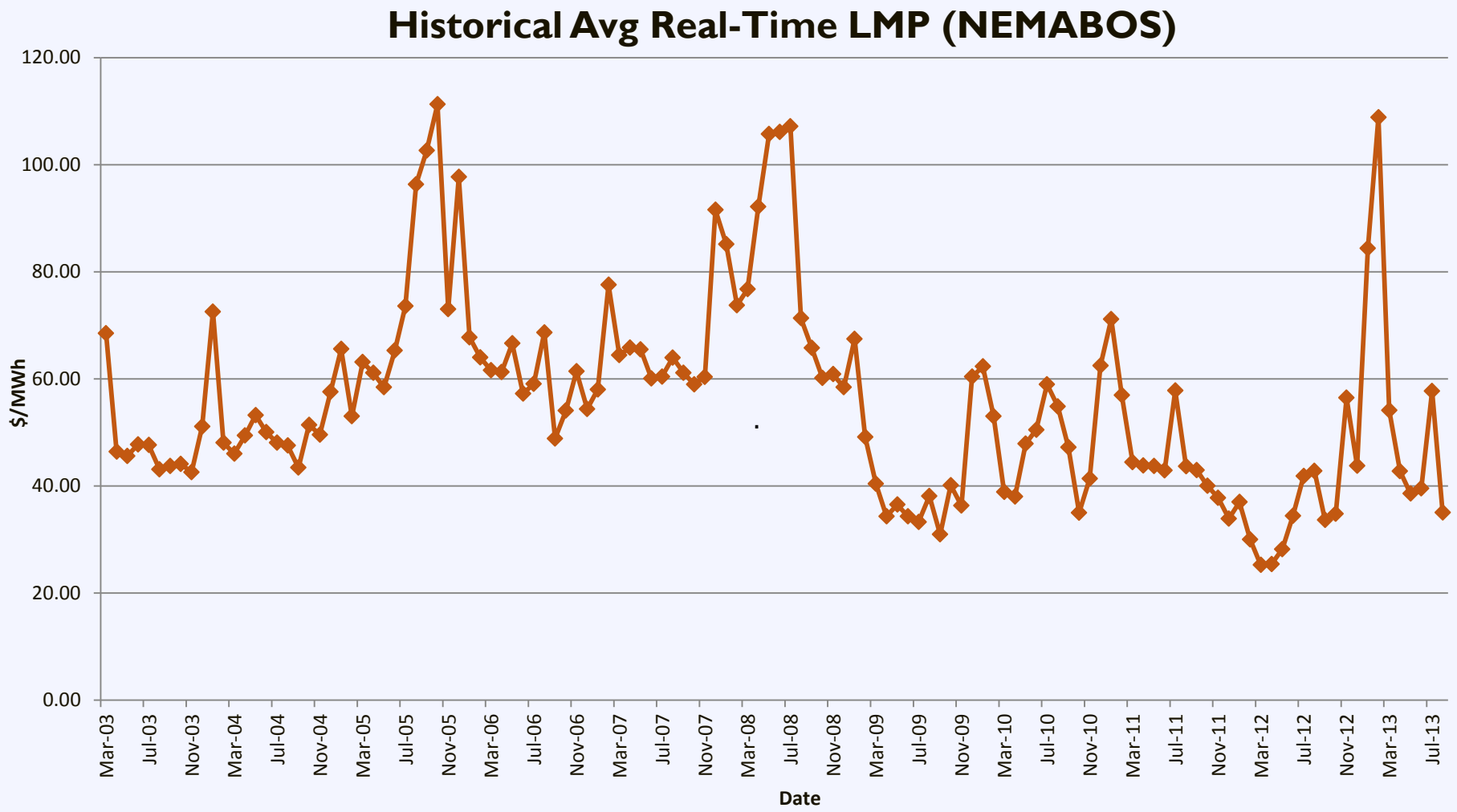
Source: SEIA/GTM Research – 2009/2010/2011/2012 Year in Review Report
http://www.seia.org/research-resources/us-solar-market-insight

Benefit: Job Growth



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

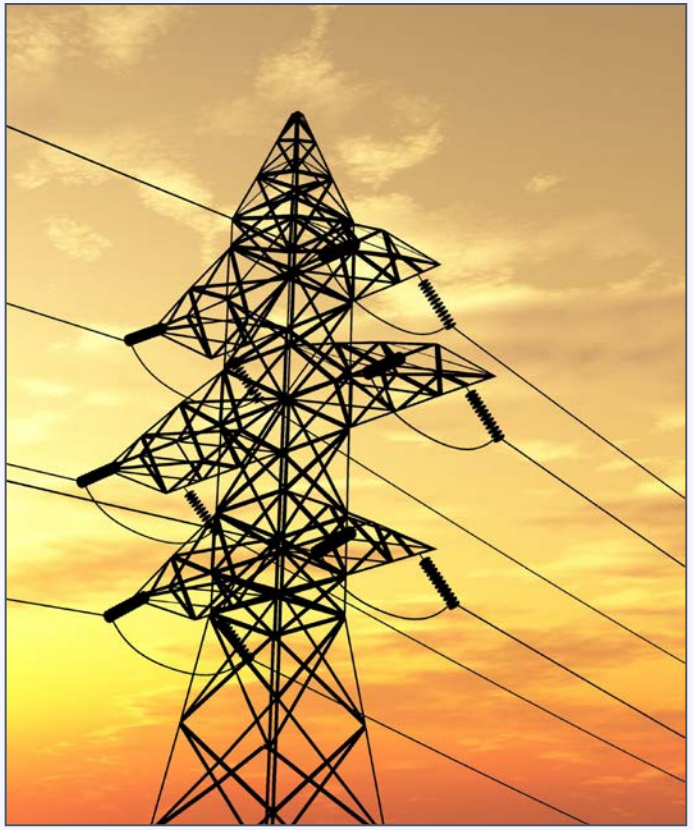
Benefit: Stabilize Energy Prices



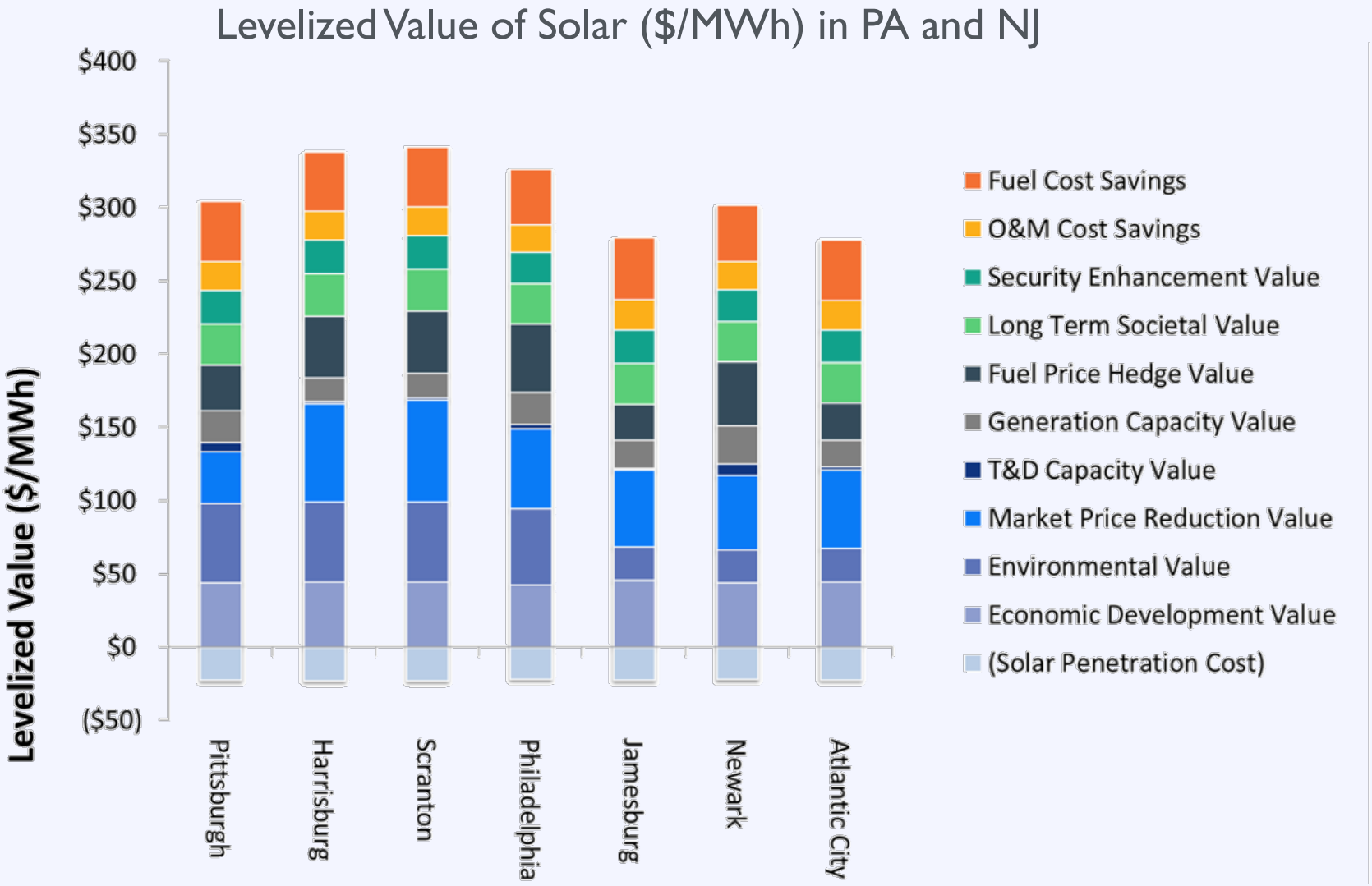
Source: ISO New England, Inc.

Benefits: Valuable to Utilities

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

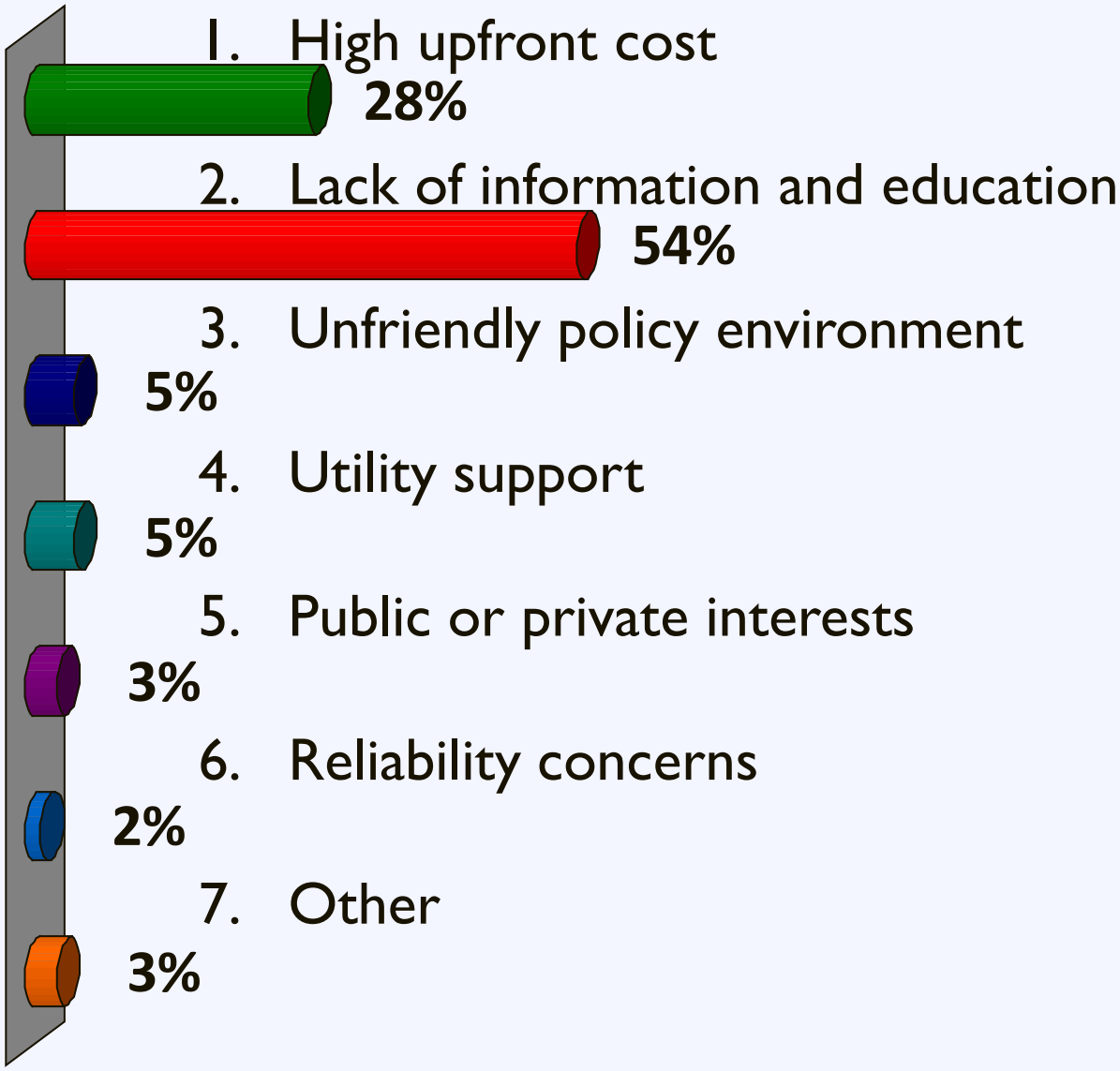


Value to Community & Utility

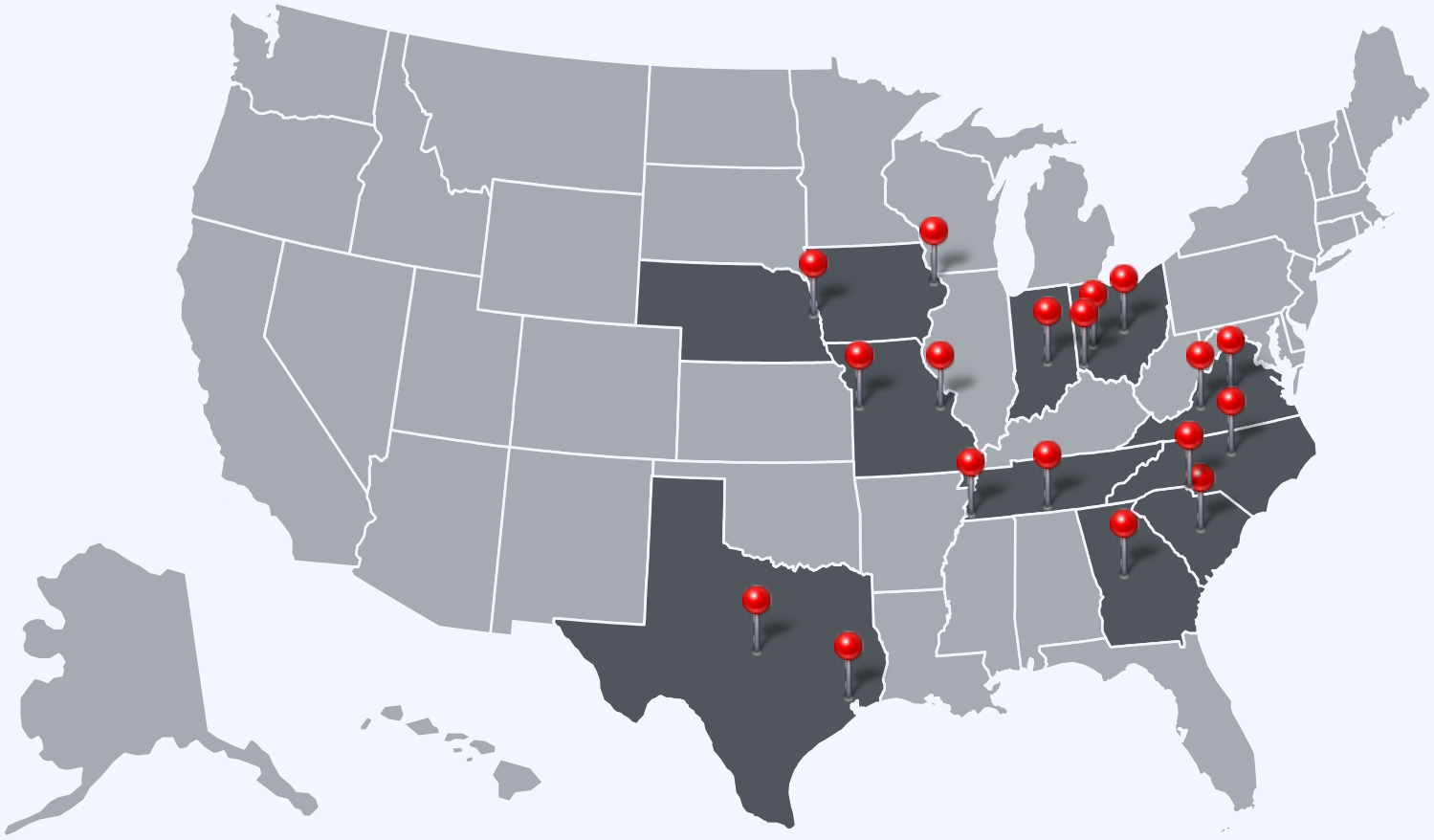


Source: Clean Power Research http://mseia.net/site/wp-content/uploads/2012/05/MSEIA-Final-Benefits-of-Solar-Report-2012-11-01.pdf

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



Activity: Addressing Barriers



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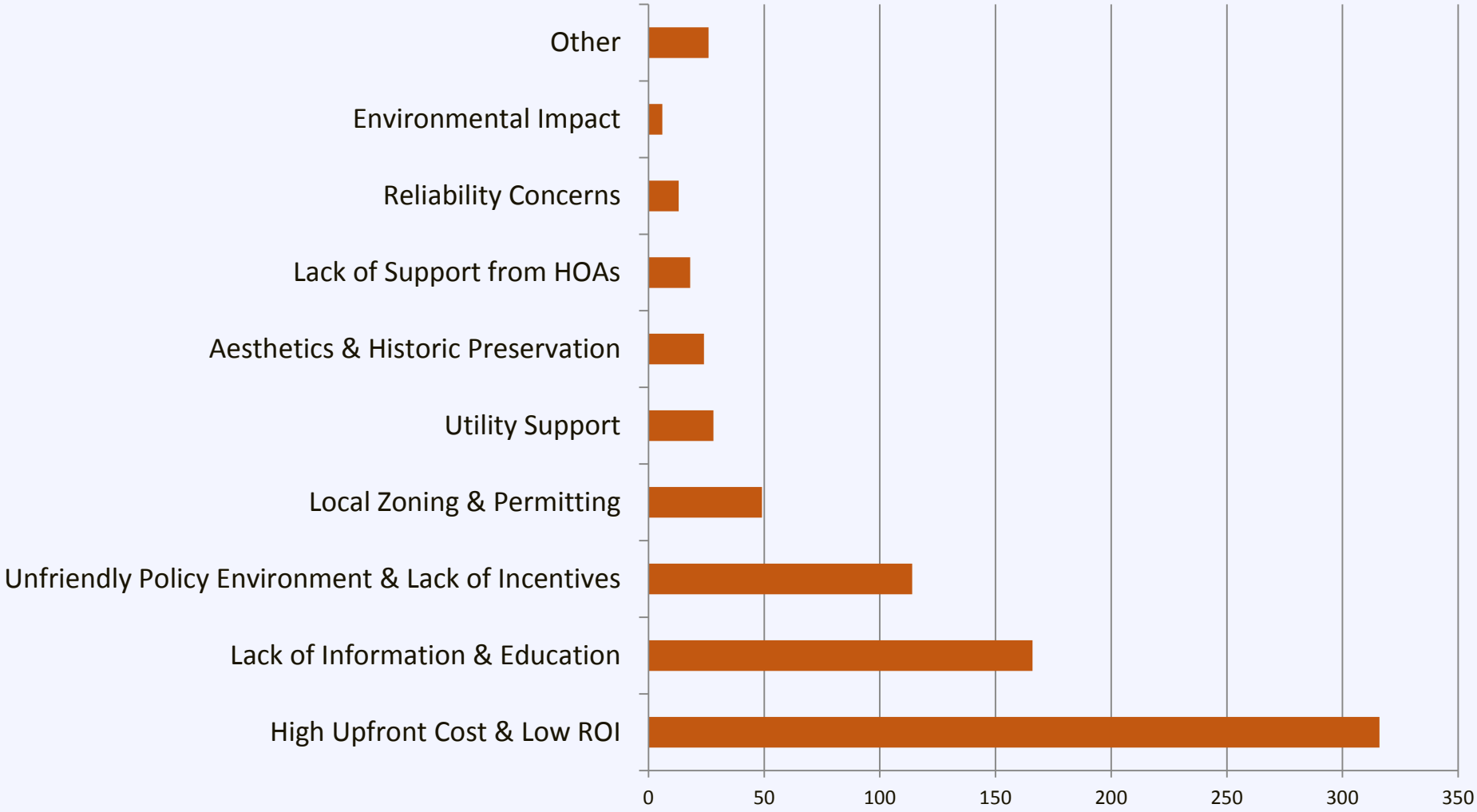
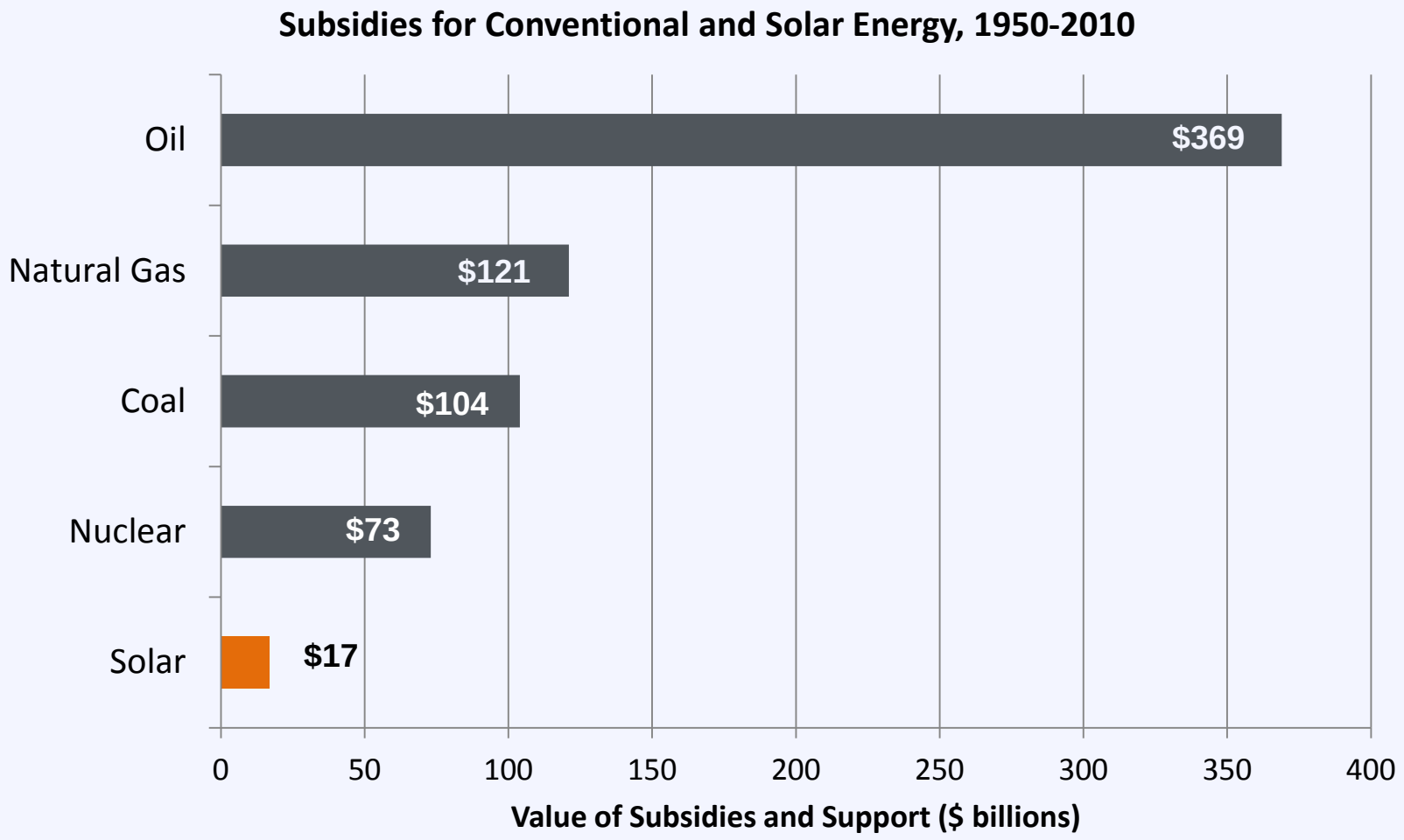


Subsidies and Support



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.*

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- Solar 101
- Solarize MA
- Mass Solar – Making it EZ

Solar Technologies

Solar Photovoltaic (PV)

Solar Hot Water

Concentrated Solar Power

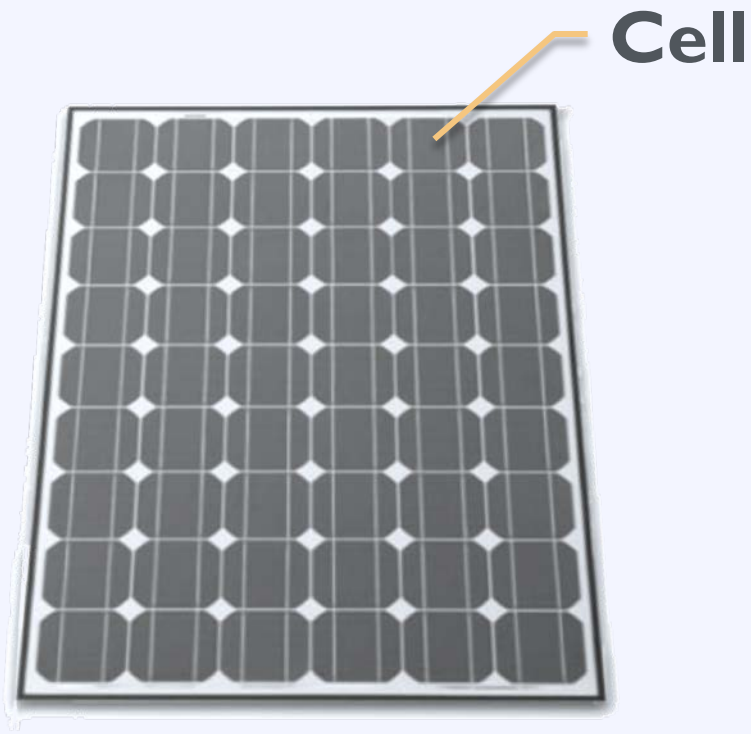
Solar Technologies

Solar Photovoltaic (PV)

Solar Hot Water

Concentrated Solar Power

Some Basic Terminology



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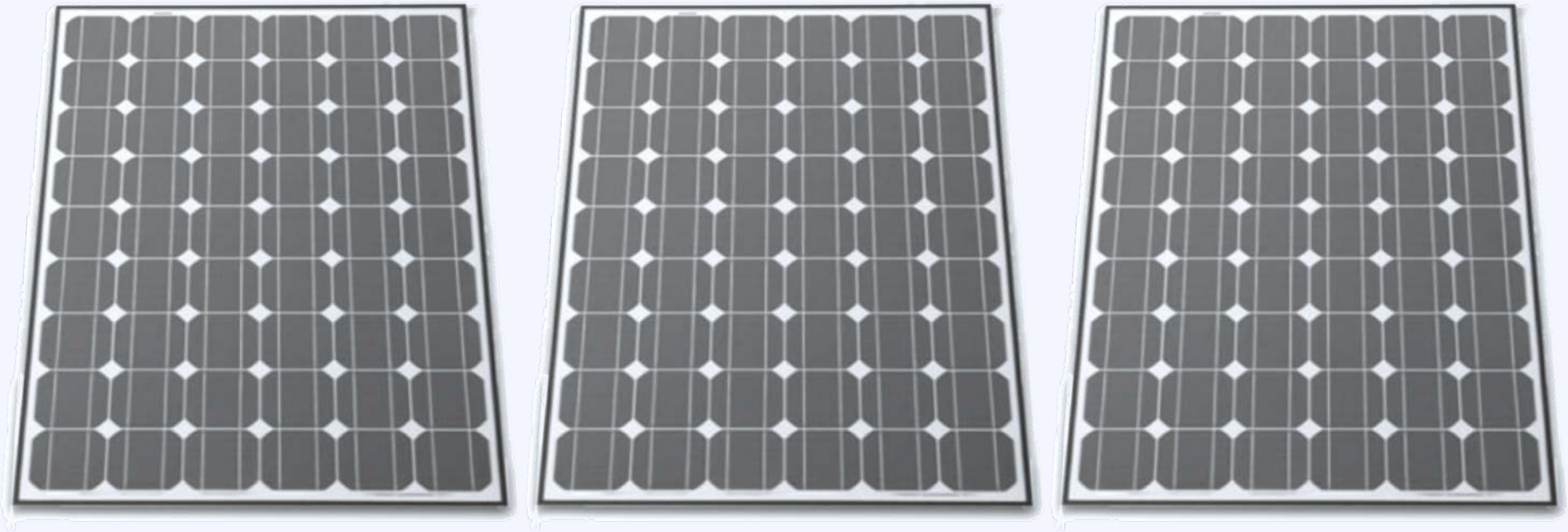
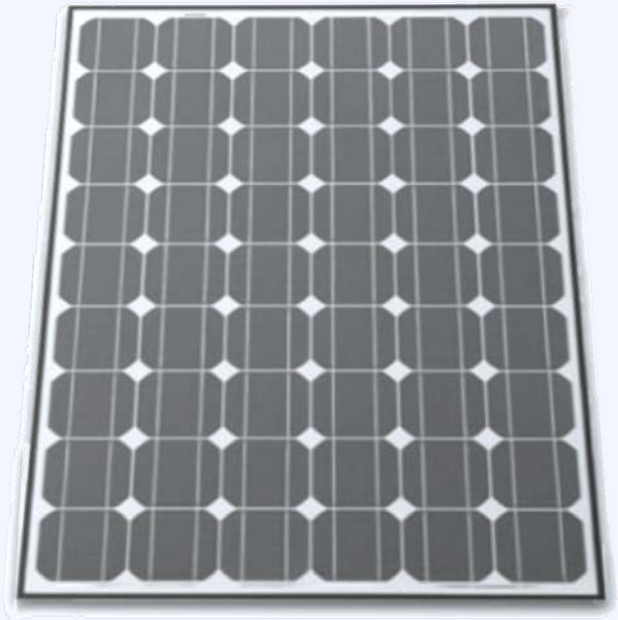


Array

Some Basic Terminology



Capacity / Power

kilowatt (kW)

Production

Kilowatt-hour (kWh)

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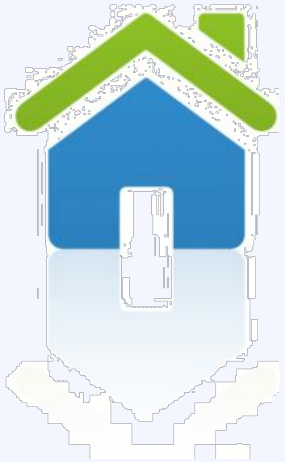
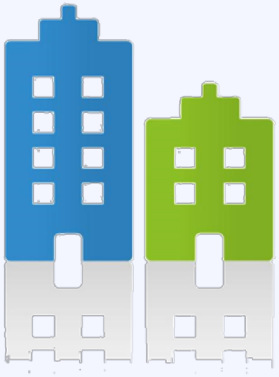
Some Basic Terminology



Residence
5 kW

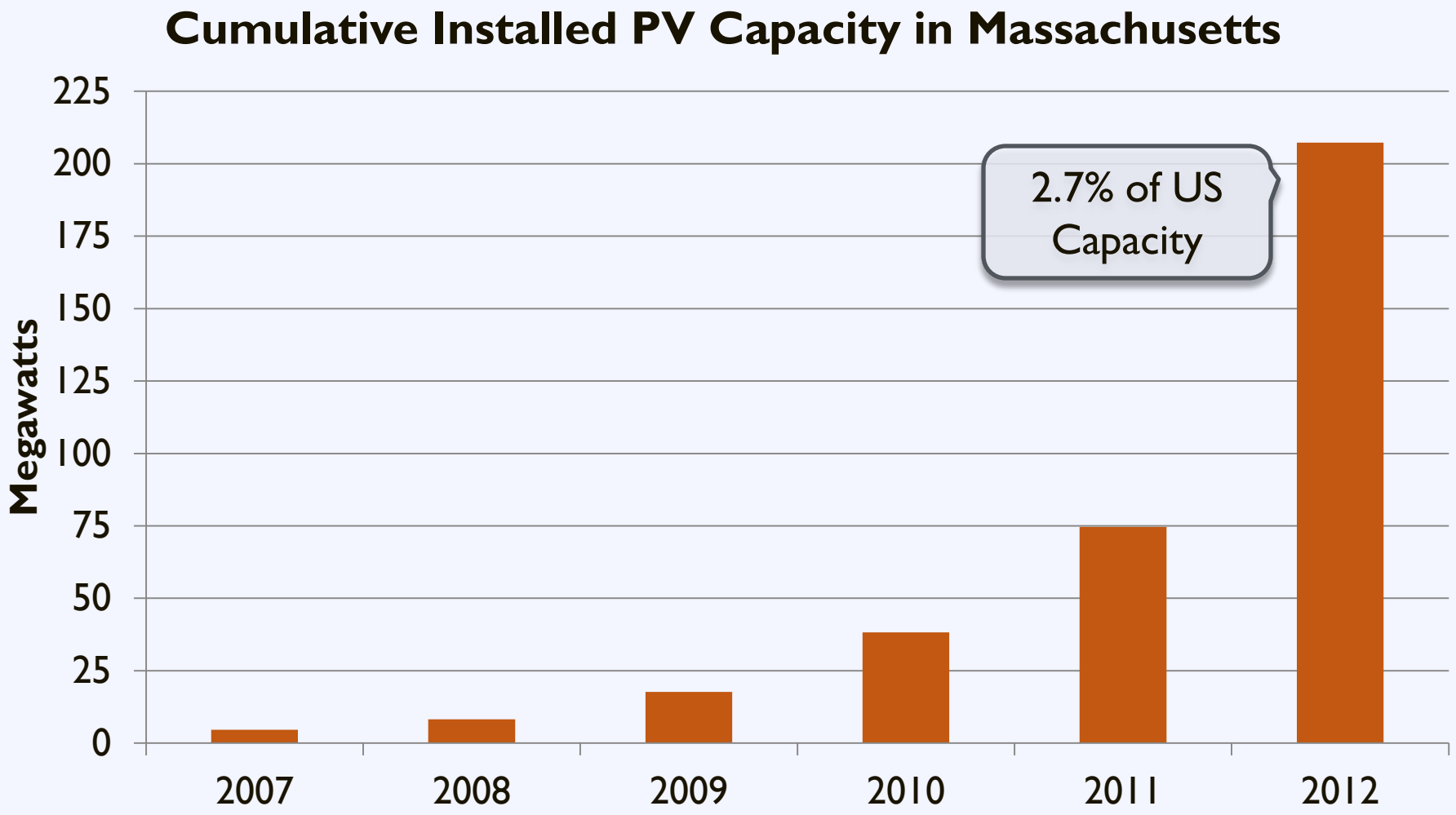
Factory
1 MW+



Office
50 – 500 kW

Utility
2 MW+

Massachusetts Solar Market



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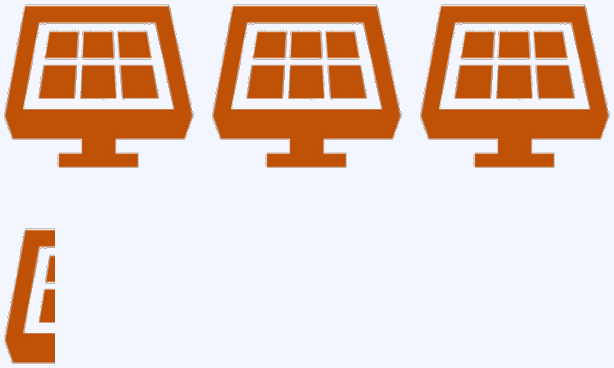
Source: IREC: US Solar Market Trends

Massachusetts Solar Market

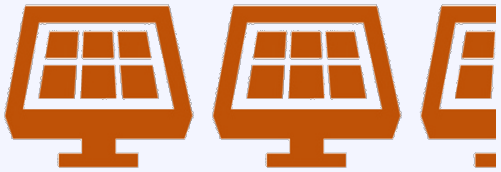
Massachusetts



31

watts per person

US



23

watts per person

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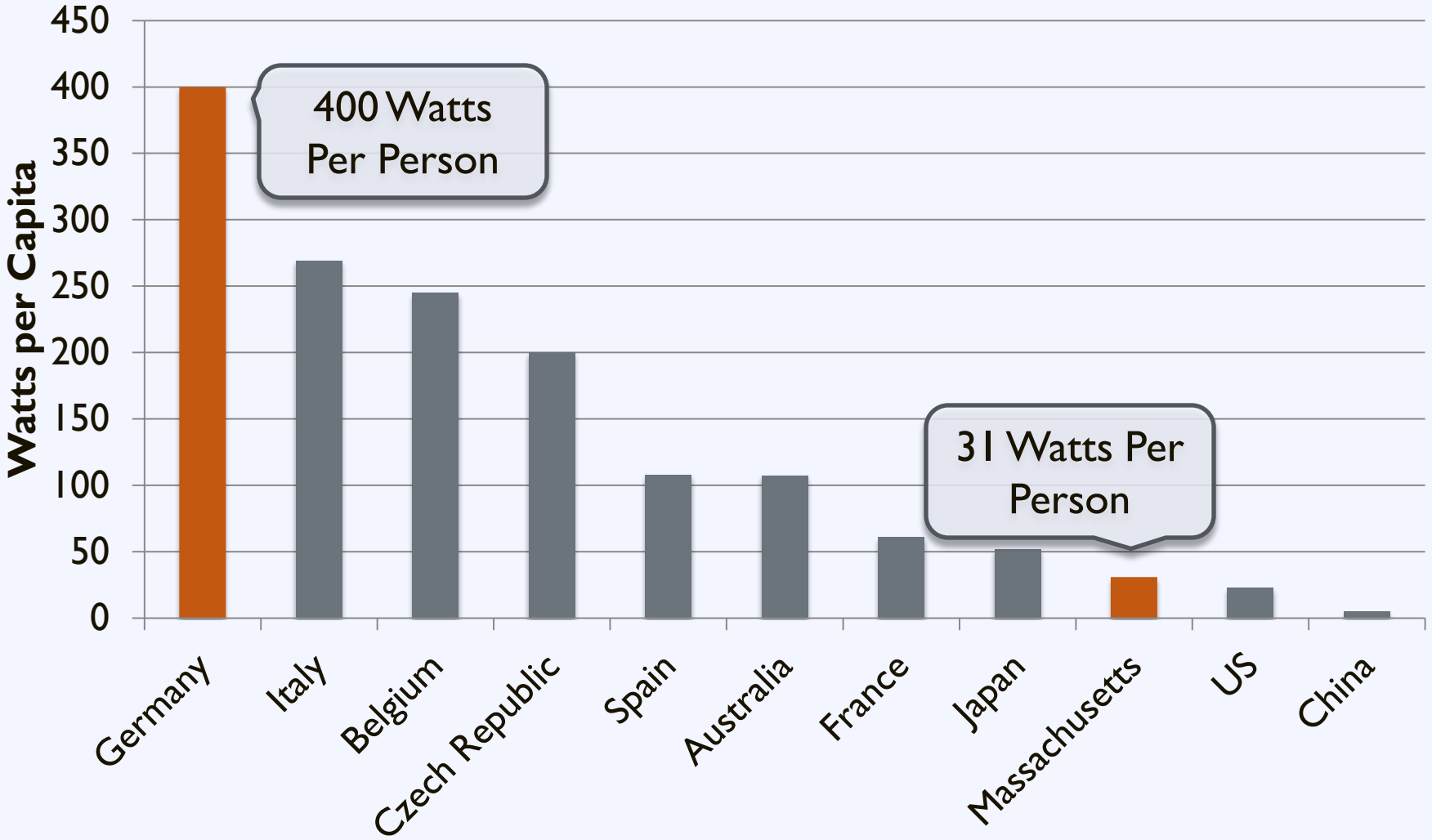
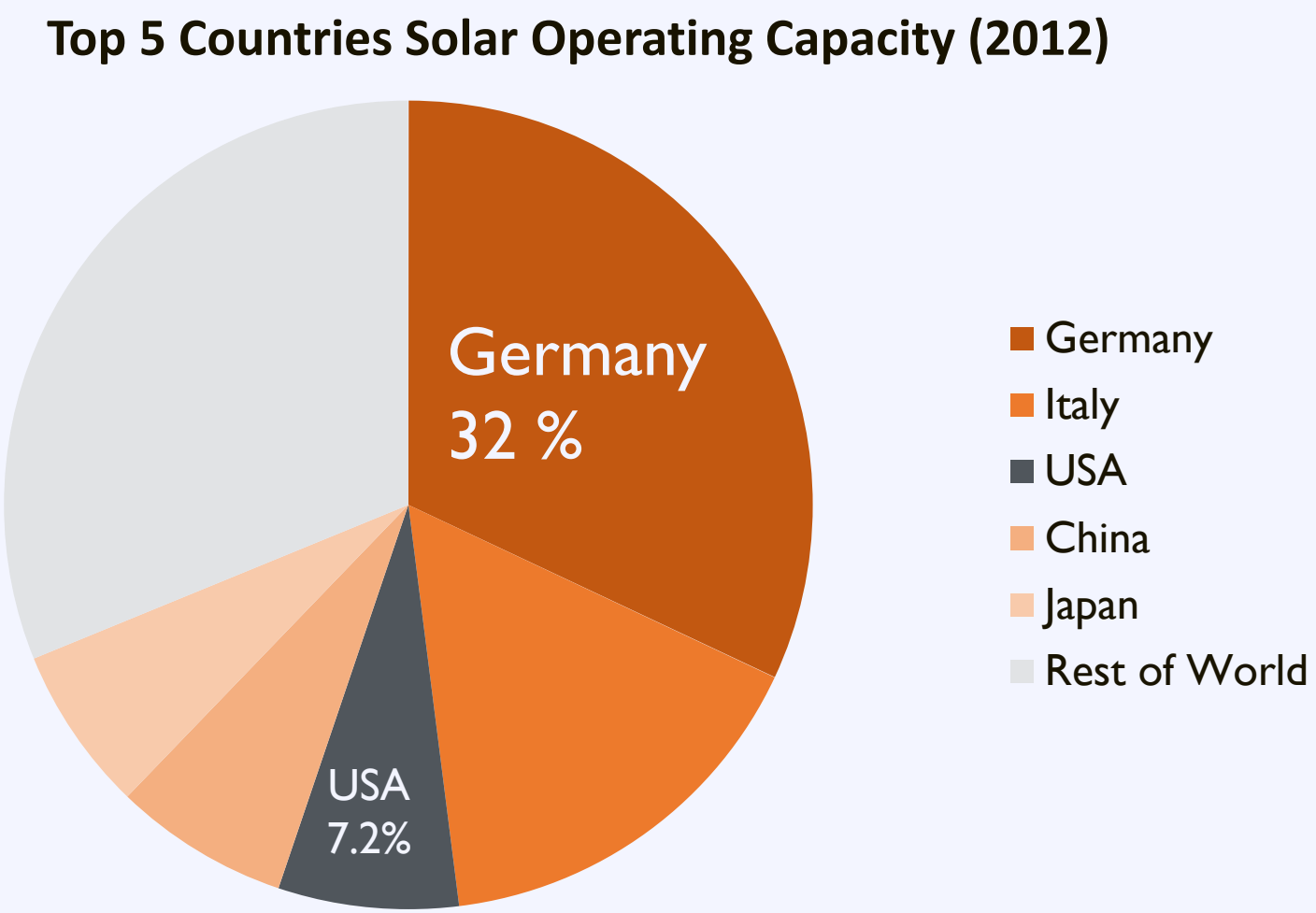
Installed Capacity per Capita



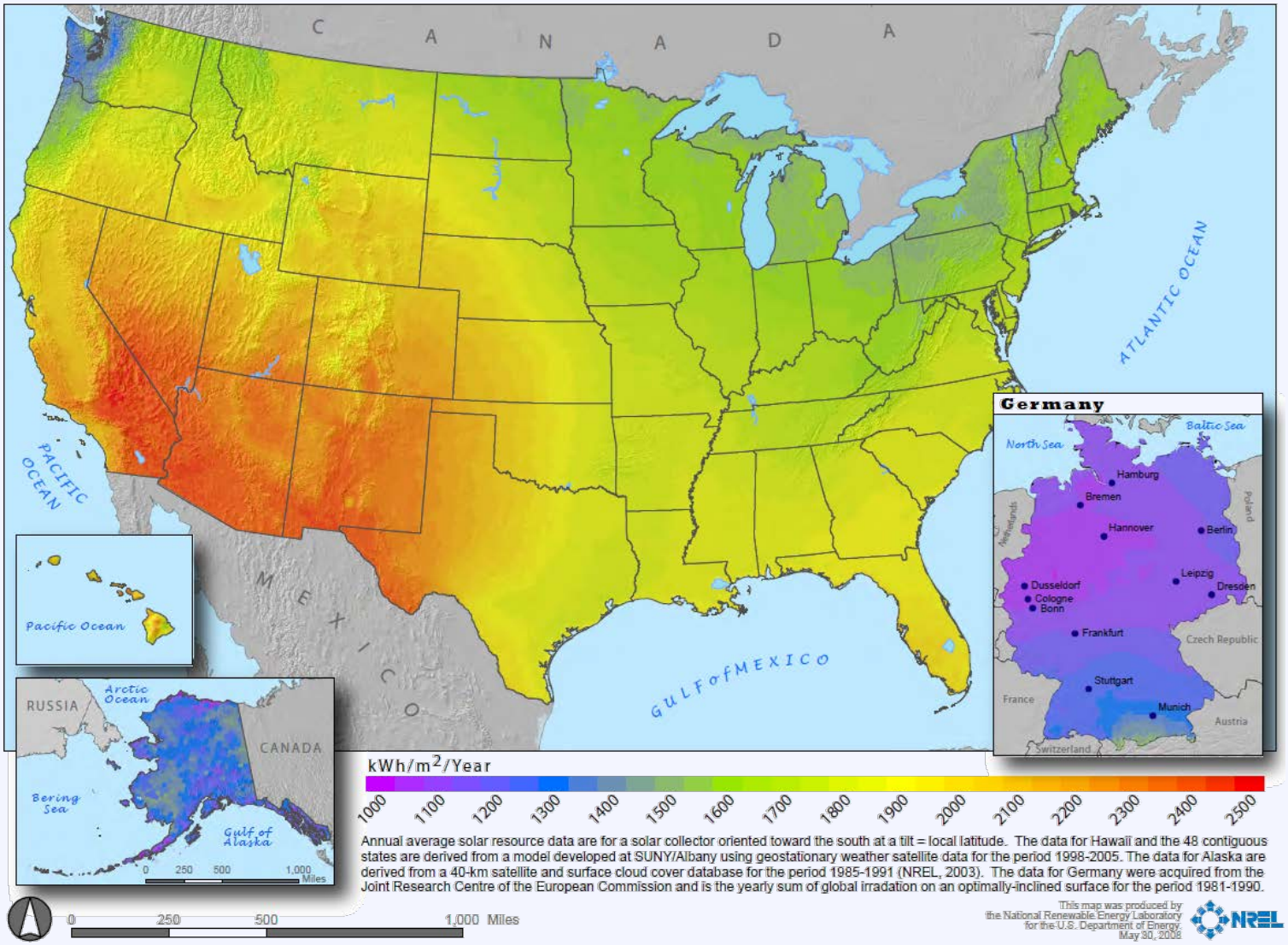
Source: REN 21, World Bank

Installed Capacity



Source: REN 21

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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Source: National Renewable Energy Laboratory

Installed Capacity

Total installed solar capacity in the US

7.7 GW

Capacity installed in Germany in 2012 alone

7.6 GW

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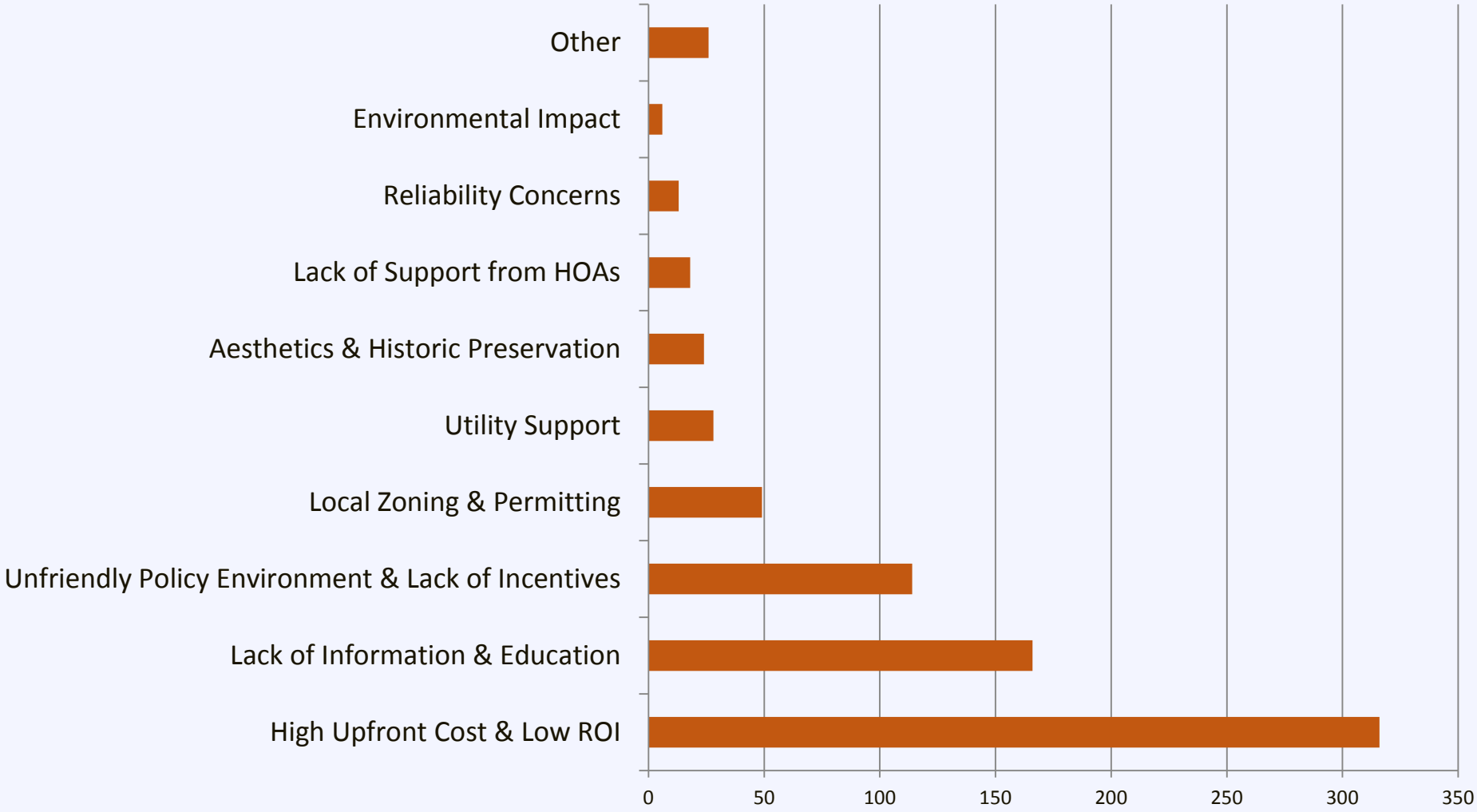
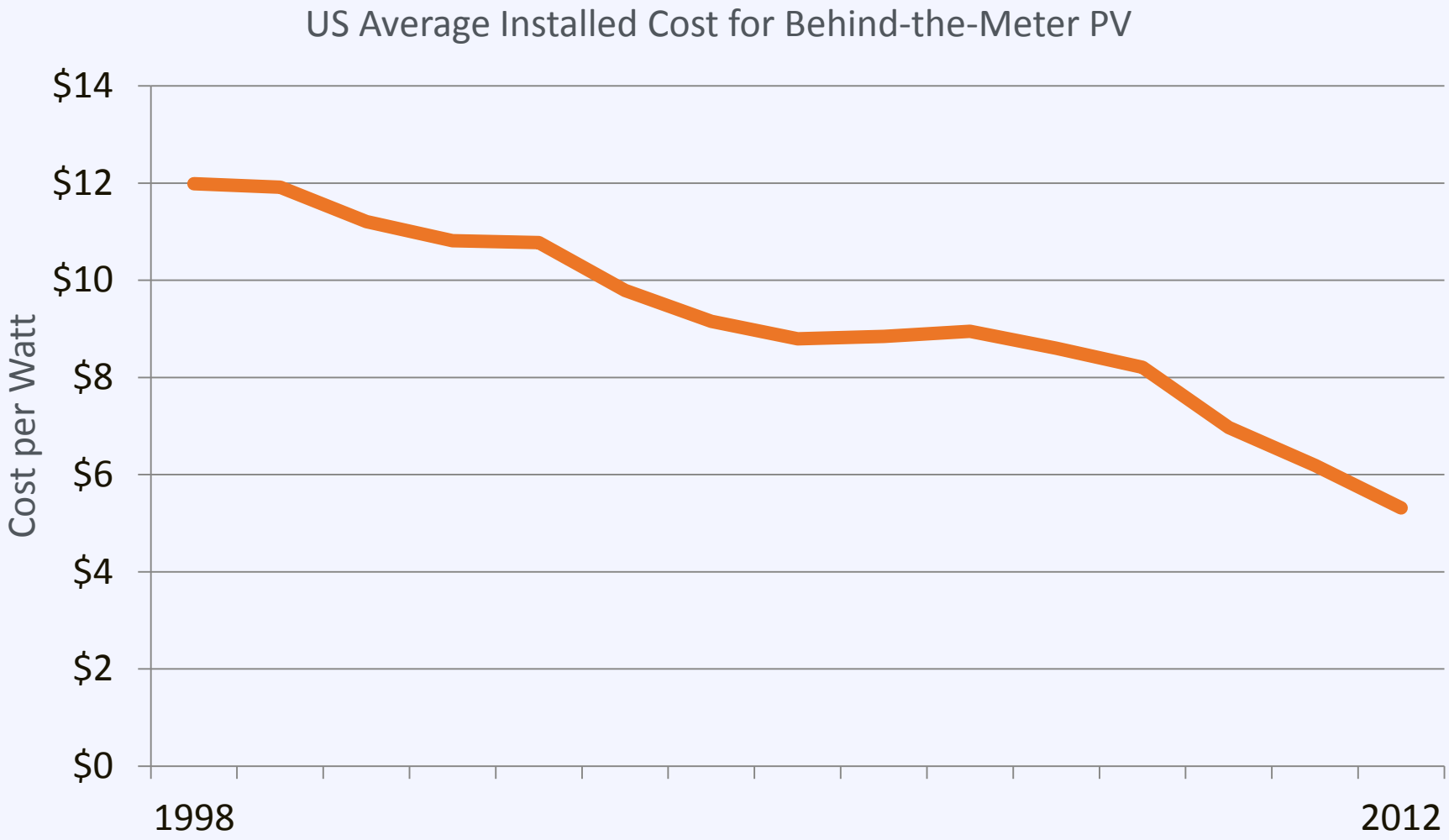
Source: (1) GTM Research/ Solar Energy Industries Association. *U.S. Solar Market Insight Report 2012 Year-in-Review*;
(2) www.erneuerbare-energien.de/fileadmin/Daten_EE/Dokumente__PDFs_/20130328_hgp_e_ppt_2012_fin_bf.pdf

Activity: Addressing Barriers

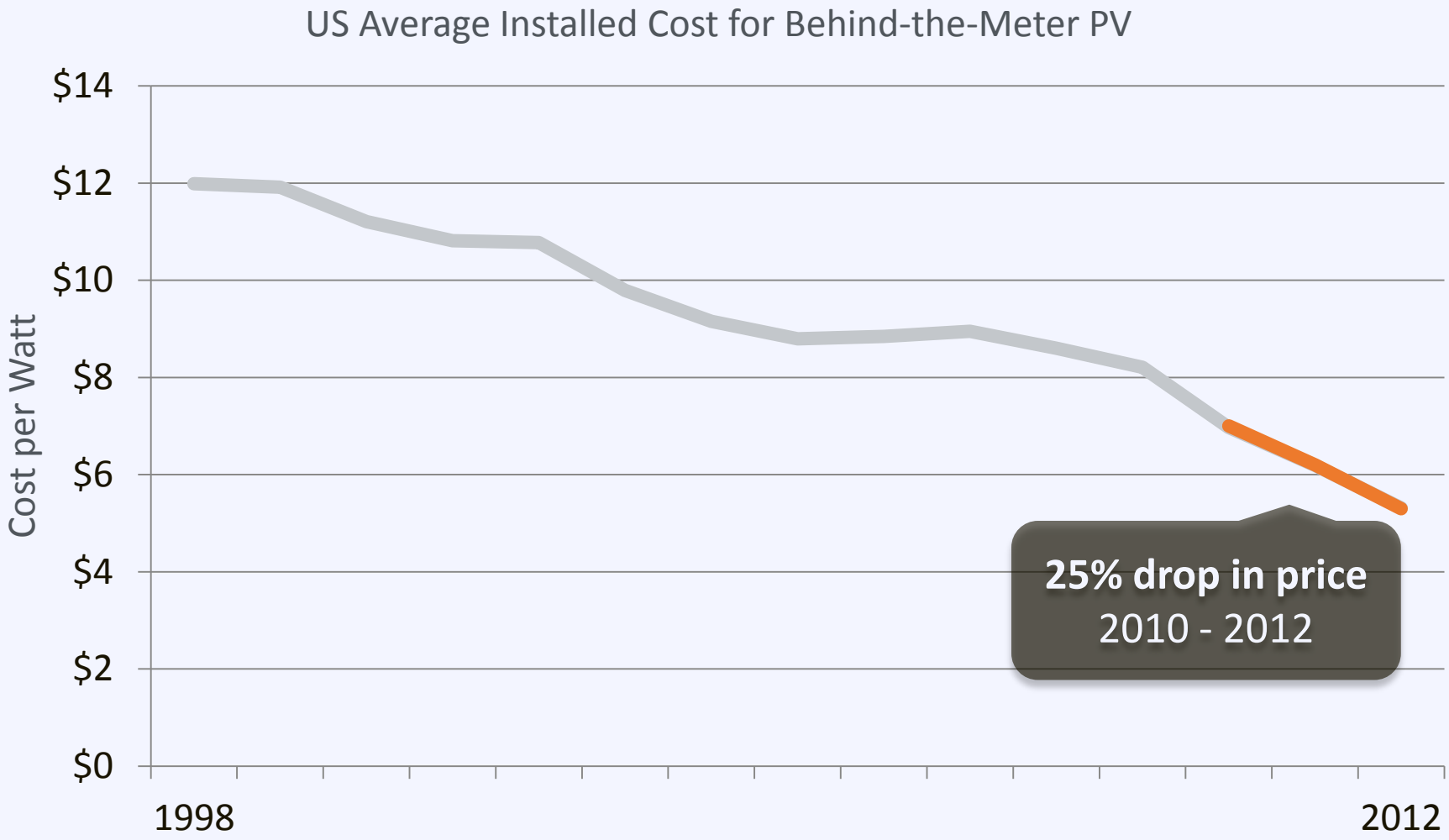


The Cost of Solar PV



Tracking the Sun VI: The Installed Cost of Photovoltaics in the US from 1998-2012 (LBNL)

The Cost of Solar PV



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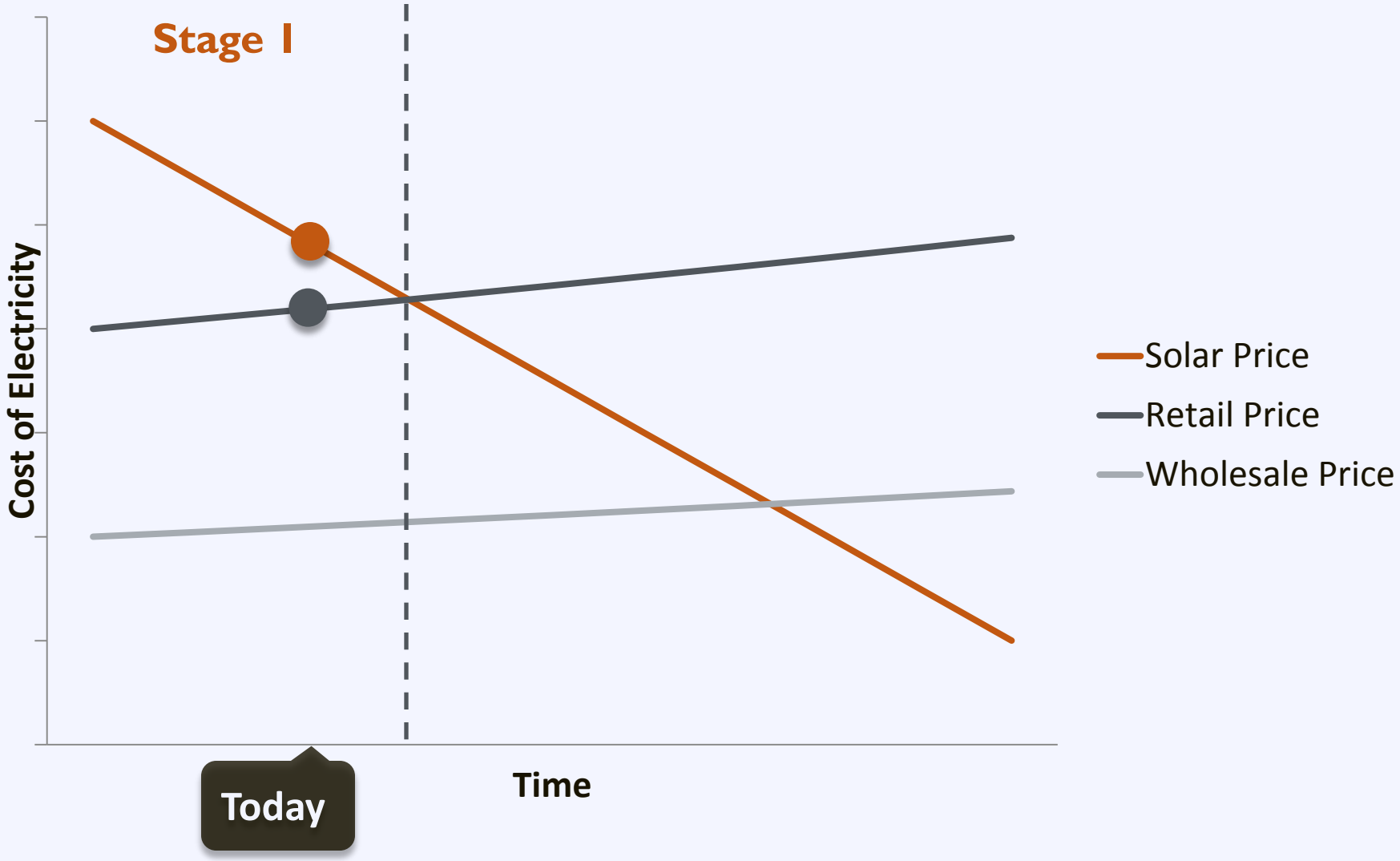
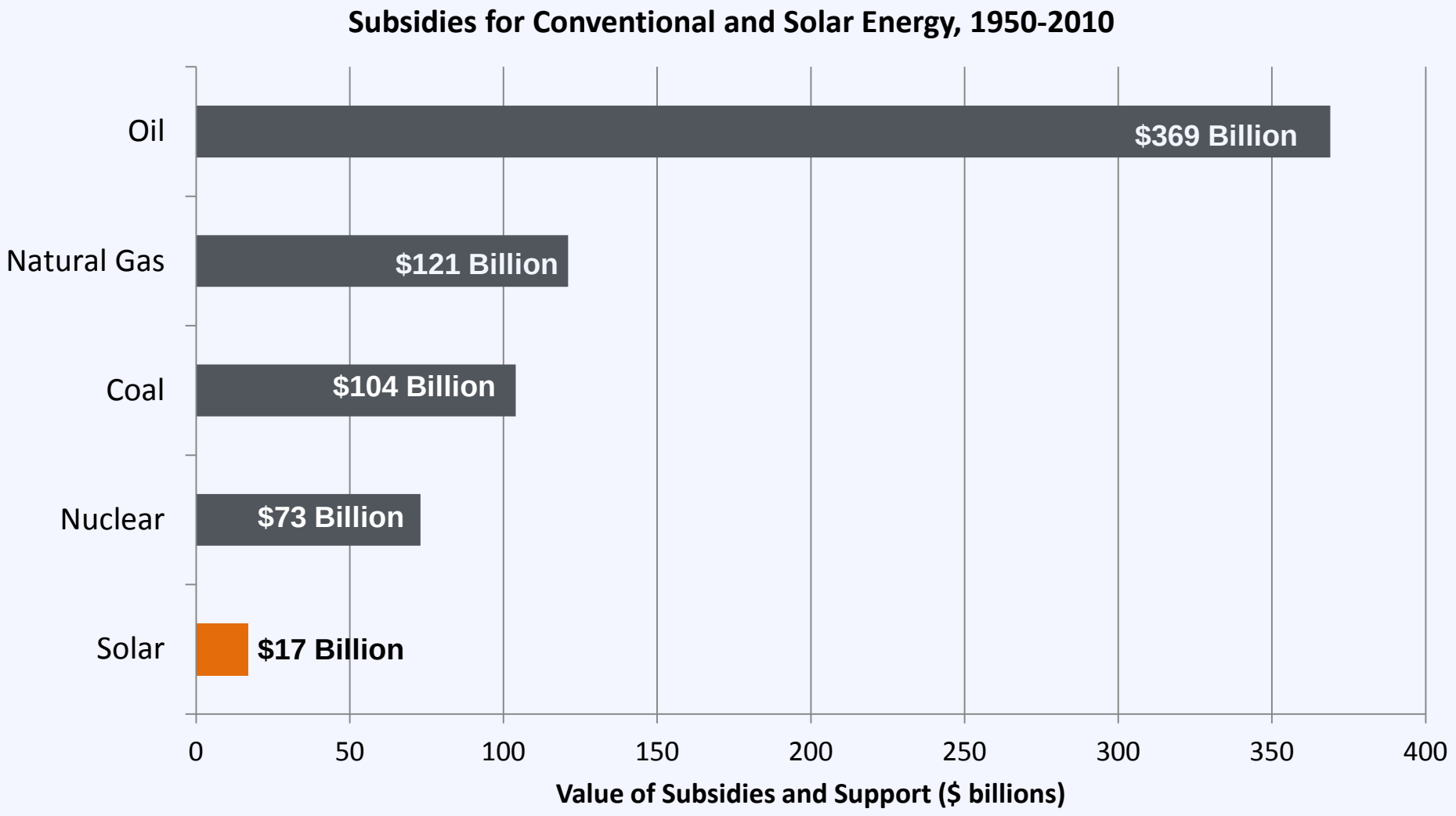


Source: Solar Electric Power Association

Subsidies and Support



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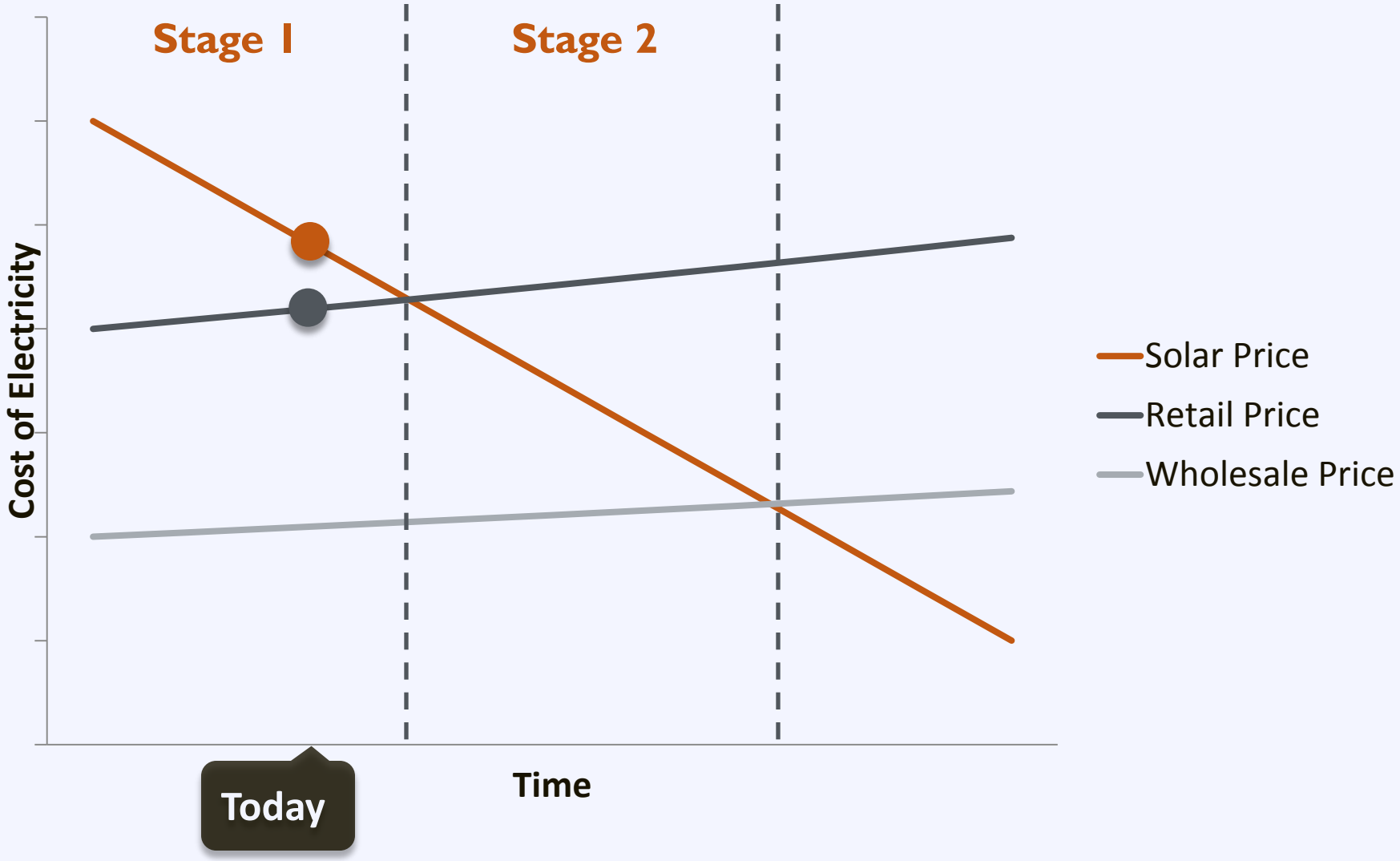

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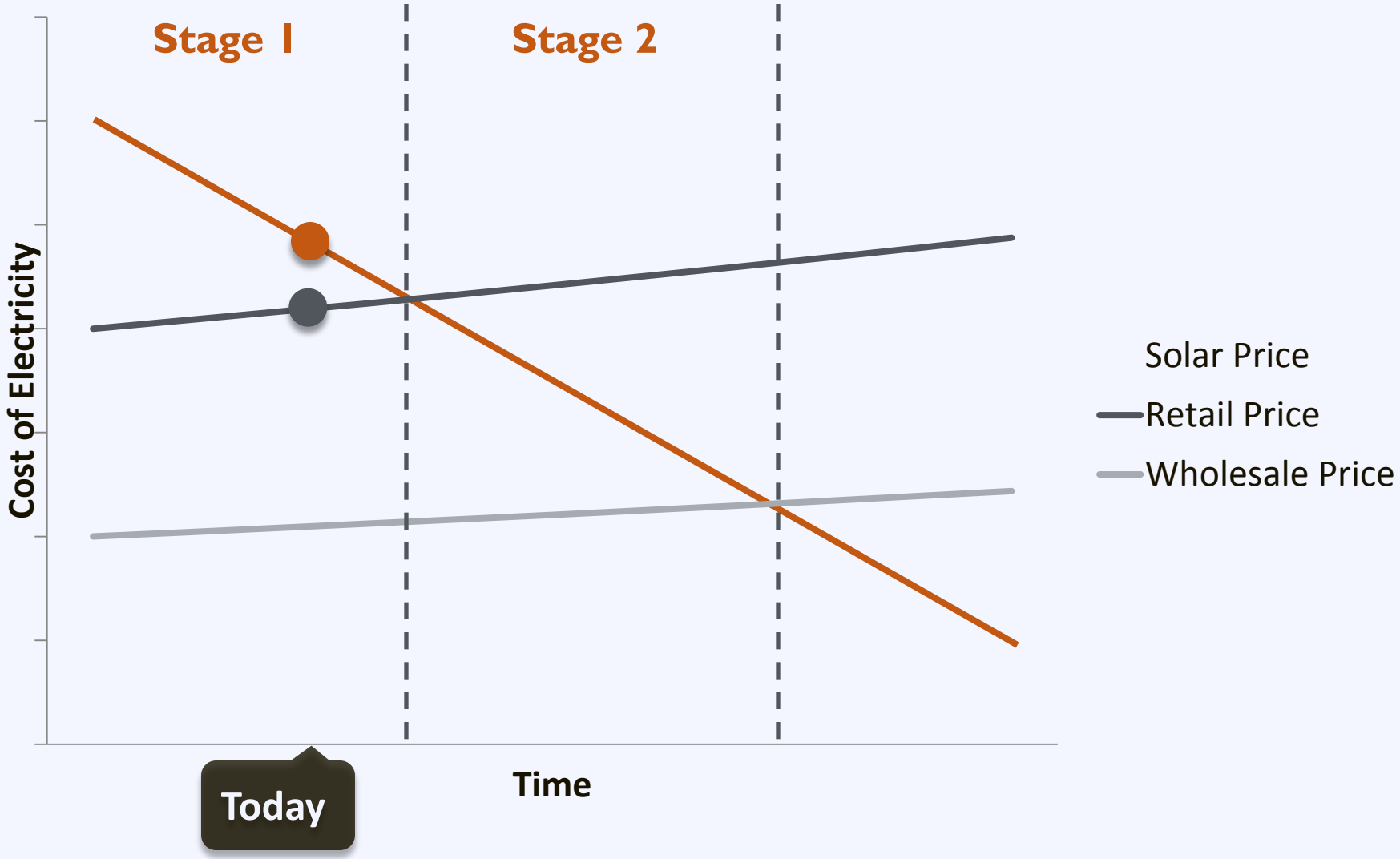
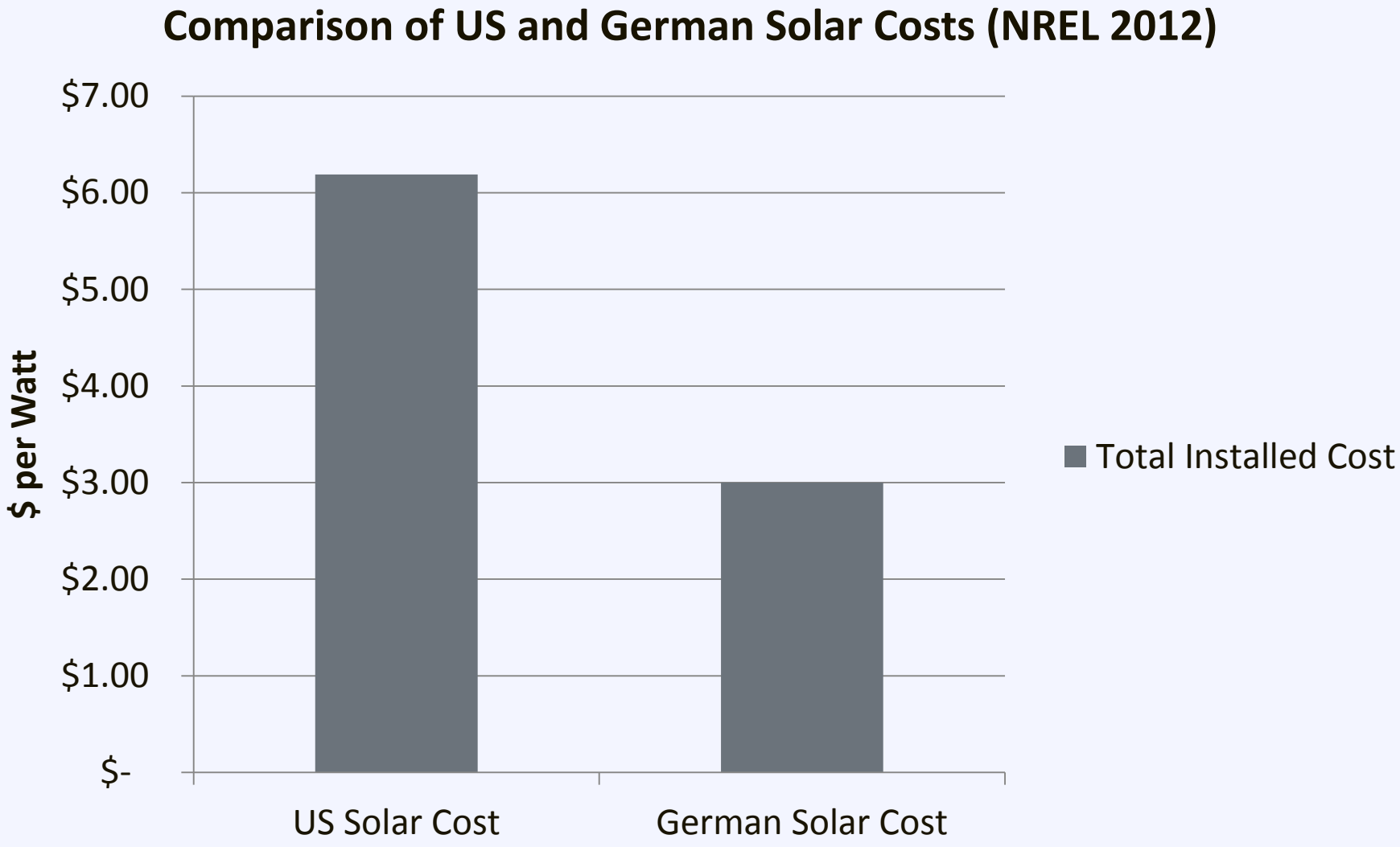


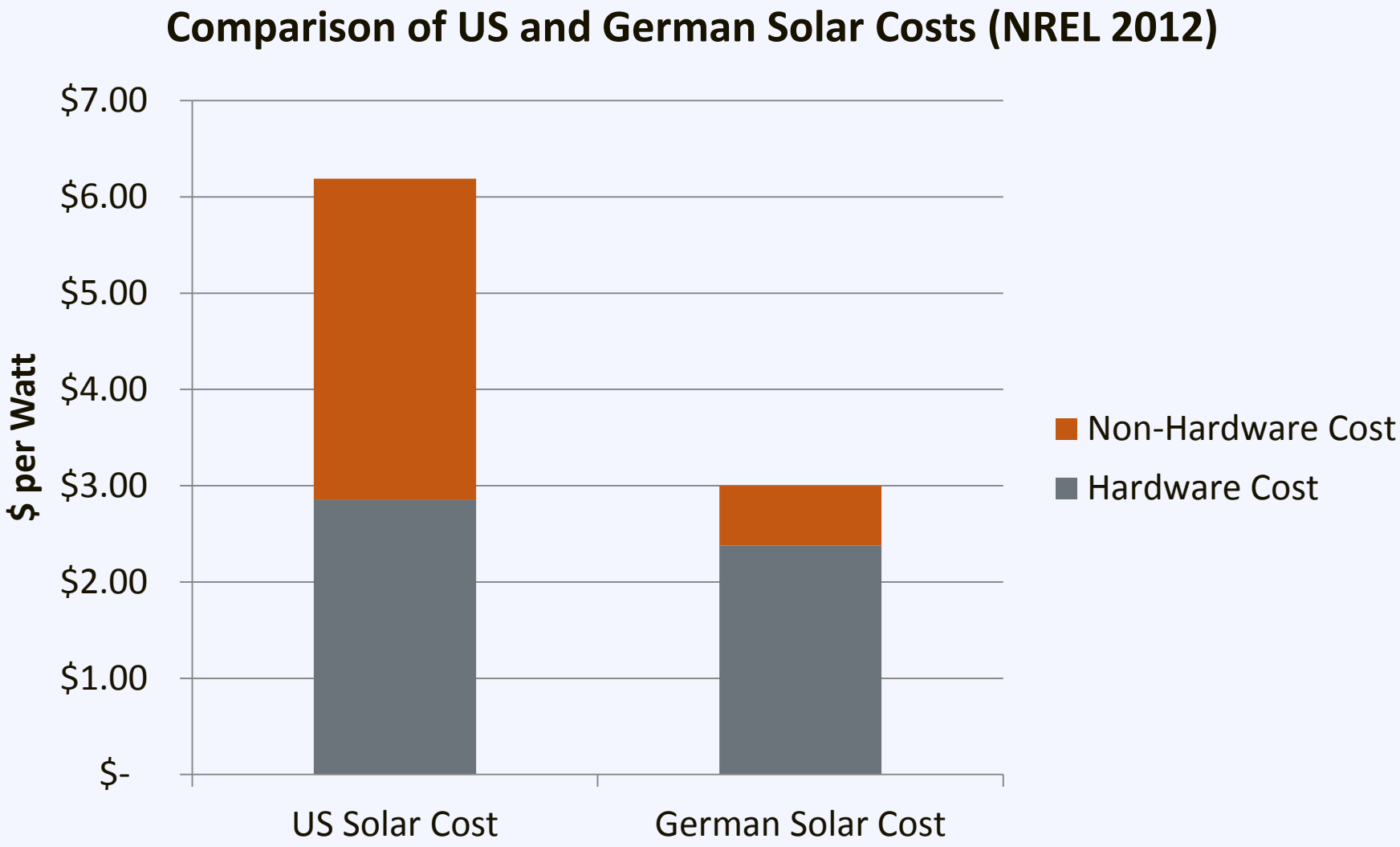
Source: Solar Electric Power Association

The Cost of Solar in the US



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

The Cost of Solar in the US



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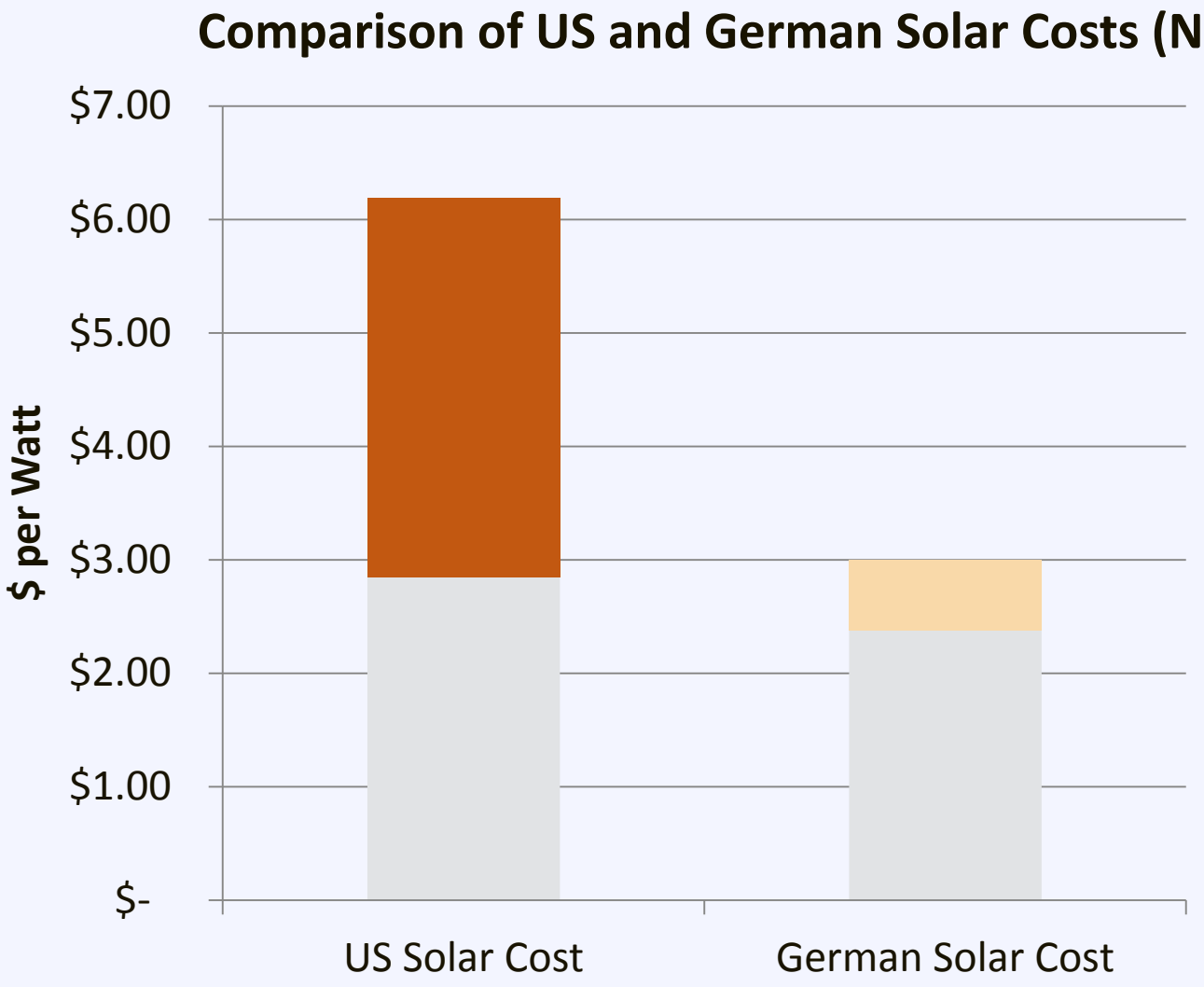
The Cost of Solar in the US



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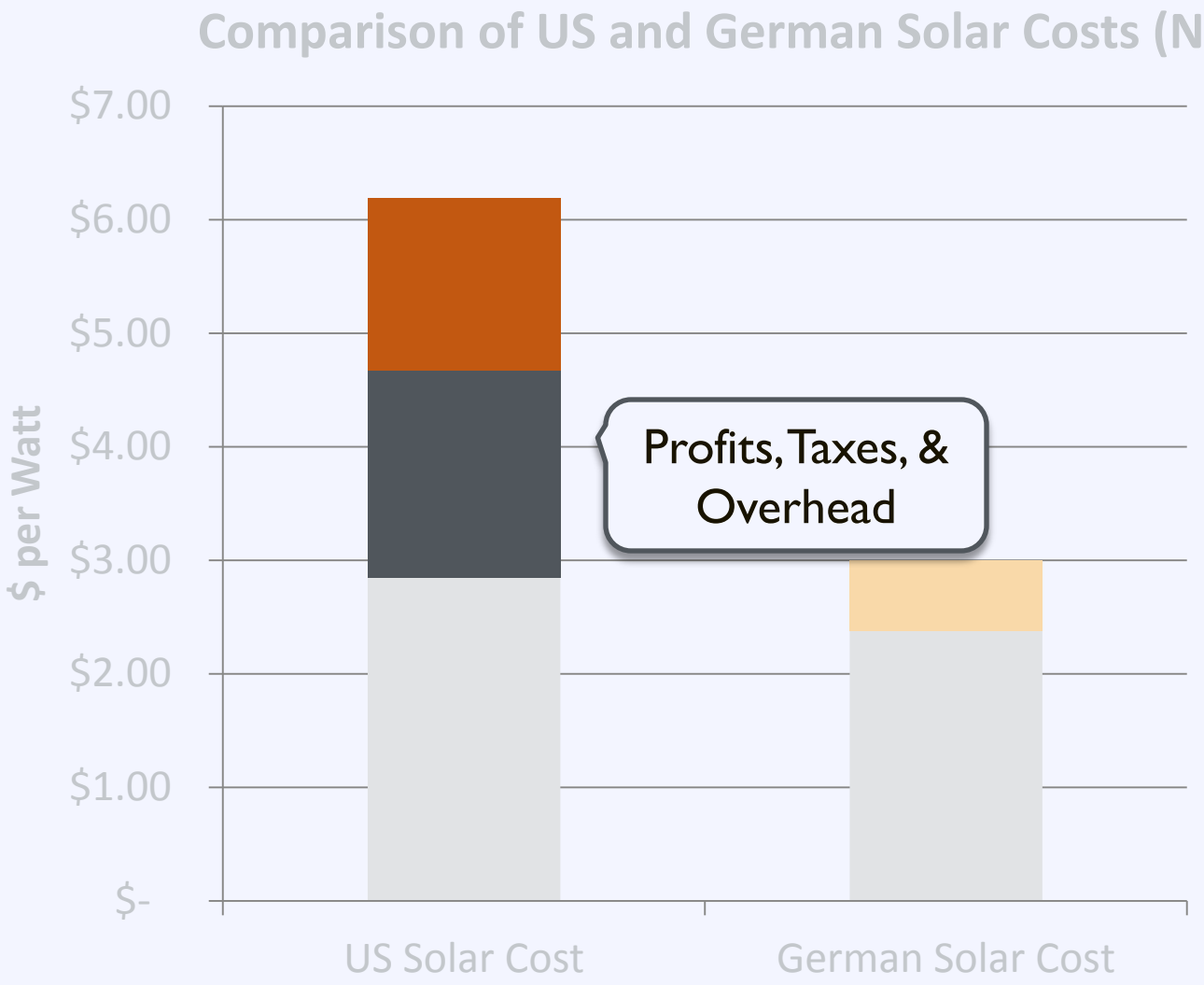

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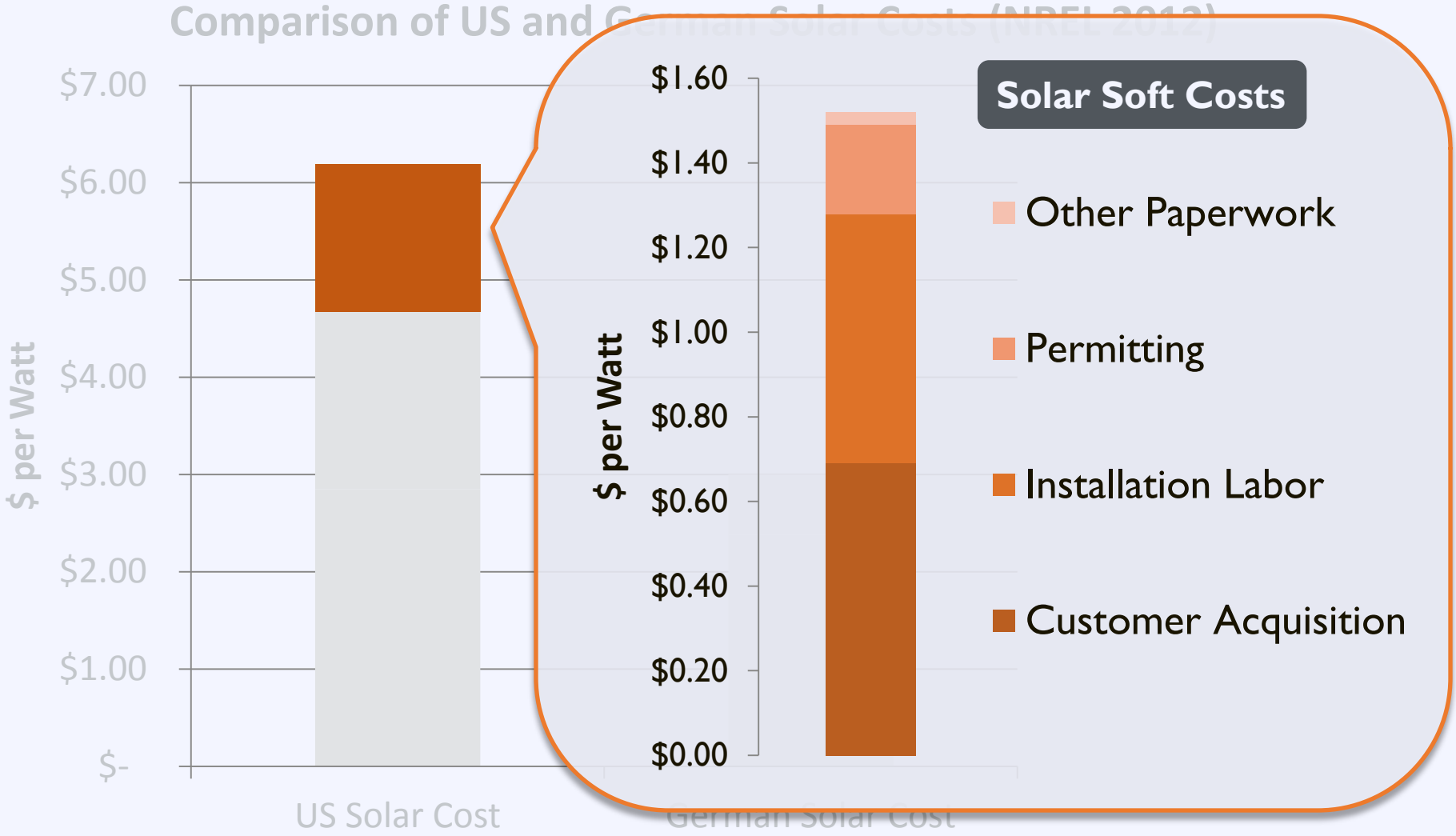
Source: NREL (http://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0599_full%20paper.pdf) (http://www.nrel.gov/docs/fy12osti/53347.pdf) (http://www.nrel.gov/docs/fy12osti/54689.pdf)

The Cost of Solar in the US



Powered by SunShot U.S. Department of Energy

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

Challenge: Installation Time

New York City's Goal

100 days

from inception to completion

Germany Today

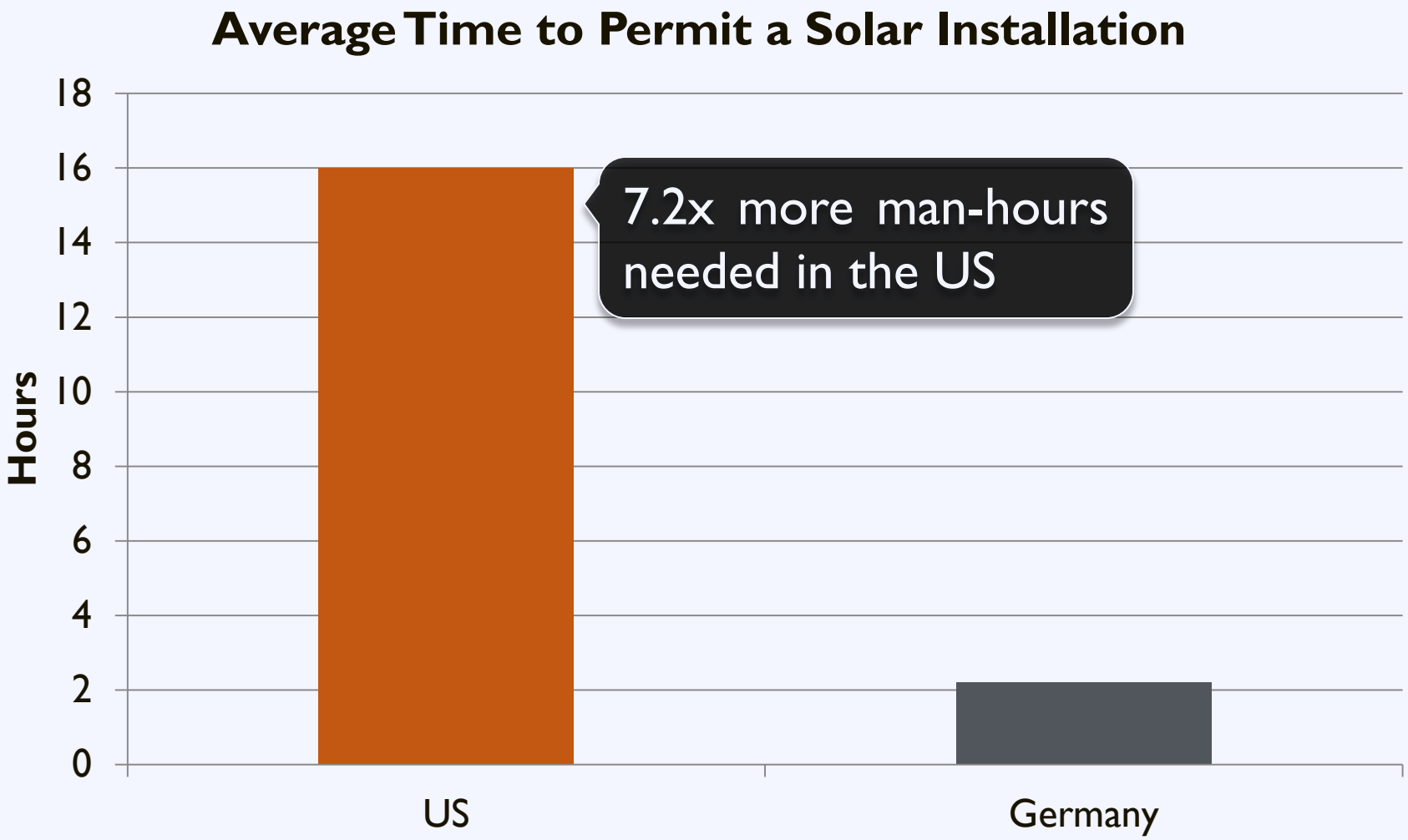
8 days

from inception to completion

Powered by SunShot U.S. Department of Energy

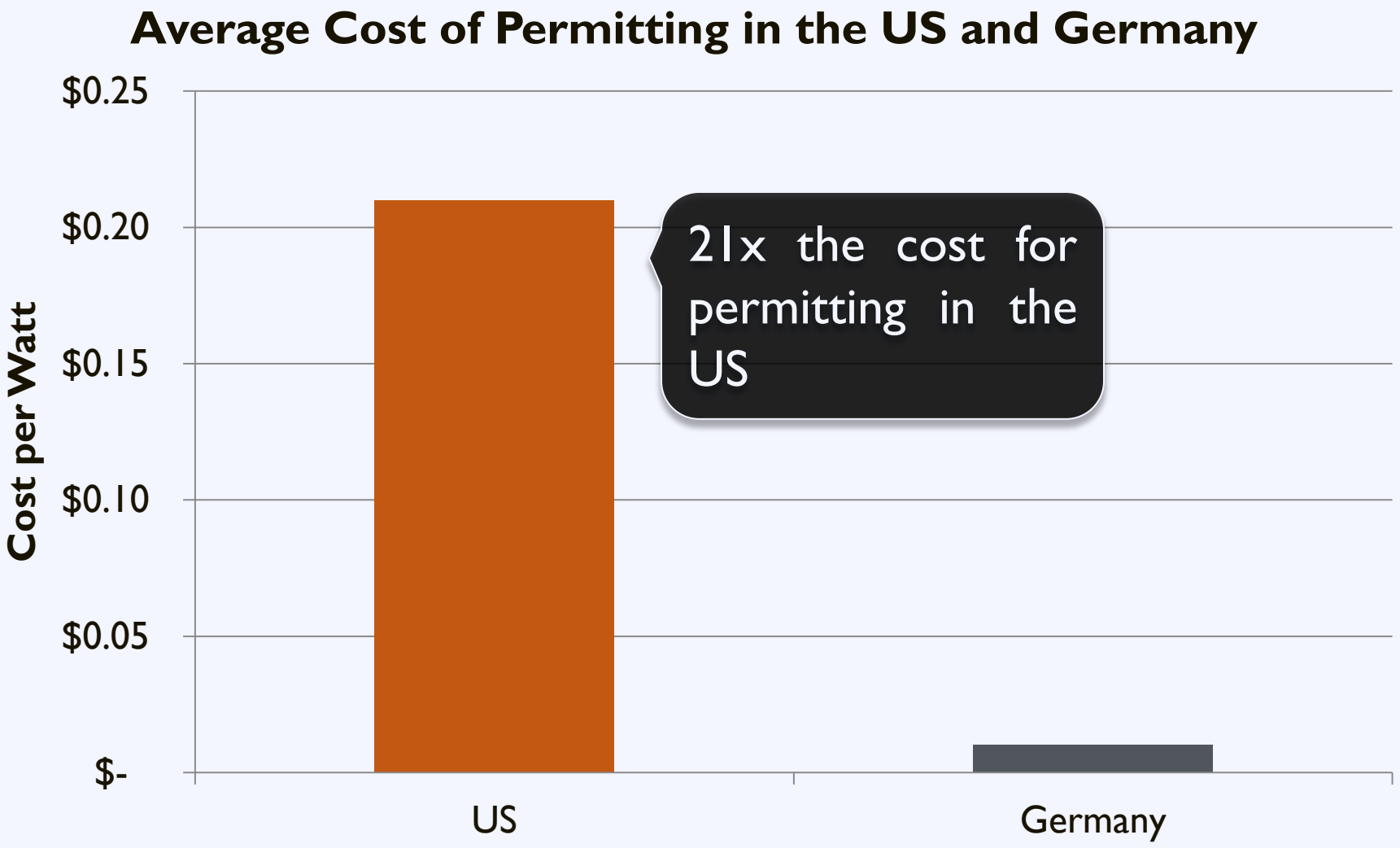
Photon Magazine

Time to Installation



Source: NREL, LBNL

Permitting Costs



Source: NREL, LBNL

Germany's Success

Consistency and Transparency

through

Standardized Processes

Workshop Goal

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

Solarize Massachusetts

Elizabeth Kennedy
Massachusetts Clean Energy Center

MASSACHUSETTS CLEAN ENERGY CENTER

Massachusetts It's all here.®

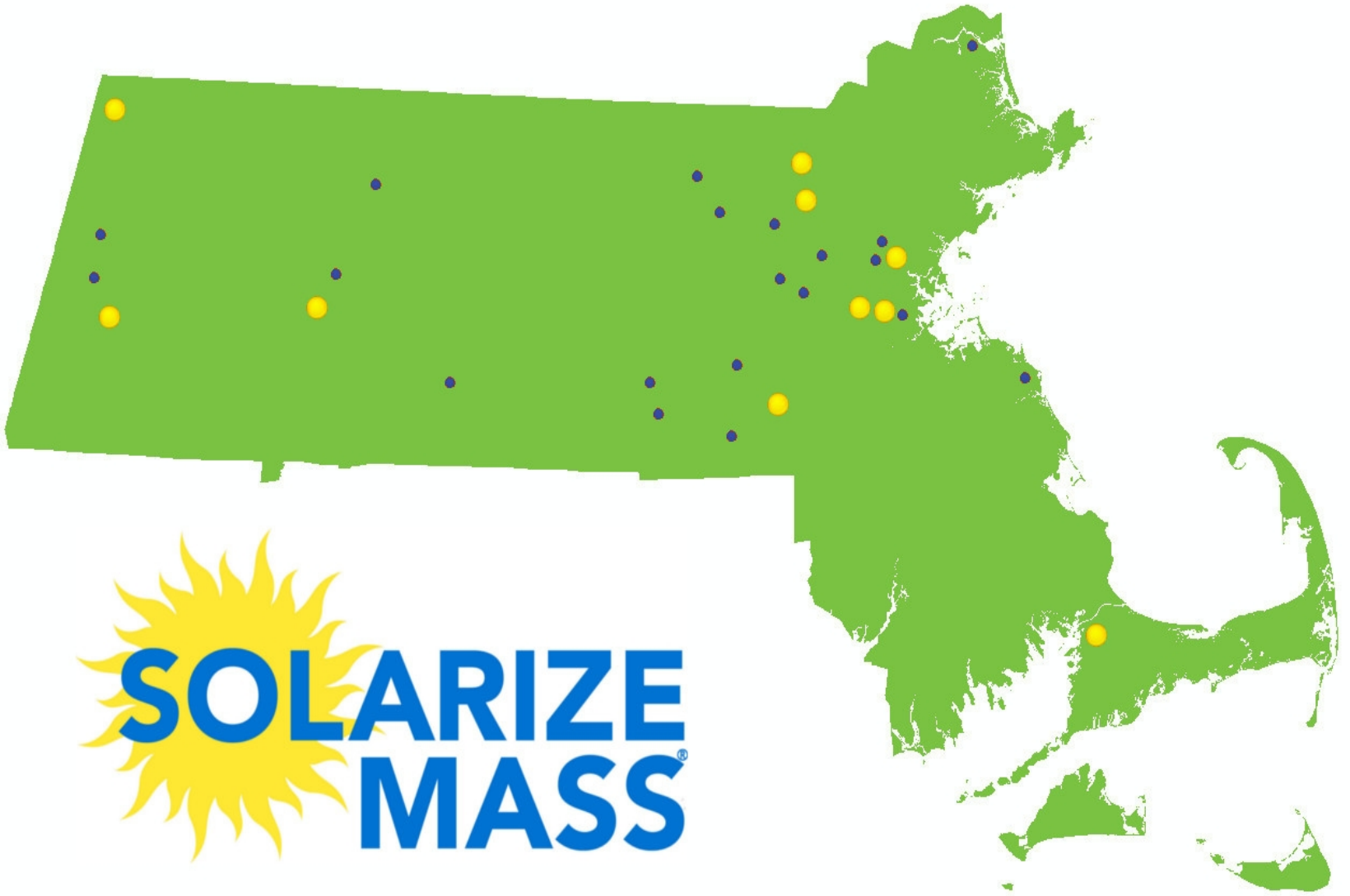
MassCEC Statutory Mandate

Advance Clean Energy Technology

Create Jobs

Develop a Trained Workforce

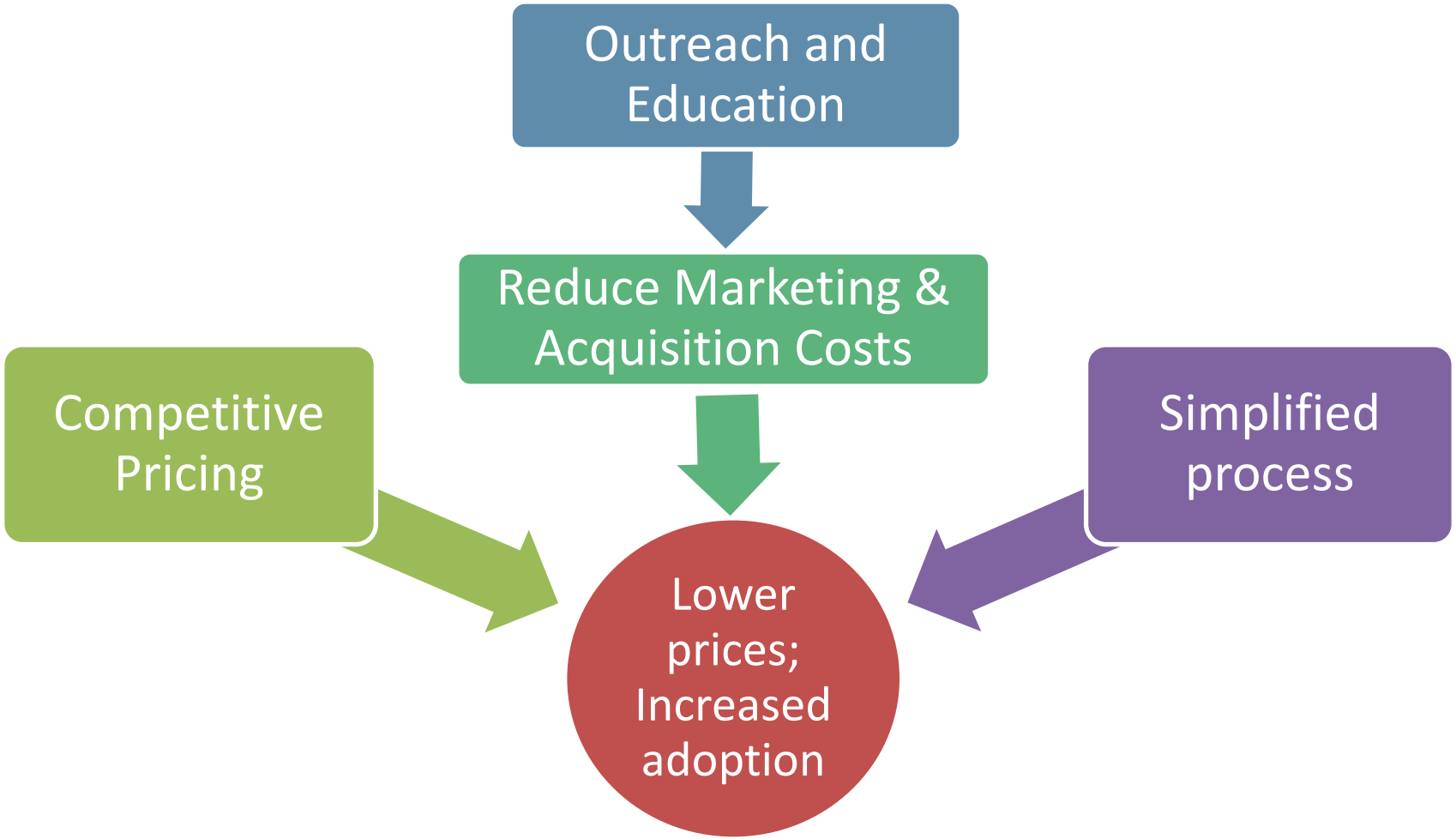
Accelerate Deployment of Clean Energy

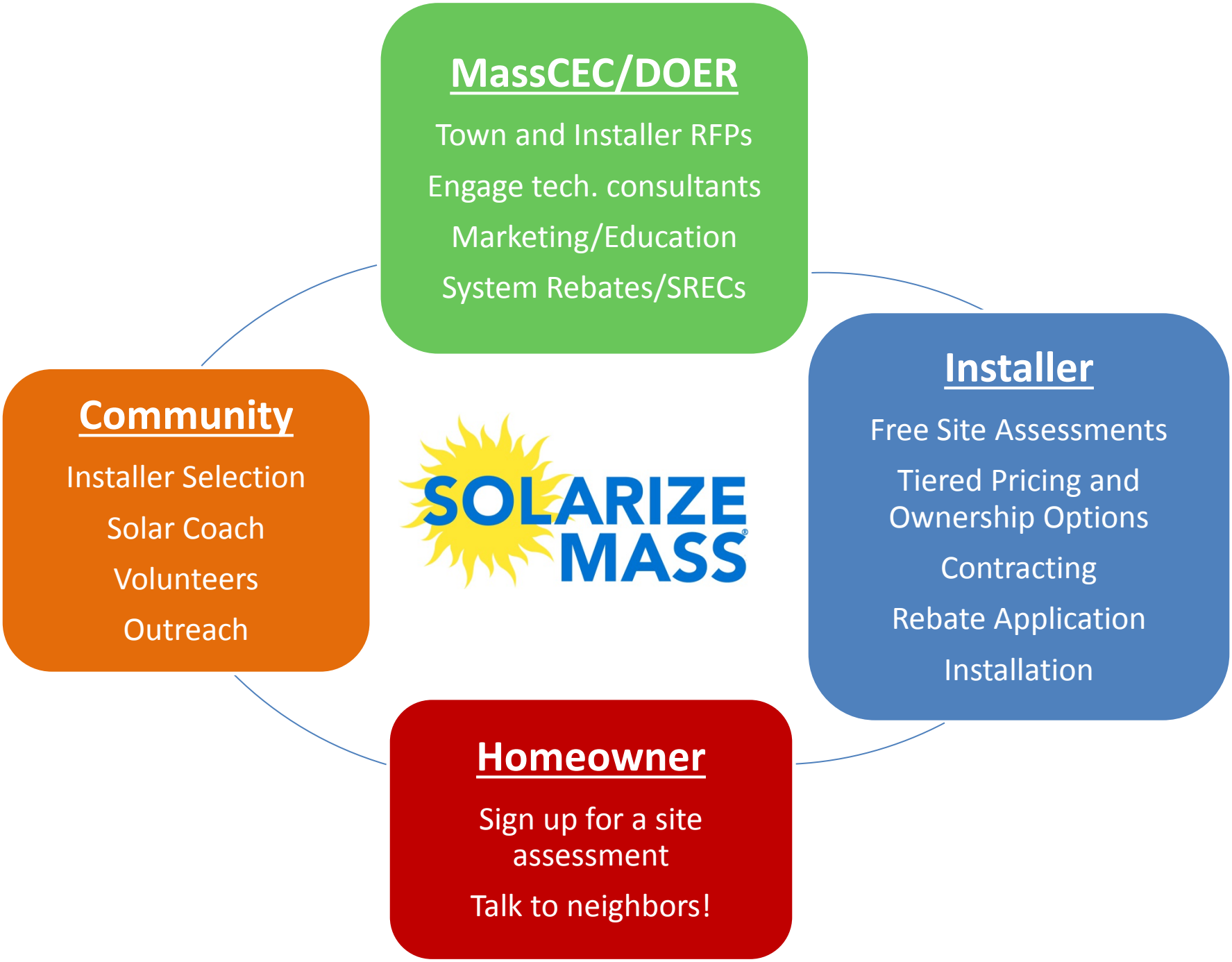


"Installing a solar PV system is a terrific investment, and of course it is a good thing to do for the earth. Once you become familiar with the economics, it is a no-brainer."

– **Resident, Hatfield, MA**

Solarize Massachusetts Goals




MassCEC/DOER
Town and Installer RFPs
Engage tech. consultants
Marketing/Education
System Rebates/SRECs
Installer
Free Site Assessments
Tiered Pricing and Ownership Options
Contracting
Rebate Application
Installation
Homeowner
Sign up for a site assessment
Talk to neighbors!
Community
Installer Selection
Solar Coach
Volunteers
Outreach
SOLARIZE MASS

2012 Solarize Massachusetts Program

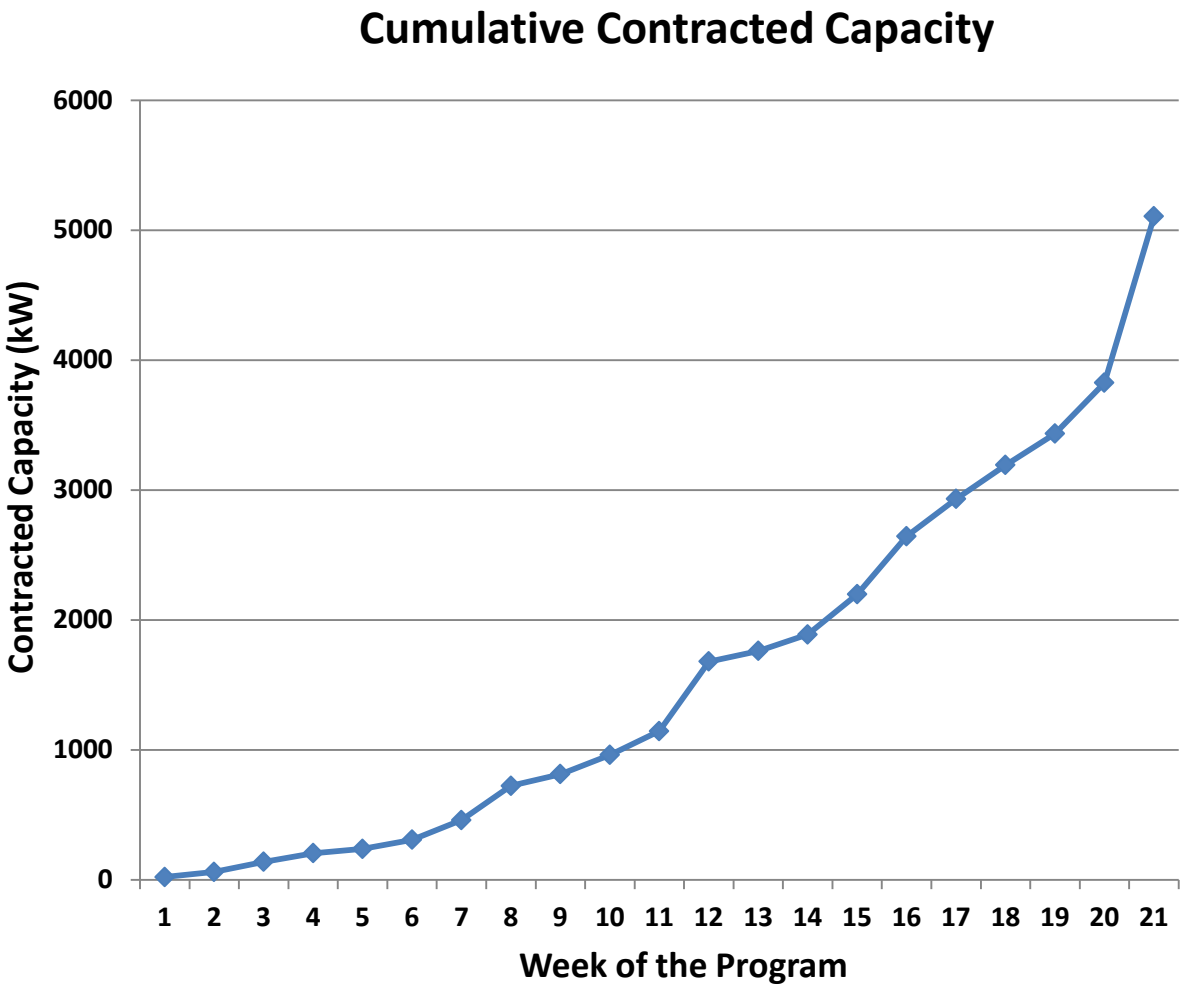
- 17 Communities – 10 individual and 7 in groups
- 8 Installers total - 6 “local”, 2 “national”
- Tier Pricing (based on contracted capacity)

Tier 1	Tier 2	Tier 3	Tier 4	Tier 5
1-25 kW	>25-50 kW	>50-150 kW	>150-250 kW	250 kW+

- Installers offered direct ownership & Lease/PPA option
- Limited time offer – Sign Ups through **Nov 4, 2012**

Solarize 2012 Final Metrics (as of 11/4/12)

Total Number Of:	
Leads Generated	5,405
Contracts Signed	803
Contracted Capacity (kW)	5,126
Communities at Tier 5 Pricing	10

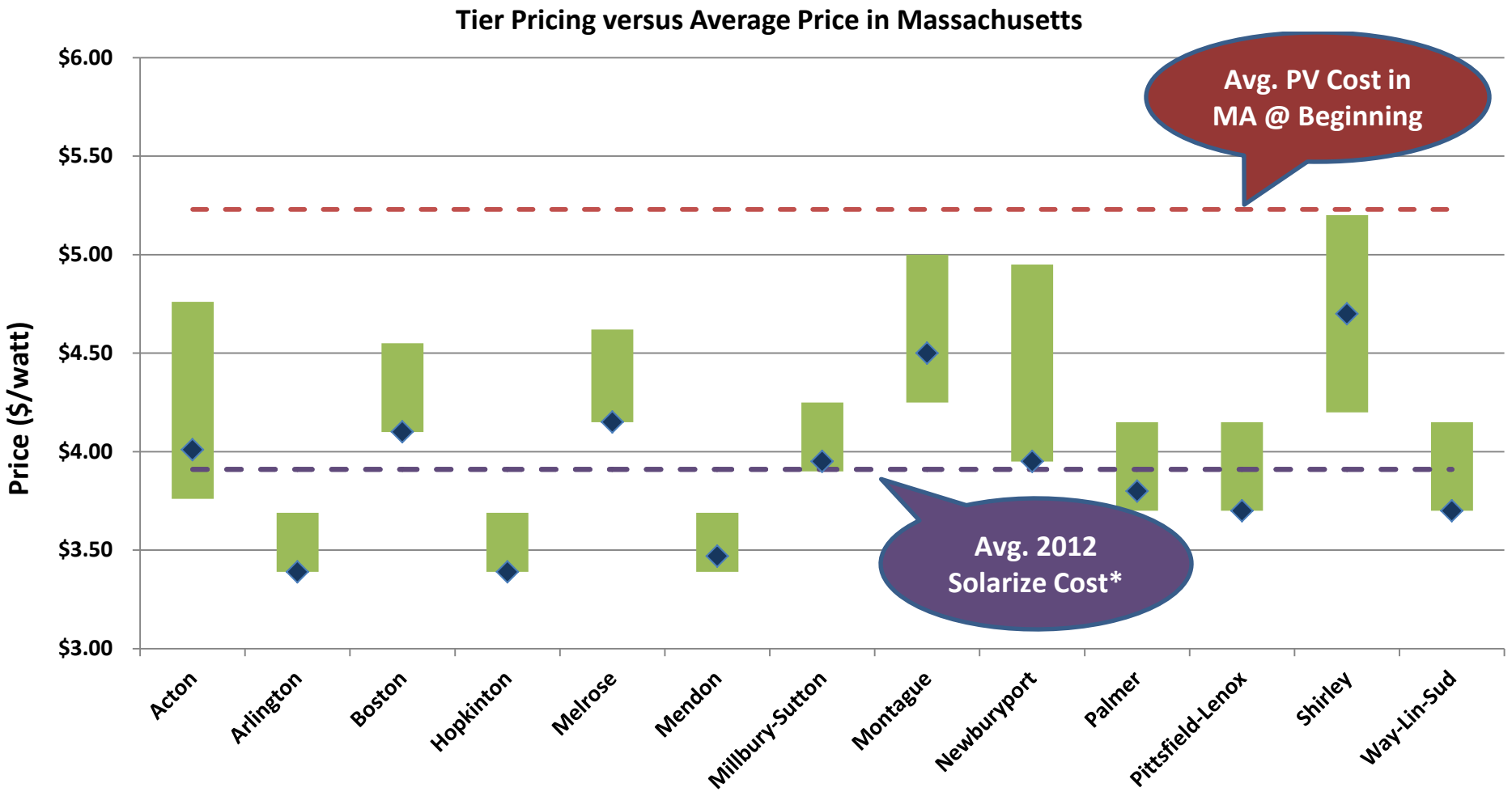


MASSACHUSETTS CLEAN ENERGY CENTER

DOER Massachusetts Department of Energy Resources

SOLARIZE MASS

2012 Solarize Mass Base Pricing



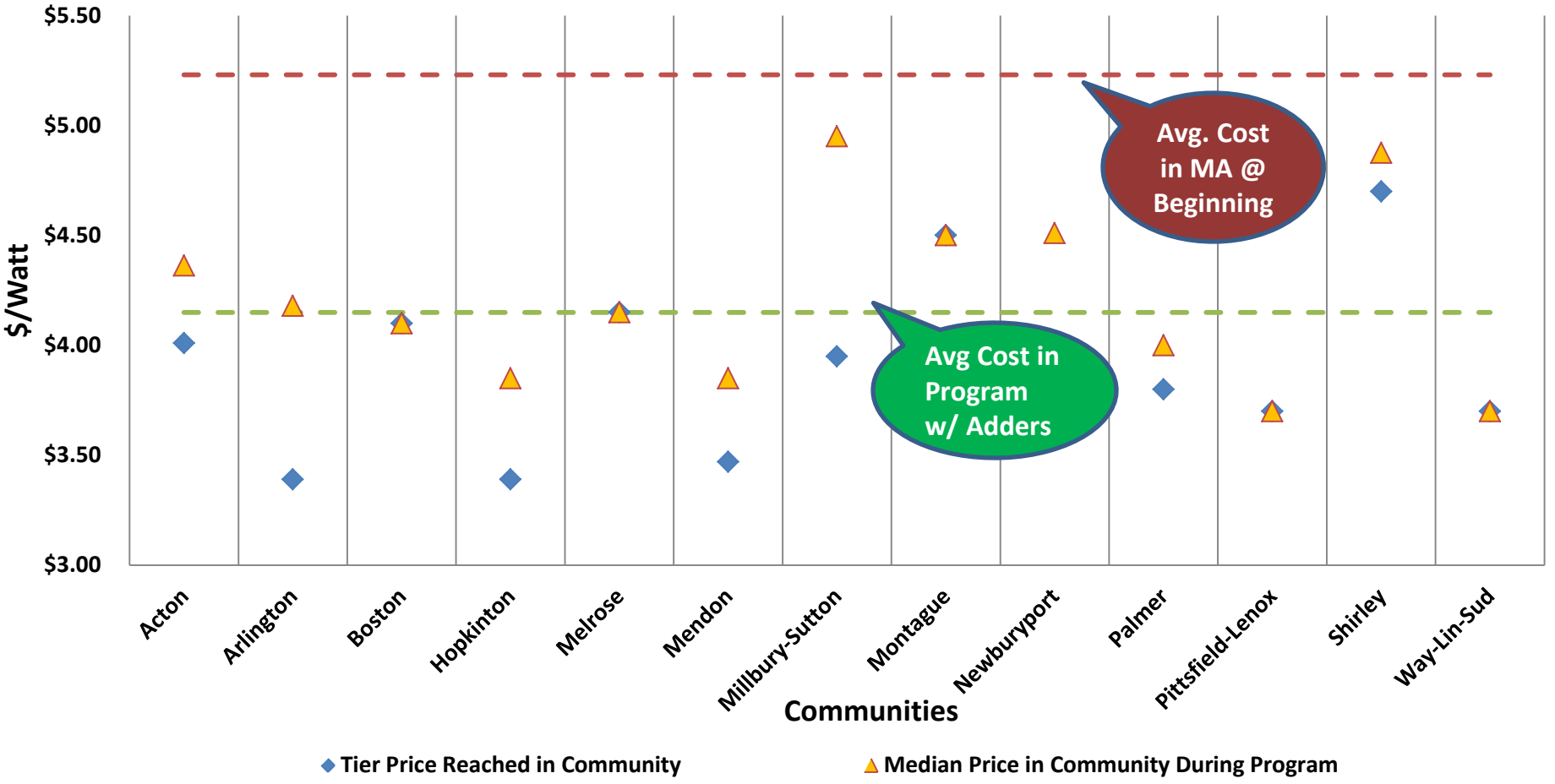
* Price does not include any cost adders that may apply.

MASSACHUSETTS CLEAN ENERGY CENTER

DOER Massachusetts Department of Energy Resources

SOLARIZE MASS

2012 Average and Median Pricing



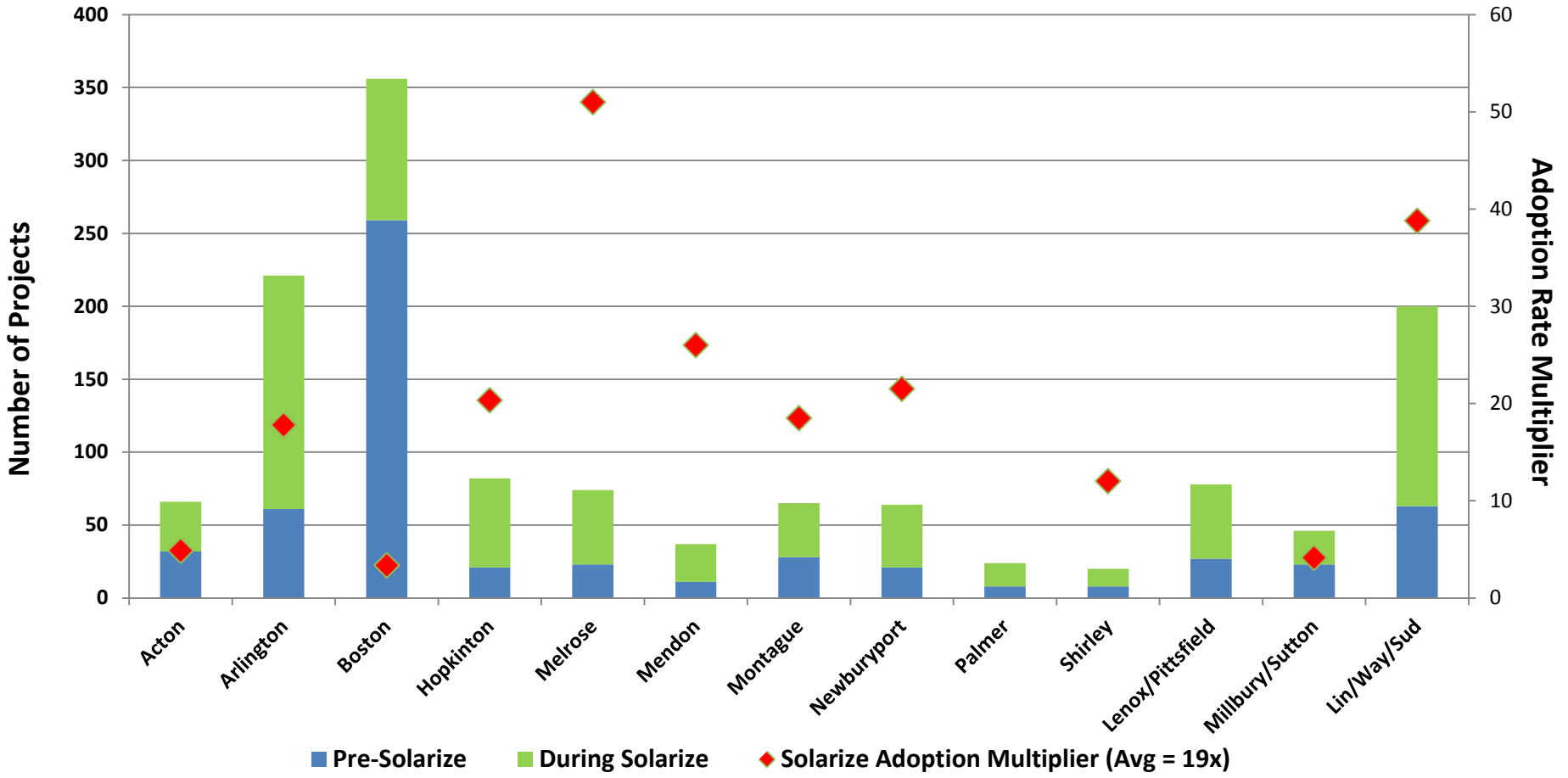
2012 Solarize Mass Adders

- Adders were easier to track for Purchased Systems
- There were **381** Purchased systems, of which **86%** included adders

Type of Project Adder	Frequency Applied to Projects	Average Adder Price ($/W)
Micro-Inverters*	57%	$ 0.22
Structural Engineer Analysis	54%	$ 0.11
Panel Upgrade*	25%	$ 0.41
Monitoring*	23%	$ 0.22
Line Side Tap	23%	$ 0.09
Rafter Reinforcement	14%	$ 0.18
Multiple Roof Arrays	12%	$ 0.10
Electrical Sub-Panel	10%	$ 0.10

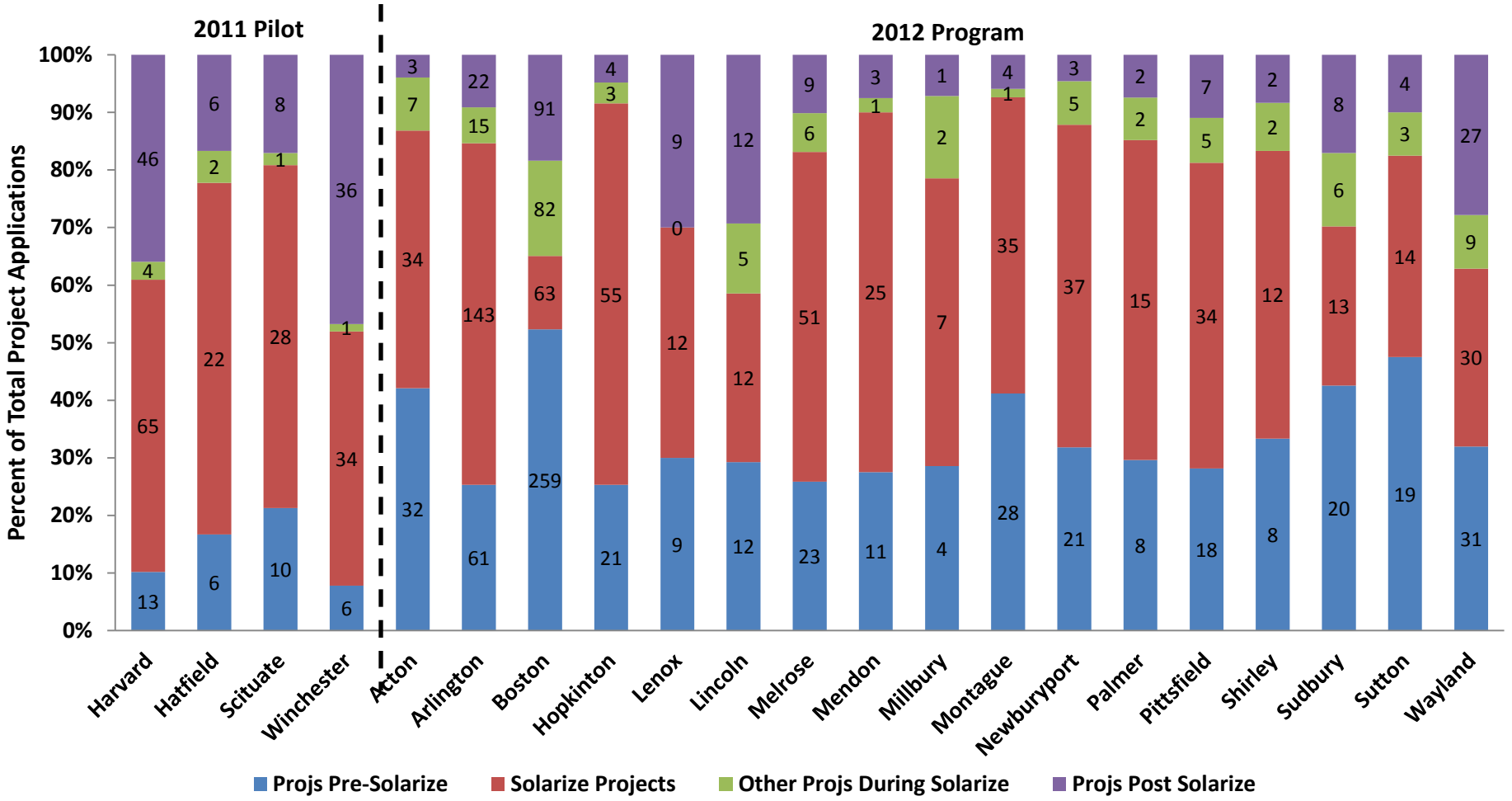
* These adders were optional, while the other adders would be mandatory for a project to move forward.

2012 Solarize Mass Adoption



Based on 2/4/13 & 5/1/13 data.

Solar Persistence in Solarize Communities



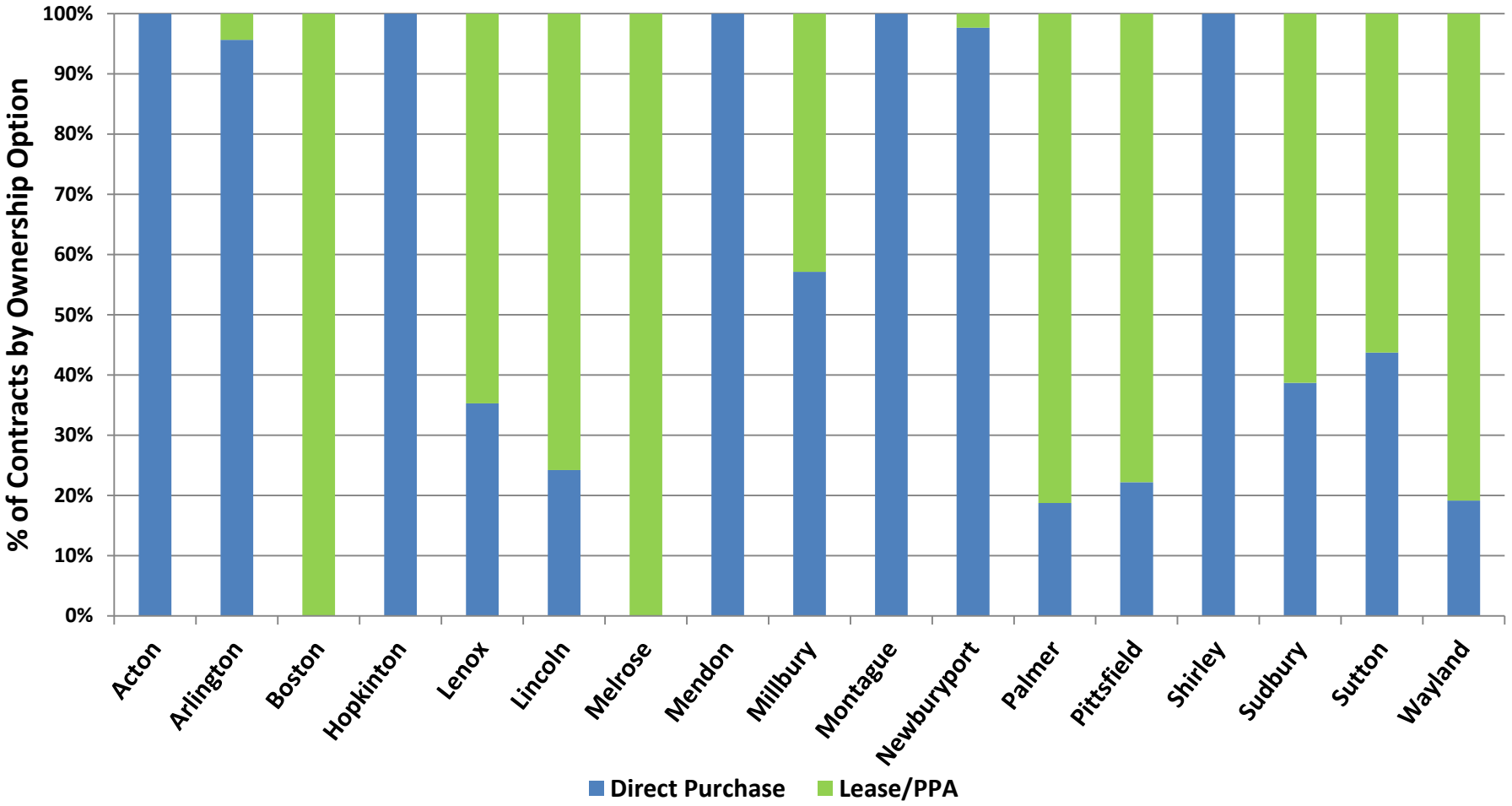
Analysis of projects 15kW and smaller (as of May 2013)

MASSACHUSETTS CLEAN ENERGY CENTER

DOER Massachusetts Department of Energy Resources

SOLARIZE MASS

2012 Ownership Options



Based on data as of 2/4/13.

2012 Solarize Mass Lessons Learned

- **Using a variety of outreach methods allows communities to reach a broader population.**

- **Community preparation is important.** Communities that developed a detailed marketing and outreach plan at the onset of the program were more successful in generating sustained interest and participation in the program.

- **Tiered Pricing Helps.** Tiered pricing motivated residents to participate, and to sell to each other.

- **Education.** Basic education about the technology, available incentives, and economics of solar PV is a key driver of generating interest and adoption.

- **Timing and Deadlines Drive Participation.** A deadline was important in motivating community members to take action and commit to signing a contract. There was a clear spike in participation as successive pricing tiers and the enrollment deadline approached**.**

2013 Solarize Mass Program

- Round 1:
  - 10 Communities selected for Round 1
  - 6 Installers selected: 5 “local” and 1 “national”

- Round 2:
  - Community RFP released on September 12th
  - Proposals due on October 22nd
  - Minimum of 8 communities will be selected
  - Round will run through June 30, 2014
  - Go to **www.solarizemass.com**, select **Community RFP**

2013 Round 2 Overview

- Open to all communities in MA
  - Be territory of an investor owned utility, or an MLP that pays into Renewable Energy Trust
  - ≤1,000 owner occupied residences
- Up to 3 communities can partner
  - Must be contiguous
- Tiered pricing for direct purchase & increased incentive for Lease/PPA
- $2,500 marketing grant per community

Thank you!

Elizabeth Kennedy
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Boston, MA 02110

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Helping Massachusetts Municipalities Create a Cleaner Energy Future

COMMONWEALTH OF MASSACHUSETTS

Deval L. Patrick, Governor
Richard K. Sullivan, Jr., Secretary
Mark Sylvia, Commissioner

US DOE Rooftop Solar Challenge: Mass Solar – Making it EZ

MAPC Regional Solar Power Workshop

September 26, 2013

Meg Lusardi, Director
Green Communities Division
Massachusetts Department of Energy Resources

Kurt Gaertner, Director of Sustainable Development
Executive Office of Energy and Environmental Affairs

Mass Solar – Making it EZ

- **DOE SunShot Rooftop Solar Challenge –** reducing soft costs of small commercial and residential rooftop solar PV

- **Award: $566,354**
  - Conduct outreach to local financial institutions
  - Update DOER's interconnection website
  - Create an implementation guide for Community Shared Solar (CSS)
  - Review and develop model local permitting process, including guidance for structural review
  - Develop model solar bylaw zoning language
  - PARTNERS: MassCEC, MassDevelopment, BBRS, SEBANE, Boston, Cambridge, Winchester, Hatfield and Harvard

Mass Solar – Making it EZ

- **Outreach to Financial Institutions**
  - Interviews with 24 financial institutions to better understand current lending practices and barriers to solar lending
  - Two half-day workshops on solar PV financing for MA lending institutions
  - Final report with recommendations:
    - Facilitate lending for ownership model
    - Provide installer with list of solar PV lenders
    - Incentivize lenders in the solar PV market

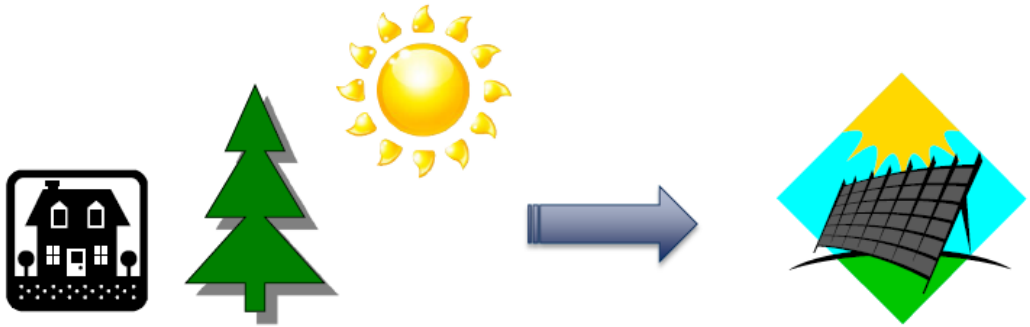
    http://www.mass.gov/eea/docs/doer/renewables/solar/doer-solar-financing-report-final.pdf

- **Update to DOER's Interconnection Website**
  - revised formatting and content to be more user-friendly
  - now includes two graphs displaying monthly interconnection process data reported to DOER by Massachusetts utilities.

    https://sites.google.com/site/massdgic

Mass Solar – Making It Easy
Community Shared Solar (CSS)

- What is Community Shared Solar?
  - 22-27% of residential bdgs are suitable for PV (NREL 2008)
  - CSS provides solar access to those facing site constraints
  - Participants benefit from
    - Net metering credits generated by the CSS project, which decrease their electric bills, and/or
    - Receive a return on a financial investment in the project
  - Hosted by an entity with a suitable roof or parcel of land



Mass Solar- Making it Easy
Community Shared Solar (CSS)

- Roles of the parties
  - **CSS Vendor** facilitates CSS project development and enrolls participants
  - **Participants** buy net metering credits from the CSS project to save money on their electric bills
  - **Site Owner** is the host and receives lease payments
  - **System Owner** is the ownership entity

Mass Solar – Making it Easy
Community Shared Solar (CSS)

- Key Considerations
  - Strong project team, with project champion
  - Availability of net metering services
  - Suitable installation site
  - Each parties' benefits are intertwined
  - Professional assistance, as needed

MassSolar – Making It Easy
Community Shared Solar (CSS)

- CSS Implementation Guidelines
  - Describe basic CSS frameworks suitable for MA
  - Help identify the best approach for a given scenario
  - Recommend best practices for project proponents
  - Explain how to estimate CSS project costs and benefits
  - Provide readers with additional resources

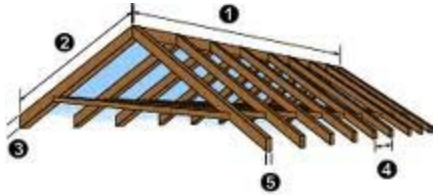
Community Shared Solar: Implementation Guidelines for Massachusetts Communities
http://www.mass.gov/eea/docs/doer/renewables/solar/community-shared-solar-implementation-guidelines-with-contracts-032913.pdf

Community Shared Solar: Review and Recommendations for Massachusetts Models
http://www.mass.gov/eea/docs/doer/renewables/solar/community-shared-solar-model-frameworks-032813.pdf

Mass Solar – Making it EZ
Model Permitting – Structural Review Guidance

- Standard guidelines for installing rooftop PV < 10 KW on 1 and 2 family residences - eliminate need for review by a PE in certain qualifying structures

- Prescriptive Process Flowchart with accompanying Maximum Rafter Span Table – applies to flush mounted systems only



- If structure “passes” the flowchart and the rafter span table “tests”, no need for PE review – guidelines signed by a PE

http://www.mass.gov/eopss/docs/dps/buildingcode/inf2/faq-prescriptive-process-stamped-signed-2-13-13.pdf

Prescriptive Process Flow chart for Residential PV < 10kW

1. House older than 1976? → **Yes**
   No ↓
2. Only one layer of roofing shingles? → **No**
   Yes ↓
3. Roof slope = > 4:12? → **No**
   Yes ↓
4. Roof rafters typical 2x lumber & regular spacing? → **No**
   Yes ↓
5. Roof rafters "Spruce-Pine-Fit" or "Hem-Fir"? → **No**
   Yes ↓
6. Fasteners are compliant w/ requirements of *Fastener Table*? → **No**
   Yes ↓
7. Skylights & other roof components within 2 ft of proposed PV array? → **Yes**
   No ↓
8. Other equipment supported by roof framing (above or below) within 2 ft of PV? → **Yes**
   No ↓
9. Other additions/renovations on or abutting roof within 6 ft of PV? → **Yes**
   No ↓
10. Roof framing showing signs of distress? → **Yes**
    No ↓
11. Any signs or known roof damage or previous repairs? → **Yes**
    No ↓

Employ Registered Design Professional to Evaluate Rooftop

If you did NOT need to use a Professional to evaluate the structure (per answers to questions above), you may use the **Maximum Rafter Span** table to evaluate the roof framing for PV.

Mass Solar – Making it EZ
Model Permitting – Structural Review Guidance

Maximum Rafter Spans (for non-cathedral ceilings)

DL = 10 psf, Max PV weight = 3.5 psf, max PV supports at 2 x Rafter spacing (alternate rafter loading)

			12" RAFTER SPACING				16" RAFTER SPACING				24" RAFTER SPACING			
			2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
P_g = 30 psf	Hem-Fir	SS	13' - 8"	18' - 0"	23' - 0"	28' - 0"	12' - 5"	16' - 5"	20' - 11"	25' - 5"	10' - 6"	13' - 11"	17' - 9"	21' - 7"
	Hem-Fir	#1	12' - 5"	16' - 5"	20' - 11"	25' - 5"	10' - 9"	14' - 2"	18' - 1"	22' - 0"	8' - 9"	11' - 7"	14' - 9"	18' - 0"
	Hem-Fir	#2	11' - 7"	15' - 4"	19' - 6"	23' - 9"	10' - 0"	13' - 3"	16' - 11"	20' - 7"	8' - 2"	10' - 10"	13' - 10"	16' - 10"
	Hem-Fir	#3	8' - 11"	11' - 9"	15' - 0"	18' - 3"	7' - 8"	10' - 2"	13' - 0"	15' - 9"	6' - 3"	8' - 3"	10' - 7"	12' - 10"
	Spruce-Pine-Fir	SS	13' - 5"	17' - 8"	22' - 6"	27' - 5"	12' - 2"	16' - 0"	20' - 6"	24' - 11"	9' - 11"	13' - 1"	16' - 9"	20' - 4"
	Spruce-Pine-Fir	#1	11' - 9"	15' - 6"	19' - 10"	24' - 1"	10' - 2"	13' - 5"	17' - 2"	20' - 11"	8' - 4"	11' - 0"	14' - 0"	17' - 0"
	Spruce-Pine-Fir	#2	11' - 9"	15' - 6"	19' - 10"	24' - 1"	10' - 2"	13' - 5"	17' - 2"	20' - 11"	8' - 4"	11' - 0"	14' - 0"	17' - 0"
	Spruce-Pine-Fir	#3	8' - 11"	11' - 9"	15' - 0"	18' - 3"	7' - 8"	10' - 2"	13' - 0"	15' - 9"	6' - 3"	8' - 3"	10' - 7"	12' - 10"
P_g = 40 psf	Hem-Fir	SS	12' - 10"	16' - 11"	21' - 7"	26' - 3"	11' - 8"	15' - 4"	19' - 7"	23' - 10"	9' - 7"	12' - 7"	16' - 1"	19' - 7"
	Hem-Fir	#1	11' - 3"	14' - 10"	19' - 0"	23' - 1"	9' - 9"	12' - 10"	16' - 5"	20' - 0"	8' - 0"	10' - 6"	13' - 5"	16' - 4"
	Hem-Fir	#2	10' - 6"	13' - 11"	17' - 9"	21' - 7"	9' - 1"	12' - 0"	15' - 4"	18' - 8"	7' - 5"	9' - 10"	12' - 6"	15' - 3"
	Hem-Fir	#3	8' - 1"	10' - 8"	13' - 7"	16' - 6"	7' - 0"	9' - 2"	11' - 9"	14' - 4"	5' - 8"	7' - 6"	9' - 7"	11' - 8"
	Spruce-Pine-Fir	SS	12' - 7"	16' - 6"	21' - 1"	25' - 8"	11' - 1"	14' - 7"	18' - 7"	22' - 8"	9' - 0"	11' - 11"	15' - 2"	18' - 6"
	Spruce-Pine-Fir	#1	10' - 8"	14' - 1"	18' - 0"	21' - 11"	9' - 3"	12' - 2"	15' - 7"	18' - 11"	7' - 6"	9' - 11"	12' - 8"	15' - 6"
	Spruce-Pine-Fir	#2	10' - 8"	14' - 1"	18' - 0"	21' - 11"	9' - 3"	12' - 2"	15' - 7"	18' - 11"	7' - 6"	9' - 11"	12' - 8"	15' - 6"
	Spruce-Pine-Fir	#3	8' - 1"	10' - 8"	13' - 7"	16' - 6"	7' - 0"	9' - 2"	11' - 9"	14' - 4"	5' - 8"	7' - 6"	9' - 7"	11' - 8"
P_g = 50 psf	Hem-Fir	SS	12' - 2"	16' - 0"	20' - 5"	24' - 10"	10' - 9"	14' - 3"	18' - 2"	22' - 1"	8' - 10"	11' - 7"	14' - 10"	18' - 0"
	Hem-Fir	#1	10' - 5"	13' - 9"	17' - 6"	21' - 4"	9' - 0"	11' - 10"	15' - 2"	18' - 5"	7' - 4"	9' - 8"	12' - 4"	15' - 1"
	Hem-Fir	#2	9' - 8"	12' - 10"	16' - 4"	19' - 11"	8' - 5"	11' - 1"	14' - 2"	17' - 3"	6' - 10"	9' - 0"	11' - 7"	14' - 1"
	Hem-Fir	#3	7' - 5"	9' - 10"	12' - 6"	15' - 3"	6' - 5"	8' - 6"	10' - 10"	13' - 2"	5' - 3"	6' - 11"	8' - 10"	10' - 9"
	Spruce-Pine-Fir	SS	11' - 9"	15' - 6"	19' - 10"	24' - 1"	10' - 2"	13' - 5"	17' - 2"	20' - 11"	8' - 4"	11' - 0"	14' - 0"	17' - 1"
	Spruce-Pine-Fir	#1	9' - 10"	13' - 0"	16' - 7"	20' - 2"	8' - 6"	11' - 3"	14' - 4"	17' - 6"	6' - 11"	9' - 2"	11' - 9"	14' - 3"
	Spruce-Pine-Fir	#2	9' - 10"	13' - 0"	16' - 7"	20' - 2"	8' - 6"	11' - 3"	14' - 4"	17' - 6"	6' - 11"	9' - 2"	11' - 9"	14' - 3"
	Spruce-Pine-Fir	#3	7' - 5"	9' - 10"	12' - 6"	15' - 3"	6' - 5"	8' - 6"	10' - 10"	13' - 2"	5' - 3"	6' - 11"	8' - 10"	10' - 9"

Notes and Assumptions for Use of Above Table

1. Prior to use of this Table, comply with the Prescriptive Process Flowchart for Residential PV <10 kW.
2. This Table to be utilized by appropriately knowledgeable engineering or construction individuals.
3. Use of this table assumes construction is Code Compliant, i.e., collar ties exist at appropriate spacing, rafters are correctly located on opposing sides of ridge beam.
4. Actual spans exceeding the Table values may be reduced by installing rafter braces to appropriate bearing wall locations, employ a Registered Design Professional (RDP) for proper details.
5. Ground Snow Loads (P_g) based on 780 CMR 58.00.
6. Allowable stress design based on NDS-2005, maximum total load deflection limited to L/180.
7. PV panels installed parallel to the roof plane and the distance between the roof covering and bottom of the PV panel is ≤ 12".

Mass Solar – Making it EZ
Model Permitting – Model Permitting Processes

- Review of 25 municipalities –
  - wide ranging permit fees;
  - department reviews range from 2 - 4 or 8;
  - lack of consolidated application
  - Only 3 with online submission, limited info specific to solar PV
  - http://www.mass.gov/eea/docs/doer/renewables/solar/recommended-model-permitting.pdf
- Recommendations developed by consultant based on Solar ABCs –
  - Flowchart of Rooftop Solar PV Permit Process
  - Standard Permit Application for Rooftop PV Systems Sized <= 300 kW
  - Fast Track Permit Application for Residential Rooftop PV Systems Sized <= 10 kW
  - Design Template Package
  - Permit Fee Table
- Pending further review by BBRS and potential future funding

Mass Solar - Making it EZ

Zoning for Solar Energy Projects

9/26/2013

Kurt Gaertner
MA Executive Office of Energy & Environmental Affairs
Kurt.Gaertner@state.ma.us
(617) 626-1154

What can Communities do to Promote Clean Energy?

Promote Clean Energy:

- Reduce greenhouse gas emissions and consumption of fossil fuels.
- Maximize energy efficiency and renewable energy opportunities.
- Support energy conservation strategies, local clean power generation, distributed generation technologies, and innovative industries.

"Ask" of Municipalities:

- **Site renewable and other clean energy facilities**
- Concentrate growth & mix uses to realize energy and emissions benefits
- Implement green building practices
- Enhance energy efficiency

Sustainable Development Principles

The Commonwealth of Massachusetts shall care for the built and natural environment by promoting sustainable development through integrated energy and environment, housing and economic development, transportation and other policies, programs, investments, and regulations. The Commonwealth will encourage the coordination and cooperation of all agencies, invest public funds wisely in smart growth and equitable development, give priority to investments that will deliver good jobs and good wages, transit access, housing, and open space, in accordance with the following sustainable development principles. Furthermore, the Commonwealth shall seek to advance these principles in partnership with regional and municipal governments, non-profit organizations, business, and other stakeholders.

1. Concentrate Development and Mix Uses
Support the revitalization of city and town centers and neighborhoods by promoting development that is compact, conserves land, protects historic resources, and integrates uses. Encourage remediation and reuse of existing sites, structures, and infrastructure rather than new construction in undeveloped areas. Create pedestrian friendly districts and neighborhoods that mix commercial, civic, cultural, educational, and recreational activities with open spaces and homes.

2. Advance Equity
Promote equitable sharing of the benefits and burdens of development. Provide technical and strategic support for inclusive community planning and decision making to ensure social, economic, and environmental justice. Ensure that the interests of future generations are not compromised by today's decisions.

3. Make Efficient Decisions
Make regulatory and permitting processes for development clear, predictable, coordinated, and timely in accordance with smart growth and environmental stewardship.

4. Protect Land and Ecosystems
Protect and restore environmentally sensitive lands, natural resources, agricultural lands, critical habitats, wetlands and water resources, and cultural and historic landscapes. Increase the quantity, quality and accessibility of open spaces and recreational opportunities.

5. Use Natural Resources Wisely
Construct and promote developments, buildings, and infrastructure that conserve natural resources by reducing waste and pollution through efficient use of land, energy, water, and materials.

6. Expand Housing Opportunities
Support the construction and rehabilitation of homes to meet the needs of people of all abilities, income levels, and household types. Build homes near jobs, transit, and where services are available. Foster the development of housing, particularly multifamily and smaller single-family homes, in a way that is compatible with a community's character and vision and with providing new housing choices for people of all means.

7. Provide Transportation Choice
Maintain and expand transportation options that maximize mobility, reduce congestion, conserve fuel and improve air quality. Prioritize rail, bus, boat, rapid and surface transit, shared-vehicle and shared-ride services, bicycling, and walking. Invest strategically in existing and new passenger and freight transportation infrastructure that supports sound economic development consistent with smart growth objectives.

8. Increase Job and Business Opportunities
Attract businesses and jobs to locations near housing, infrastructure, and transportation options. Promote economic development in industry clusters. Expand access to education, training, and entrepreneurial opportunities. Support the growth of local businesses, including sustainable natural resource-based businesses, such as agriculture, forestry, clean energy technology, and fisheries.

9. Promote Clean Energy
Maximize energy efficiency and renewable energy opportunities. Support energy conservation strategies, local clean power generation, distributed generation technologies, and innovative industries. Reduce greenhouse gas emissions and consumption of fossil fuels.

10. Plan Regionally
Support the development and implementation of local and regional, state and interstate plans that have broad public support and are consistent with these principles. Foster development projects, land and water conservation, transportation and housing that have a regional or multi-community benefit. Consider the long-term costs and benefits to the Commonwealth.

Why is it important that a community zone for solar energy facilities?

Of course, to facilitate the siting of solar systems. But also to avoid the problems that come with a solar proposal in the absence of zoning. Struggling with what reasonable regulation means now is far better than dealing with an application for a solar facility in the absence of zoning.

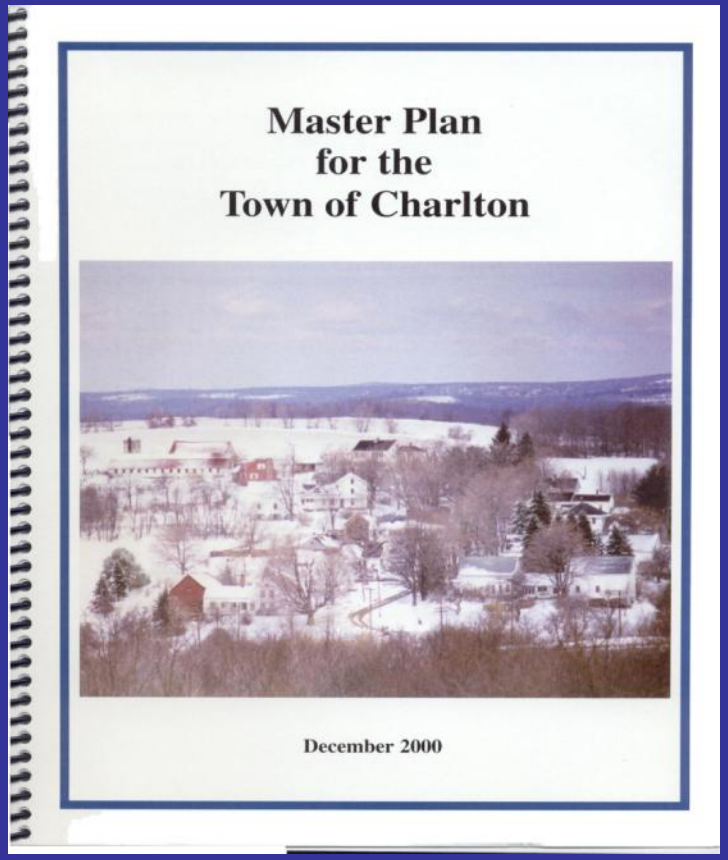
Can local zoning treat varying sizes and types of solar facilities differently?

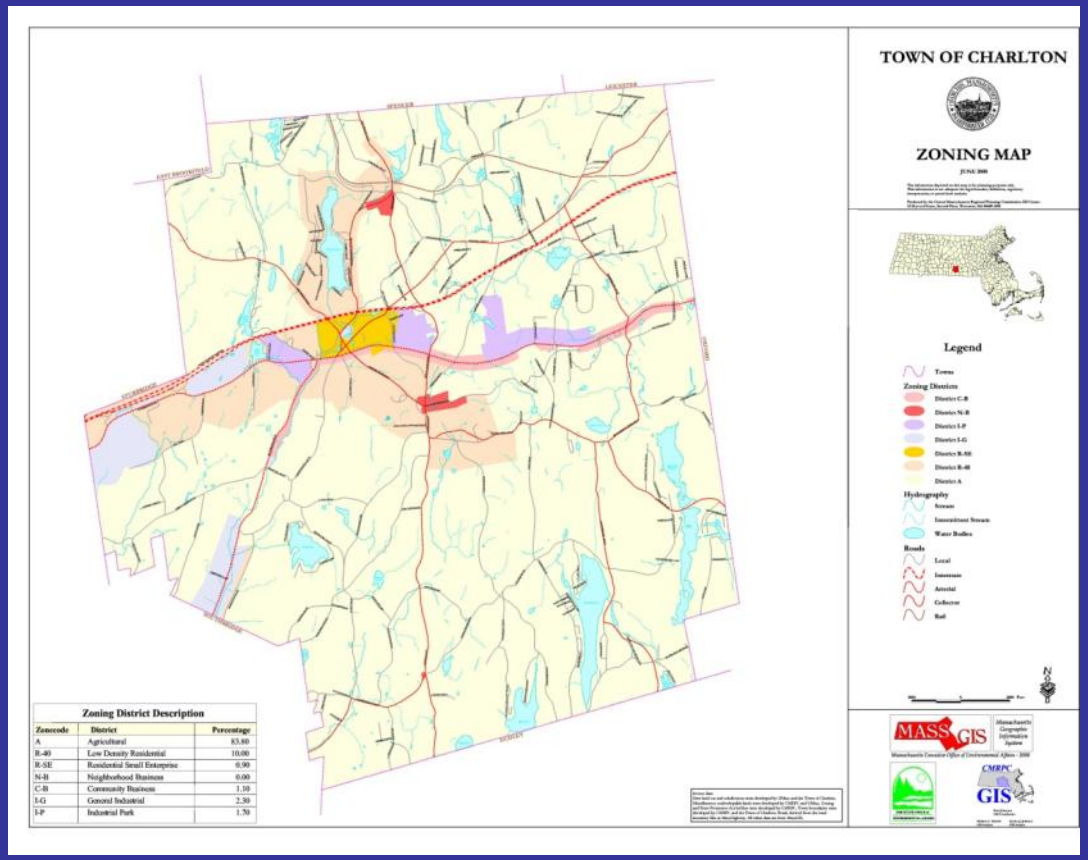
Yes, common means of differentiating between facilities are by type (roof vs. ground mounted) and size (square feet of surface area or generating capacity)

What is the ideal local regulatory approach?

A Master Plan that addresses energy, AND

Zoning, consistent with the plan, that facilities the siting of renewables and advances other energy goals





What is a good way for a community to approach incorporation of solar energy systems into the local zoning bylaw/ordinance?

Begin with an audit, with particular attention to:

- Definitions
- Allowable Uses
- Dimensional Requirements
- Site Plan or Design Review Regulations

As necessary develop local zoning language

What does state law have to say about the siting of solar energy facilities?

Existing Massachusetts law limits the ability for local governments to regulate solar facilities. Massachusetts General Laws Chapter 40A Section 3 reads:

No zoning ordinance or by-law shall prohibit or unreasonably regulate the installation of solar energy systems or the building of structures that facilitate the collection of solar energy, except where necessary to protect the public health, safety or welfare.

Can a general bylaw/ordinance [rather than zoning] be used to regulate solar energy systems?

Since language relative to solar energy systems is primarily found in Chapter 40A zoning is the appropriate tool to regulate these systems.

Are there any concerns about the intersection between zoning regulations that pertain to solar energy systems and building code?

Chapter 30A Section 3 includes the following exemption language “No zoning ordinance or bylaw shall regulate or restrict the use of materials, or methods of construction of structures regulated by the state building code...” The state’s model zoning has been carefully drafted to abide by this provision of state statute. Communities adapting the model zoning should be similarly cautious to avoid adopting requirements that are precluded by statute as they are already addressed in the Building Code.

Can a community restrict large-scale ground mounted solar facilities to certain zones? Require a special permit for these facilities?

Some have. But, is this “reasonable” & necessary to protect public health, safety, or welfare?

What is the relationship between as of right solar zoning and Green Community status?

The legislation that created Green Communities established the criteria to be “Green”. Criterion One explicitly states that zoning must be by right, which is consistent with Administration policy. (Note: this zoning could be for renewable energy generation, or clean energy related R & D or Manufacturing.

Does DOER have any guidance in regard to the proper siting of large-scale ground mounted facilities?

- DOER strongly discourages designating locations that require significant tree cutting or that lead to the unnecessary loss of agricultural land

- DOER encourages designating locations in industrial and commercial districts, or on vacant, disturbed land.

Resources – Model Bylaws

Large Scale Ground Mounted Available, Small-Scale Solar Zoning Bylaw Under Development

Three Step Process for New Local Bylaw

1. Model bylaw provides a framework for local zoning regulation
2. Blue commentary sections highlight questions local decision makers should answer to tailor the model to local circumstances
3. Review customized bylaw with legal counsel

RECOMMENDATION: The minimum setback for a side yard shall be zero feet. Where deemed appropriate by the Planning Board, alleys between buildings may be encouraged for the provision of beneficial public connections between buildings, open spaces and streets. The maximum side setback shall be determined by the Planning Board, and shall not exceed 25 feet.

ALTERNATIVE: *In smaller town centers or rural locations, it may be more appropriate to have side yard setbacks of up to 15 feet. In town centers or urban areas with substantial vehicle traffic, side setbacks may need to be up to 30 feet to allow for two-way traffic to rear parking & loading areas.*

What subjects are covered by DOER's Model Zoning for Large-Scale systems?

- Dimensional Regulations
- Specifics regarding site plan review, such as required documents
- Operation and Maintenance Plan
- Design Standards
- Safety and Environmental Standards
- Monitoring and Maintenance
- Abandonment and Decommissioning

Further Information:

DOER Model Zoning and other information:

http://www.mass.gov/eea/energy-utilities-clean-tech/green-communities/gc-grant-program/criterion-1.html

Massachusetts Smart Growth / Smart Energy Toolkit

www.mass.gov/envir

Clean Energy Results:
Ground-Mounted Solar Photovoltaic Systems – Questions & Answers

http://www.mass.gov/eea/docs/doer/renewables/solar/solar-pv-guide.pdf

Massachusetts DG and Interconnection Main Page

https://sites.google.com/site/massdgic/

MA Clean Energy Center

http://www.masscec.com/

Renewable Energy Portfolio Standard & Alternative Energy Portfolio Standard Programs

http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/rps-aps/

Contact Information

Meg Lusardi - meg.lusardi@state.ma.us

Mike Judge – michael.judge@state.ma.us

http://www.mass.gov/eea/energy-utilities-clean-tech/renewable-energy/solar/sunshot-rooftop-solar-challenge.html

Kurt Gaertner – kurt.gaertner@state.ma.us

Agenda

08:30 – 08:45	Welcome & Introductions
08:45 – 09:05	Interactive Activity: Benefits & Barriers
09:05 – 10:25	Promoting Solar Power in Your Community
10:25 – 10:35	*Break*
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- MAPC Regional Solar Initiative
- Solar Contracting Basics

CADMUS

Solar Power on Public Properties

MAPC Regional Solar Initiative, Solar PPAs, and Alternatives

September 26, 2013

Summary

- Introductions
- MAPC Regional Solar Initiative
- Solar EMS 101
- EMS Negotiations
- MA Solar Update
- Alternatives to Solar EMS

CADMUS

- Waltham-based energy & environmental consulting firm
- Helped 50+ state and local entities make informed business decisions about renewable energy for 10 years
- Serve as prime solar policy consultant to the MA Department of Energy Resources
- Grant assurances of net metering eligibility as the Administrator of the “Net Metering Queue”
- Cadmus is **MAPC’s Regional Solar Services Consultant**

MAPC Regional Solar Initiative

- MAPC leading a regional procurement of solar Energy Management Services (EMS) for 17 communities
- Solar developer, **Broadway Renewable Strategies**, selected through qualifications-based approach
- Broadway Renewable Strategies and participating communities now exploring options for solar on public properties

BROADWAY

MAPC
METROPOLITAN AREA PLANNING COUNCIL
Smart Growth & Regional Collaboration

Solar EMS 101

What is a Solar EMS Contract?

- A **solar Energy Management Services** (solar EMS) contract is a long-term (20+ year) contract for services, including:
  - PV system design, financing, and installation
  - Operations, maintenance, and system removal
  - Long-term lease of public space
  - PV Electricity
  - System performance guarantee
- All of these services can be procured under **one solicitation** via MGL c.25A
- This **is not a public works contract**. It is a service agreement.




Solar EMS 101

Who are the Parties Involved?

Solar Developer

- Design, finance, build PV system
- Long-term O&M
- System removal
- Guarantee production of electricity
- Take SRECs (usually)

Host Community

- Host PV system for 20+ years
- Buy all electricity generated by PV system per a set price schedule ($ per kWh)

Utility Company

- Take excess generation
- Provide net metering credits to community, where applicable

Solar EMS 101

Hypothetical Price Schedule

- System capacity
  - 150 kW
- Estimated Annual Production
  - 170,000 kWh
- **Guaranteed Annual Production**
  - 80% of Estimate = 136,000 kWh
- Year 1 EMS Rate
  - 10 cents per kWh
- Annual EMS Rate Escalator
  - 2%

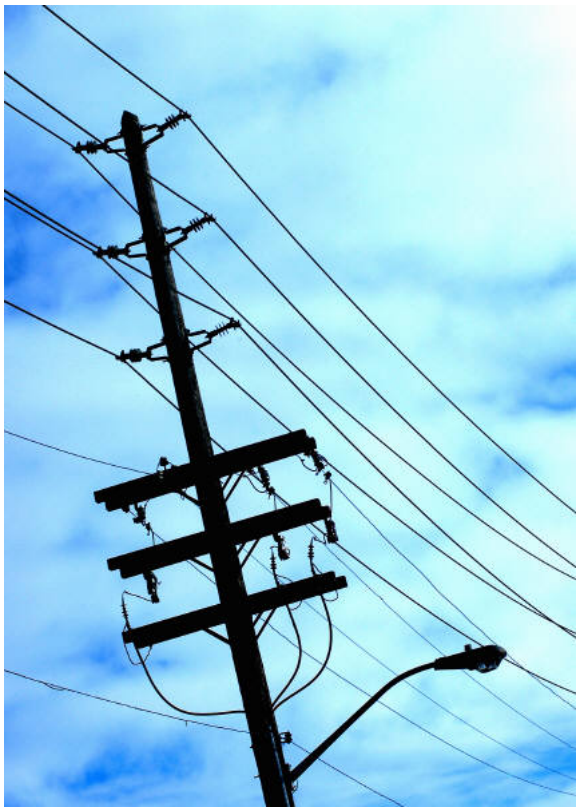
Year	Price ($/kWh)
1	0.0100
2	0.0102
3	0.0104
4	0.0106
5	0.0108
6	0.0110
7	0.0113
8	0.0115
9	0.0117
10	0.0120
11	0.0122
12	0.0124
13	0.0127
14	0.0129
15	0.0132
16	0.0135
17	0.0137
18	0.0140
19	0.0143
20	0.0146




Solar EMS 101

Where do Energy Cost Savings Come From?

Grid Rate = 12 cents/kWh



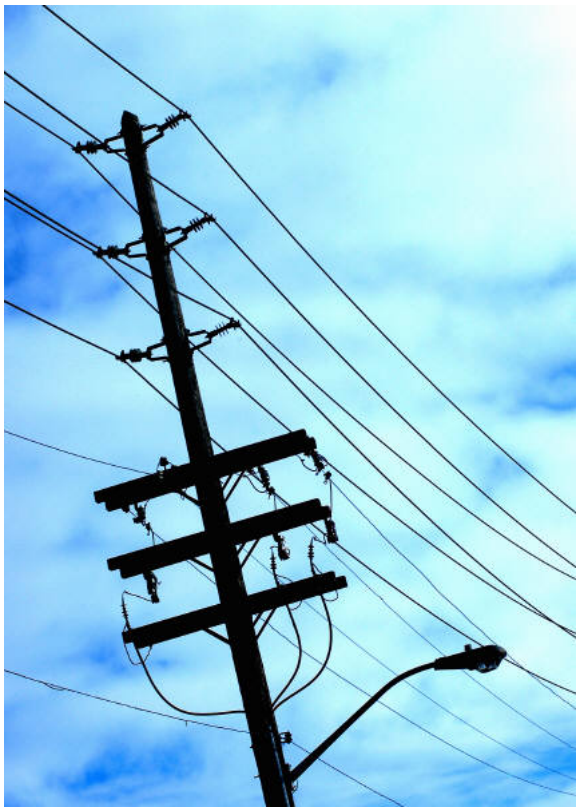



Solar EMS 101

Where do Energy Cost Savings Come From?

EMS Rate = 10 cents/kWh

Grid Rate = 12 cents/kWh






Solar EMS 101

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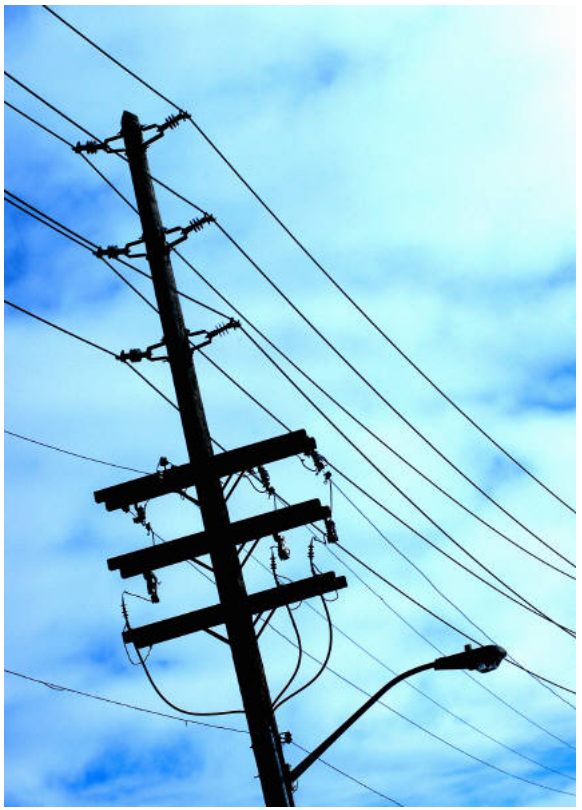


Solar EMS 101

What is the Long-term Value?

EMS Rate = 10 cents/kWh

Grid Rate = 12 cents/kWh

Savings to Community per kWh Produced by PV System

= Grid Rate – EMS Rate

=12 cents/kWh – 10 cents/kWh

=2 cents/kWh

NOTE:
Knowing if an EMS rate is a good or bad deal requires that you understand your grid rate.

Solar EMS 101

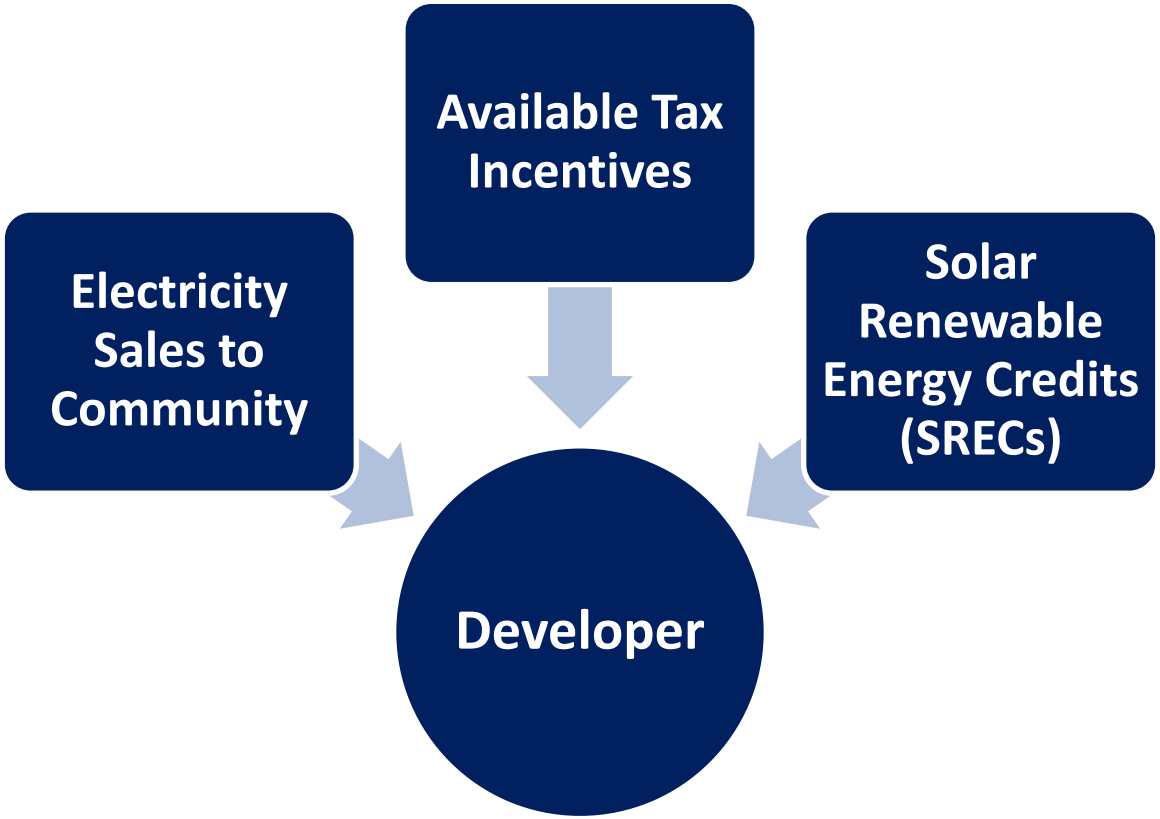
What is the Motivation?

- Low-cost solar electricity
- …at no upfront cost
- …without the costs/risks of ownership
  - No O&M responsibilities
- Hedge against electricity price volatility
- Take advantage of available tax incentives




Solar EMS 101

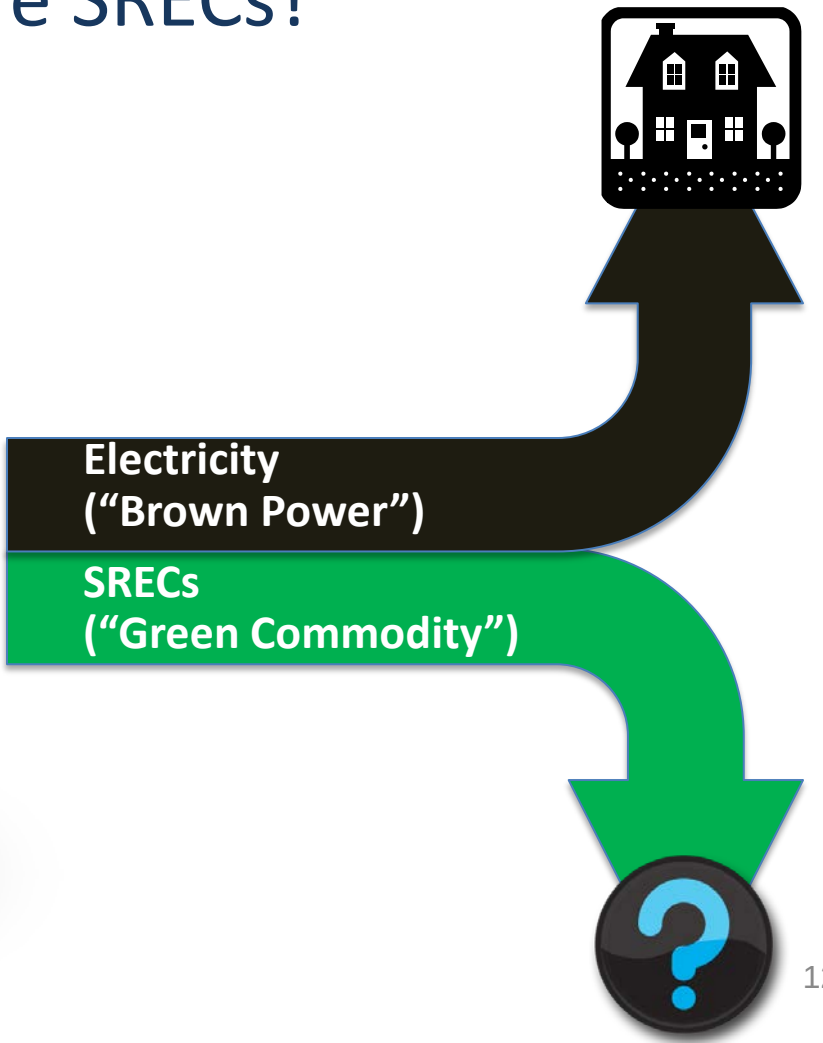
What are the Benefits to the Developer?






Solar EMS 101

What are SRECs?



Update
MAPC Regional Solar Initiative

- Participating communities submitted potential sites to Broadway for consideration
- Broadway evaluated potential sites and provided
  1. Preliminary technical proposal
  2. Preliminary pricing
  3. Energy cost savings estimates
- Next step: EMS contract negotiations

EMS Contract Negotiations

- General Recommendations
  - Change-in-Law
  - Performance guarantee
  - Force Majeure & vandalism
  - Emergency repairs
  - Net metering regulatory risk
  - Bonding
- Major decision points
  - Taxes
  - Timelines
  - Default assurance mechanism
  - Extras: CORI checks, educational package, etc.
  - Project locations/size
  - Pricing (per kWh rate and % escalation)

Introduction to Solar EMS Contracts: Key Provisions

- **Services:** 20+ year contract for the purchase of SEMS services, including PV system design, installation, O&M, and removal, and electricity generation

WHEREAS, User desires to purchase solar-generated electricity for use by User in one or more buildings located on the property of the User (the "***Premises***"), all as set forth in Attachment A attached hereto;

WHEREAS, Developer is in the business of financing, installing, owning, operating and maintaining solar power electric generation facilities;

WHEREAS, Developer proposes to finance, install, own, operate and maintain one or more solar energy facilities (each a "***System***" and together the "Systems") on the rooftop(s) of certain buildings on the Premises, such Systems being more particularly set forth in Attachment B attached hereto;

(g) Removal of the Systems. Except as otherwise provided herein, Developer shall, within ninety (90) days following the end of the Term and at Developer's sole cost and expense, remove the Systems from the Premises and restore the Premises to its original condition, normal wear and tear excluded.

Introduction to Solar EMS Contracts: Key Provisions

- **System Ownership:** The PV system, SRECs, and tax incentives are owned by Developer.

IV. FACILITY DEVELOPERSHIP, INSTALLATION, OPERATION, MAINTENANCE, AND REMOVAL

(a) Title. Except as otherwise set forth in this Agreement, as between the Parties during the Term of this Agreement, all ownership of and title to the System, permits, approvals, Environmental Attributes, tax benefits associated with the System shall be with the Developer. Developer shall be the legal and beneficial owner of the System, which System will at all times retain the legal status of personal property of Developer as defined under Article 9 of the Uniform Commercial Code. The System will not attach to or be deemed a part of, or a fixture to, the Premises notwithstanding the manner in which the System is or may be affixed to real property of User. User will not take a position on any tax return or in other filings suggesting that it is anything other than a purchaser of Electricity

Introduction to Solar EMS Contracts: Key Provisions

- **Purchase and Sale of Electricity:** The Community purchases 100% of the electricity produced by the PV system. The electricity price ($/kWh) follows the negotiated price schedule.

V. PURCHASE AND SALE; DELIVERY; GOVERNMENTAL CHARGES

(a) Purchase and Sale of Electricity. Commencing on the Commercial Operation Date and continuing throughout the remainder of the Term, Developer shall sell and make available to User, and User shall purchase and take delivery of at the Delivery Point, all of the Electricity generated by the System.




Introduction to Solar EMS Contracts: Key Provisions

- **Governmental Charges:** These provisions dictate how taxes are treated. For ground-mounted systems, it is important to have a plan for the treatment of property taxes. Comprehensive guidance on how to assess property taxes for these systems, however, is not available at this time.

> (e) Governmental Charges.
>
> (i) Developer is responsible for local, state and federal income taxes attributable to Developer for income received under this Agreement.
>
> (ii) User shall pay directly or reimburse Developer for all sales and use taxes that may be imposed by any Governmental Authority on the sale of Electricity to User. User shall provide Developer with its exemption certificate or documentation which may be necessary for Developer to demonstrate to such Governmental Authority that no sales or use taxes should be imposed on User as a municipal corporation.

Introduction to Solar EMS Contracts: Key Provisions

- **Performance Guarantee:** Each contract year, if the system does not produce the guaranteed amount of electricity for that year, Developer will reimburse Community for underperformance.

> (f) Guaranteed Annual Electric Output.
>
> (i) Developer guarantees that the System will produce the Guaranteed Annual Electric Output in each Contract Year, as adjusted by the Annual System Degradation Factor. On the first anniversary of the Commercial Operation Date and each anniversary of the Commercial Operation Date thereafter during the Term (and any extension thereof), the Guaranteed Annual Electric Output shall be decreased by the Annual System Degradation Factor.

Introduction to Solar EMS Contracts: Key Provisions

- **Ownership of Environmental Attributes (SRECs):** The contract gives Developer the title to SRECs.

VI. ENVIRONMENTAL ATTRIBUTES

(a) Title to Environmental Attributes. All Environmental Attributes relating to the System or the Electricity will be and remain property of Developer. Developer shall have all right, title, and interest in and to any and all Environmental Attributes that relate to the Electricity during the Term, and User shall have no right, title or interest in or to any such Environmental Attributes. Title to environmental attributes as of the effective date of this Agreement are vested in the Developer and shall remain with the Developer at all times relevant to this Agreement.

Introduction to Solar EMS Contracts: Key Provisions

- **Metering and Meter Accuracy:** Developer owns and maintains the meter that determines the amount of electricity produced; however, Community can challenge the accuracy of the meter.

> (a) Metering Equipment. The Parties acknowledge and agree that Developer shall provide, install, own, operate and maintain the Metering Device. Developer shall maintain the Metering Device in accordance with all Applicable Legal Requirements.

> (c) Testing and Correction/User's Right to Conduct Tests. Each Party and its consultants and representatives shall have the right to witness each test conducted by or under the supervision of Developer to verify the accuracy of the measurements and recordings of the Metering Device.

Introduction to Solar EMS Contracts: Key Provisions

- **System Loss:** Developer bears the risk of system loss and funds repairs (except in the case of User negligence). The contract envisions two scenarios – partial loss and total loss (if damage results in *total* loss, Developer elects whether or not to repair/replace system).

> (ii) Partial Loss. In the event of any System Loss that results in less than total damage, destruction or loss of the System, this Agreement will remain in full force and effect and Developer will, at Developer's sole cost and expense, subject to the provisions below, repair or replace the System as quickly as practicable. To the extent of any System Loss that results in less than total damage, destruction or loss of the System, and is caused by User Misconduct, User shall promptly upon demand therefore from Developer pay any and all costs and expenses of such repair or replacement, including any lost revenues for sales of Electricity and Environmental Attributes based upon the estimated energy production capacity of the System in the relevant Contract Year.

Introduction to Solar EMS Contracts: Key Provisions

- **Force Majeure:** Force Majeure can excuse the performance of obligations under the contract for up to 12 months.
- **Default:** If the Developer defaults (fails to keep insurance, makes false claim, etc.), the Community can require that system be removed and that the Developer pay a termination payment. This is also true in the reverse.

> (c) User Rights Upon Termination for Default. In the event that User is the Non-Defaulting Party and elects to terminate this Agreement as provided in Section IX, User shall, at its sole and exclusive option and in its sole and absolute discretion, either (i) require Developer to remove the System as provided in Section IV above and pay the Developer Termination Payment, or (b) exercise the Purchase Option provided in Section XIII below and require the Developer to pay the Developer Termination Payment. In the event that User elects either of the foregoing remedies, such express remedy and any associated measure of damages shall be the sole and exclusive remedy available to User as a result of termination of this Agreement subject, however, to subsection (h) below.

Introduction to Solar EMS Contracts: Key Provisions

- **Invoicing and Payment:** Community has a given number of days to pay monthly invoice for electricity from the PV system.
- **System Purchase and Sale:** Community can purchase the PV system during the contract term. The system's cost is determined by an independent appraiser.

XIII. SYSTEM PURCHASE AND SALE OPTIONS

(a) Grant of Purchase Option. For and in consideration of the payments made by User under this Agreement, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the Parties, Developer hereby grants User the right and option to purchase all of Developer's right, title and interest in and to the System and the Environmental Attributes on the terms set forth in this Agreement (the "***Purchase Option***").

Introduction to Solar EMS Contracts: Key Provisions

- **Representations and Warranties:** Best practice to have local counsel review
- **Limitations:** Best practice to have local counsel review
- **Indemnification:** Best practice to have local counsel review
- **Dispute Resolution:** Best practice to have local counsel review
- **Assignment:** Developer may transfer its obligations under the agreement to another party

> (a) Assignment; Binding Effect. Developer shall not, without the prior written consent of User, which consent will not be unreasonably withheld or delayed, assign, pledge or transfer all or any part of, or any right or obligation under, this Agreement, whether voluntarily or by operation of law, and any such assignment or transfer without such consent will be null and void; provided, however, that Developer may, with only prior written notice to User, assign, pledge or transfer all or any part of, or any right or obligation under this Agreement for security purposes in connection with any financing or other financial arrangements regarding the System (each, a "*Permitted Transfer*"); provided, however, that such assignment shall not relieve the Developer of its obligations under this Agreement. Developer shall deliver notice of any Permitted Transfer to User in writing as soon as reasonably practicable.

Introduction to Solar EMS Contracts: Key Provisions

- **Site Access:** License component of the SEMS contract gives Developer the right to occupy the space.

5. During the Term (unless the Agreement is earlier terminated), USER agrees that it shall not grant any license or other interest in and to the Licensed Area that would materially interfere with the License granted to Developer that would permit or cause shading of the System or that would otherwise materially impair Developer's ability to obtain the benefit of its rights and to perform its obligations under this Agreement.

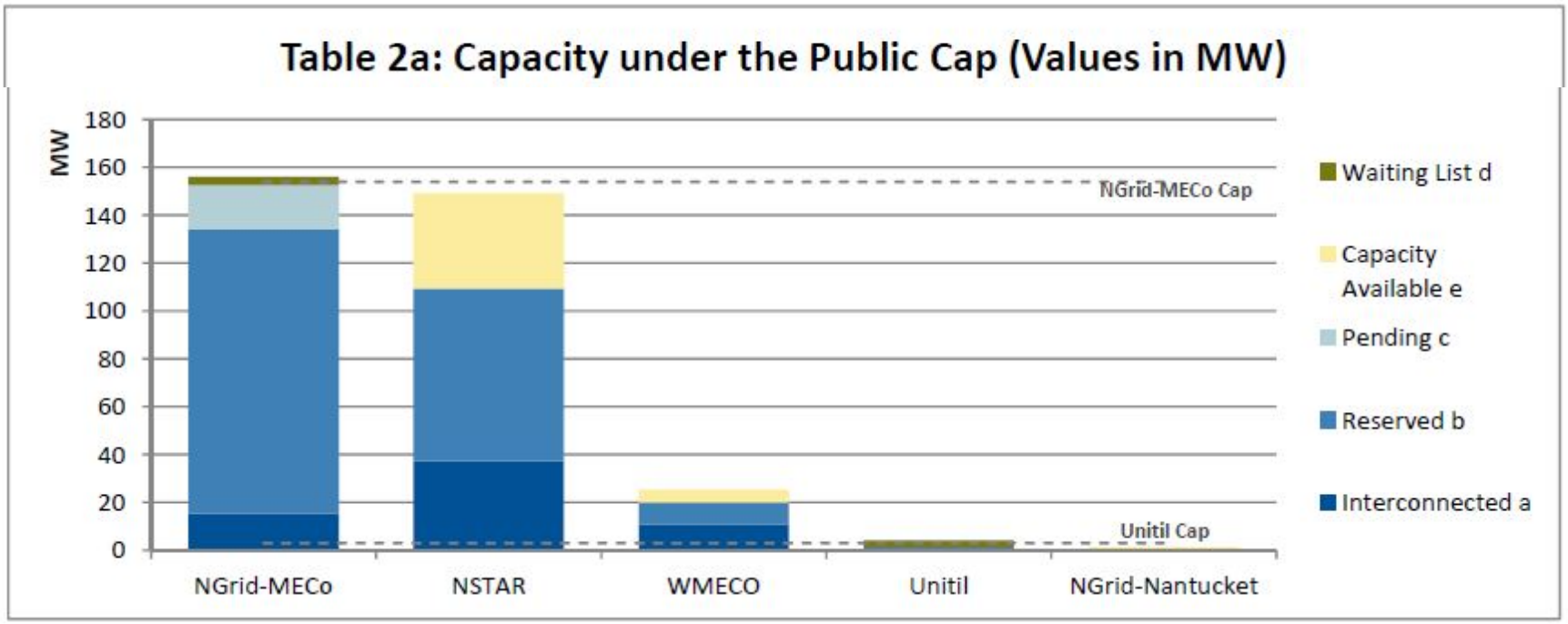
6. Developer hereby covenants to pay USER, on or before the Commercial Operation Date, and on or before each anniversary of the Commercial Operation Date during the Term, as and for rent of the License Area, $1.00 (one U.S. dollar).

MA Solar Update
Solar Carve-Out Program

- **Massachusetts solar incentives are changing**
- Original Solar Carve-Out Program (400 MW)
  - Fully subscribed
  - New regulations being developed
- New Solar Carve-Out Program (1600 MW)
  - Program rules likely to benefit early adopters
  - Updated regulations anticipated for early 2014
- **Some projects are on hold as program is finalized**




MA Solar Update
Net Metering



*As of September 12, 2013

MA Solar Update
Net Metering

- Net Metering is a capped incentive in MA
- Facilities that will net meter must secure a spot in the “net metering queue”
- National Grid Public & Unitil Public Caps have been reached
  - Weekly Cap reports can be found at MassACA.org

Alternatives to Solar EMS
Local Barriers

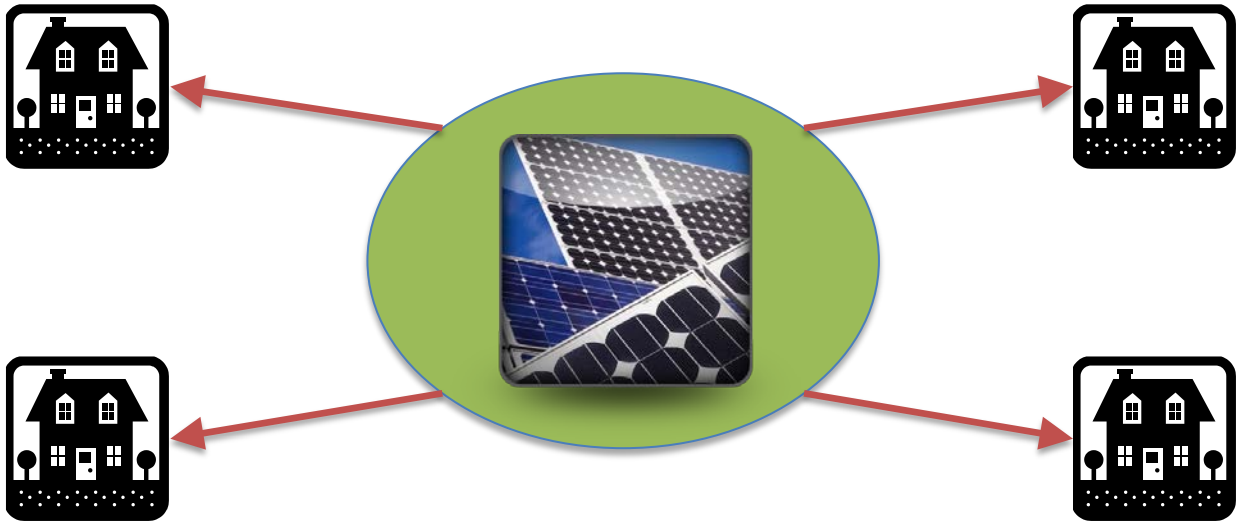
- What barriers to a local solar EMS projects are you seeing in your community?
  - No sizeable properties?
  - Old roof membranes?
  - Legal and tax questions?
  - Stakeholder concerns?
  - Confusing approval process?
  - Conflict with competitive supply contract?
  - Municipal utility?

Alternatives to Solar EMS
Different Approaches

- Credit purchase agreements
- Power purchase agreements
- Lease model
- Supporting residential solar
- Options for municipal utilities




Community Shared Solar (CSS)



- Hosted by an entity with a suitable roof or parcel of land
- Participants motivated by an inability to install PV at their property
- Residents and business purchase net metering credits or buy shares

Erin Sweet

617-673-7101

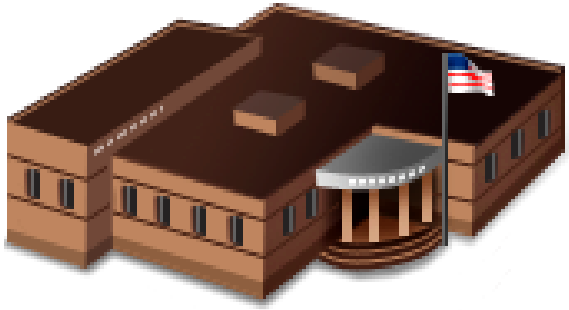
Erin.sweet@cadmusgroup.com




Virtual Net Metering

*Investor-owned Utilities Only

kWh Production



Net Metering Credits ($$)

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Merrimack Valley Planning Commission
*plan * develop * promote*

Going Green Regionally

Dennis A. DiZoglio
Executive Director

Merrimack Valley Clean Energy Action Plan

- Common Challenges
- Green Communities Act
- Energy Programs and Resources
- Community Strategies and Recommendations
- Regional Action Plan
  - Regional Energy Assistance Program (REAP)
  - ESCO
  - Electric Aggregation
  - Brightfields
  - Net Metering

“Brightfields”

- Convert Landfills/Brownfields into Solar Farms
  - 9 Communities & 11 landfills
  - “Fatal Flaw” Analysis
  - Identify & Organize Options
  - Regional Renewable Energy Manager
  - Power Purchase Agreement

Net Metering Utility Credit

- Green Communities Act of 2008
- Municipalities Can Purchase Energy Generated from Renewable Projects
- 10 MW Cap (AC)
- Within Municipalities Electric Load Zone

MVPC Net Metering Credit Program

- Local Experience
- Expertise
- Request for Proposals (RFP)

Proposal Responses

- Retail Rate: $0.138
- 3 Options Offered
  - $0.0975/kWH fixed for 20 years
  - 10% off Retail
  - $0.0775/kWH, 2.5% escalator/year, 20 year term
- Economy of Scale: 15M kWH >
- Status

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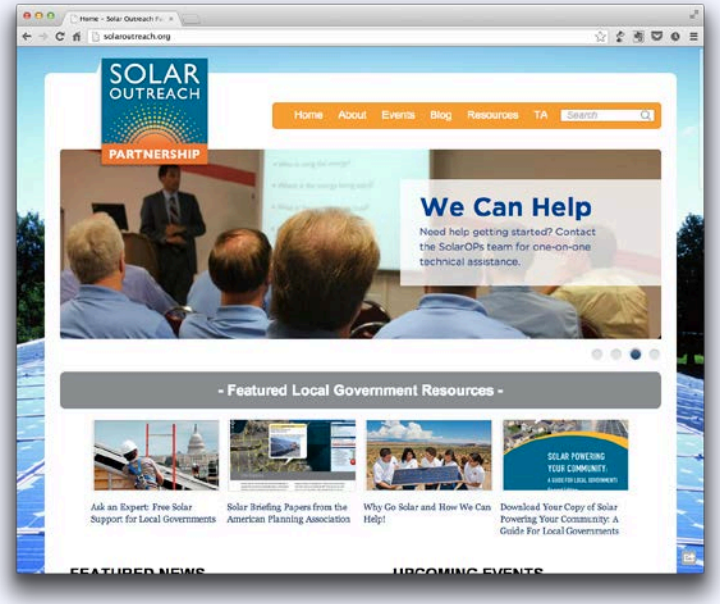
Activity: Next Steps

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

About the SunShot Solar Outreach Partnership

Technical Support

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



www.solaroutreach.org

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

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U.S. Department of Energy